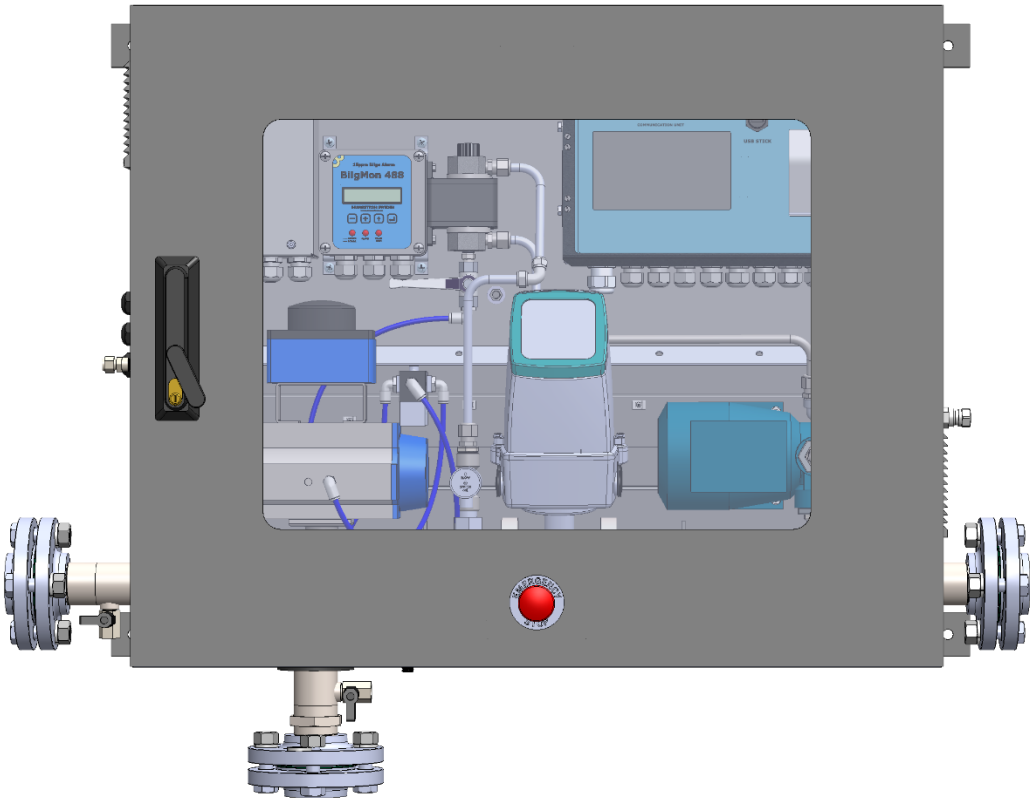
MasterTrack 588®

Bilge discharge monitor and alarm

Models B1 and B1.5



User Manual

Version B
2016-09-23

Content

1 Table of validity

The following table describes the software and hardware versions on which this manual was based.

User Manual version	Software version	Processor PCB	I/O PCB	Power connection box
A	1.02	CTUP_G	MTPOW_C	MTHV_D

2 Specifications

Oily water separator discharge water

Flow rate Model B1 (1", DN25 pipes) Model B1.5 (1.5", DN40 pipes)	 0.4 – 3.6 m^3/h 0.6 – 40 m^3/h
Maximum pressure Note: must be at least ~1 bar lower than *fresh water inlet* pressure.	3 Bar *
Maximum overboard oil content, MEPC.107(49)	15 ppm

Fresh water inlet
Used for automatic cleaning of optical sensor

Maximum pressure Note: must be at least ~1 bar higher than *Oily water separator discharge water* pressure.	6 Bar
Connect with pipe dimension	OD 12 mm

Compressed air inlet

Minimum / nominal / maximum pressure	5 / 6 / 12.5 Bar
Connect with pipe dimension	OD 8 mm

Electrical

Supply voltage	230 VAC $^{+}$/- 10%, 50-60 Hz 6A Fuse

* Pressure tested at 9 bar during the standard factory test. This will ensure that no leaks are present.

3 Overview

MasterTrack 588® is a bilge discharge monitor and alarm offering extra protection against excessive oil discharge from ships. Water with an oil content of less than 15 ppm is sent overboard. The amount of water pumped overboard together with the time and GPS coordinate is logged every 10 minutes. OBV close/open, alarms and door open/closed is also logged. The total amount of water pumped overboard and the total amount rejected is shown on the main screen (resettable).
The 15 ppm bilge alarm, *BilgMon 488®*, the *over board valve* (OBV) and the *communication unit*, which logs all important data both electronically and on paper (option), are all enclosed in a locked cabinet. MasterTrack 588® is delivered with 3 high security keys.
Figure 1 shows the inputs and outputs on the outside of the system. *Figure 2* and *Figure 3* show the internal parts of the system for model B1.5 and B1 respectively.

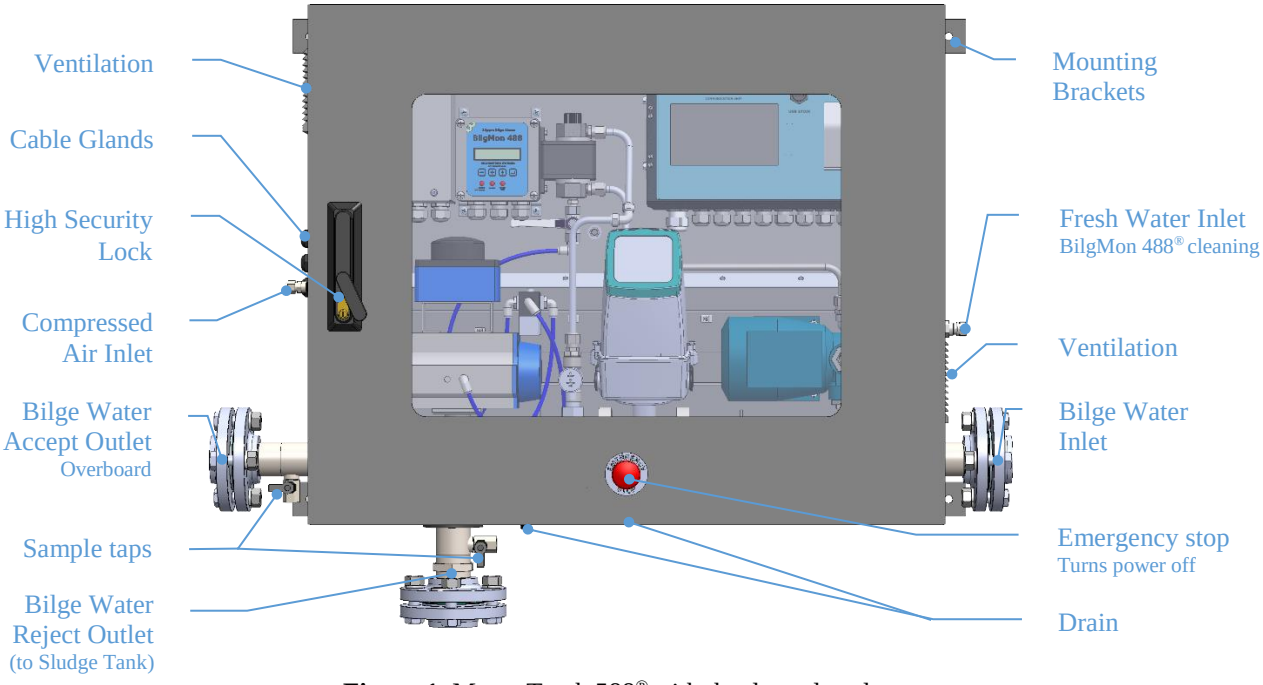


Figure 1. MasterTrack 588® with the door closed.

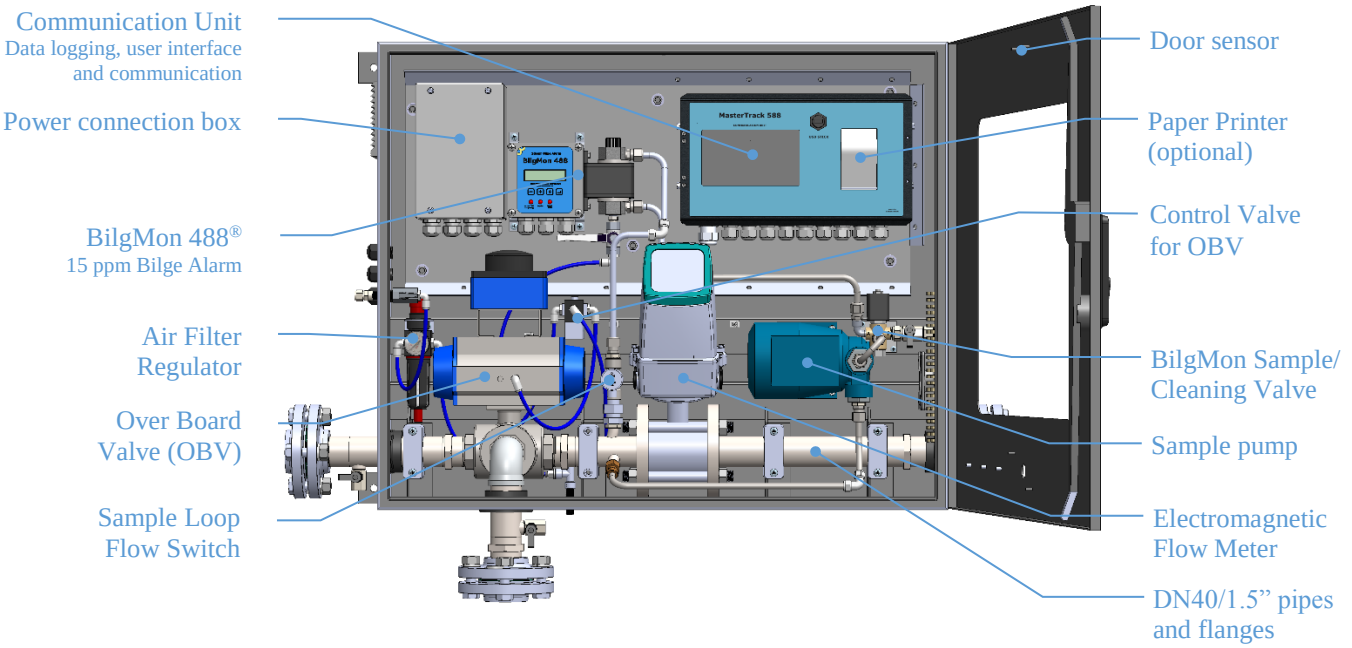


Figure 2. MasterTrack 588® (B1.5) with the door open.

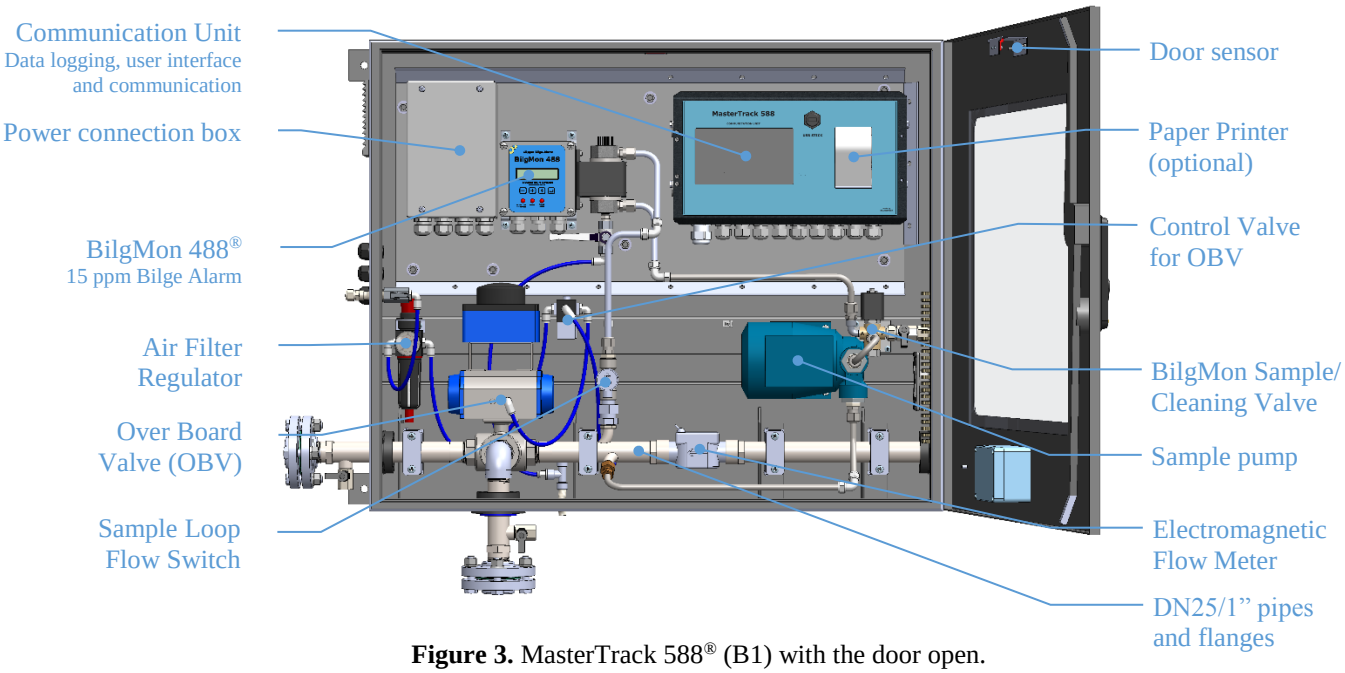
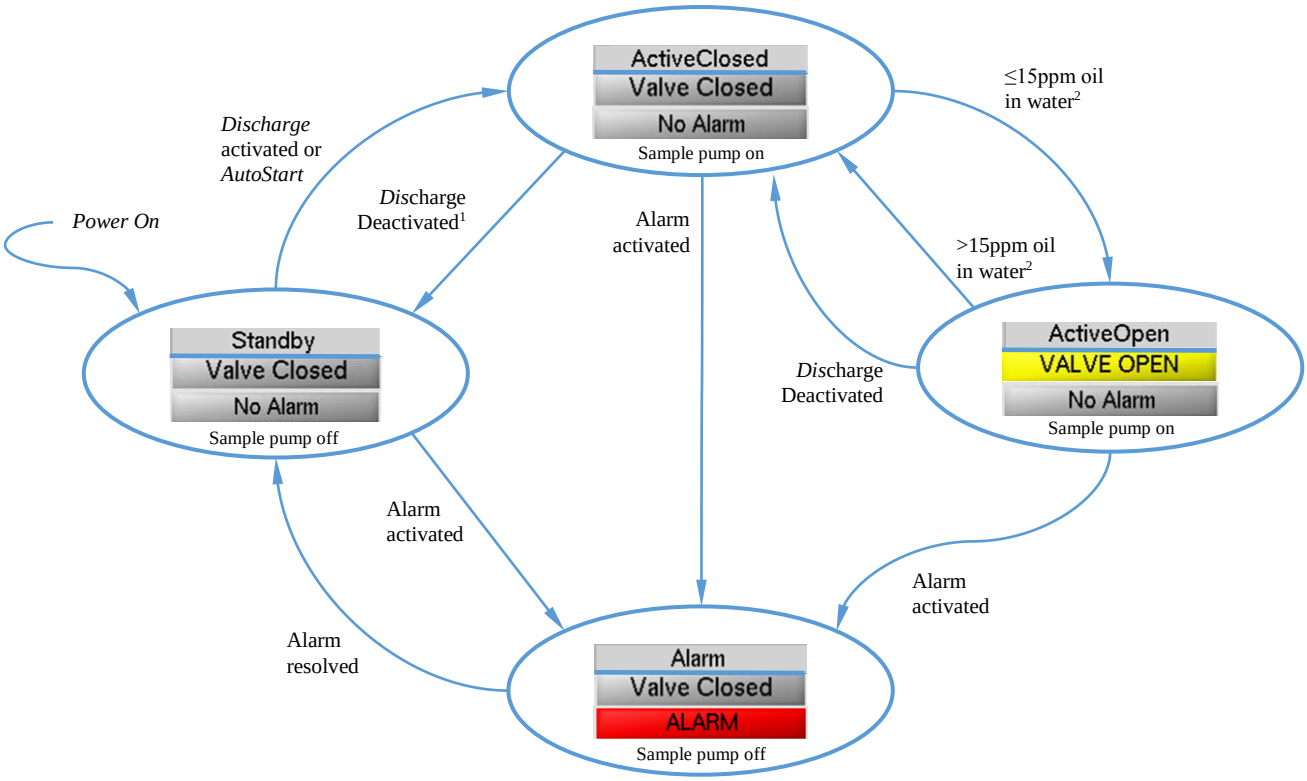
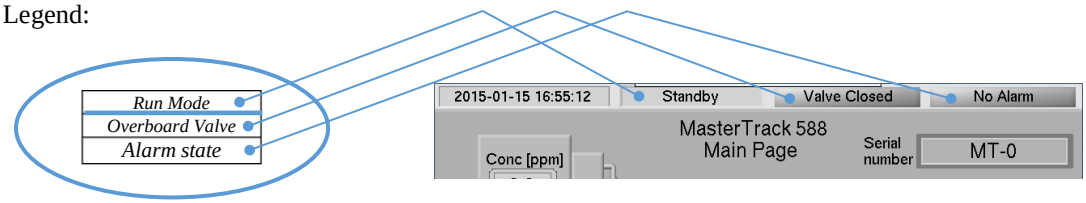


Figure 3. MasterTrack 588® (B1) with the door open.



Legend:



Discharge: Discharge Input 1 or 2
AutoStart: Automatical start when flow is detected, see *chapter 5.6.7 Settings – Autostart, page 24*.
Valve: Overboard Valve

[1]The system remains in *ActiveClosed* for another 15 minutes after the *Discharge input* deactivates. The discharge summery *Total Discharge* is logged when the system goes to Standby.

Figure 4. State diagram showing the operation of MasterTrack 588®.

Figure 4 shows a state diagram, which depicts the operation of MasterTrack 588®. The overboard valve (OBV) is closed in the *Standby* state. The system is activated with electrical inputs *Discharge 1* or *Discharge 2* (state *ActicveClosed*). The system can also be automatically activated when flow is detected by enabling AutoStart (*see chapter 5.6.7* Settings – Autostart, *page 24*). The sample pump starts and OBV opens (allowing bilge water overboard) as soon as the oil content is <15 ppm (state *ActievOpen*). OBV is closed if the oil content is >15 ppm. The Alarm will activate (state *Alarm*) if oil content >15 ppm for more than 60 sec (and the BilgeMon 488® sensor will be automatically cleaned). OBV is closed and the sample pumps is stopped in the *Alarm* state. See *chapter 5.4 Active Alarms page 16*, for info about all the alarms.
A summary of the discharge is logged when the system goes to *Standby* state (when discharge inputs have been deactivated for 15 minutes). The summery includes Total water overboard (overall total in m^3) and the total discharge for the last session in litres with the average oil content. See *Table 2, page 20*, for a complete list of events that are logged electronically and on paper (option).

4 Installation and Commissioning

See *chapter 8 General Arrangement Drawing, page 36*.
See *chapter 9 Electrical Drawings page 37*.
See *chapter 10 Mechanical Drawings, page 41* for dimensions etc.

4.1 Outlets must be routed above MasterTrack 588®

Unless the sludge tank and the overboard outlets are located higher up than MasterTrack 588®, the outlet piping should be routed to a level above the MasterTrack 588® and fitted with vacuum breakers at the highest point to ensure that the flow meter and the bilge alarm (BilgMon 488®) are always fully flooded. This will avoid air pockets inside MasterTrack 588®. See *chapter 8 General Arrangement Drawing, page 36*.

5 Communication Unit

The *Communication Unit* is the main computer, which handles I/O, data logging (recorded data) and the user interface.

Figure 5. Front panel of the MasterTrack 588® Communication Unit.

5.1 Using the touch screen

5.1.1 Editing numerical parameters

Parameters with white background are set values and can be changed. Press the parameter with the tip off your finger and a numerical keyboard will appear. The parameter name and value is displayed on the numerical keyboard.

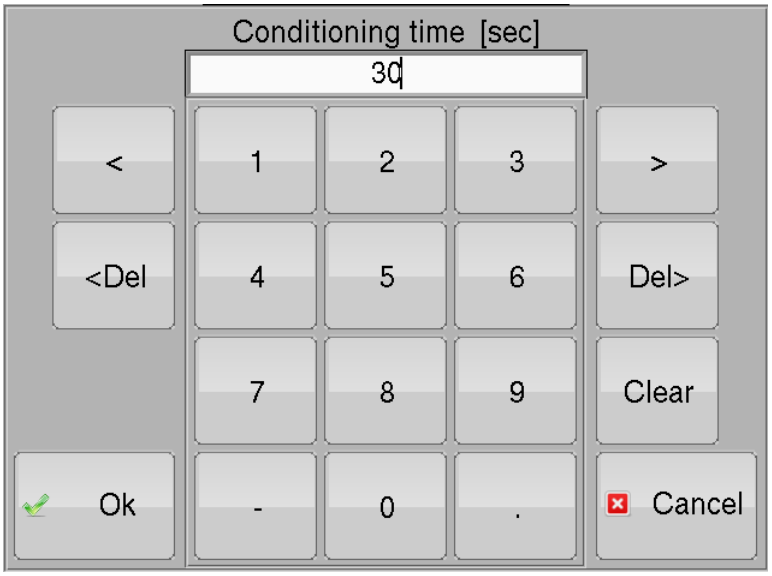


Figure 6. This example shows *Conditioning time* being set to 30 sec.

After the value is changed, save by pressing *Ok* or cancel without saving by pressing *Cancel*.

5.1.2 Keys

All keys, if not greyed, can be pressed. The function of a key is explained by text above or in the key. Different actions and feedback is taken by the computer depending on which key that is pressed. The key can change the displayed page, open a submenu, open a drop down list or simply change colour to yellow as an indication of activation.

Figure 7. Example showing a button that can be pressed to toggle between YES and NO.

5.1.3 Password

Some operations requires a password. Enter the password and select "Admin" for administrator level or "User" for lower user level.

Figure 8. The password dialogue box.

5.2 Top of Screen indicators

The following important information is always show on top of the screen.

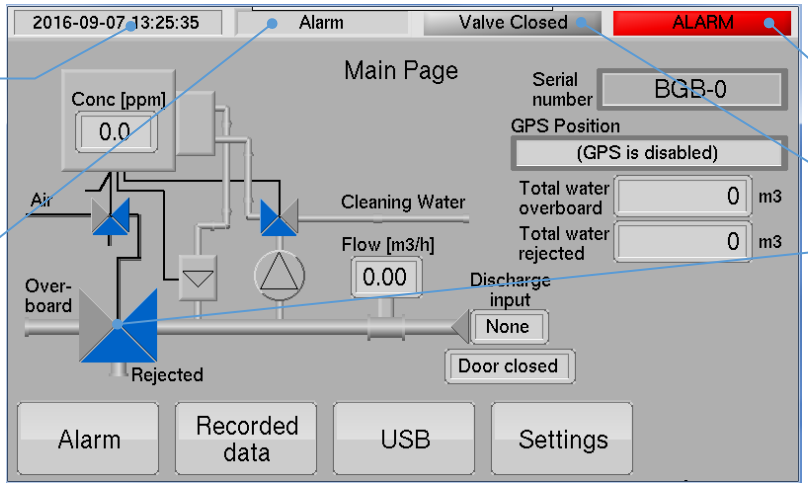


Figure 9. Top of screen indicators.

Run State:

Standby	Standby. Ready for start if a discharge input (or Autostart) goes active.
ActiveOpen	ActiveOpen. Active and discharging water overboard.
ActiveClosed	ActiveClosed. Active but the overboard valve is closed (discharged water goes to sludge tank).
Alarm	One or more alarms are active. Overboard valve is closed.

Overboard valve status:

Valve Closed	Overboard valve is closed (discharged water goes to sludge tank).
Valve Closed / Valve Closed	Overboard valve is closed according to feedback, but it should be open. Flashing between grey and black background.
VALVE OPEN	Overboard valve is open. Discharged water goes overboard.
VALVE OPEN / VALVE OPEN	Overboard valve is open according to feedback, but it should be closed. Flashing between yellow and black background.

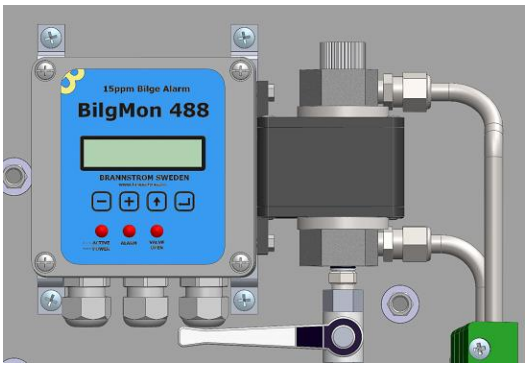
Alarm status:

ALARM / ALARM	At least one alarm is active. Flashing between red and black. The buzzer is sounding. The alarm relay is open circuit. The alarm relay is also open circuit when MasterTrack 588® is powered off.
ALARM	All active alarms have been reset. The buzzer is off. The alarm relay is closed circuit.
No Alarm	No alarm. The buzzer is off. The alarm relay is closed circuit.

5.2.1 Changing Date and Time

The date and time is controlled by BilgMon 488®. Changing the local date and time is possible, but must be done via the user interface of BilgMon 488®. The UTC time (which is also shown in the recorded data) is not possible to change.

Changing local date and time on BilgMon 488®:



Go to *Settings* → *Set Clock* by pressing [+][+][+][+][↵][+][+][+].

Edit the time by pressing [↵], use [+] and [−] to change a number. Goto next digit with [↵].

Press and hold [↵] for 2 seconds to save the new time.

Press [↑] to abort without changing the time.

5.3 Main Page

The *Main Page* consists of a block diagram with all major components in the system. The state of the valves, flow switch, flow meter and the measured oil content is shown. *Figure 2 (page 7)* and *Figure 3* shows where these components are placed physically.

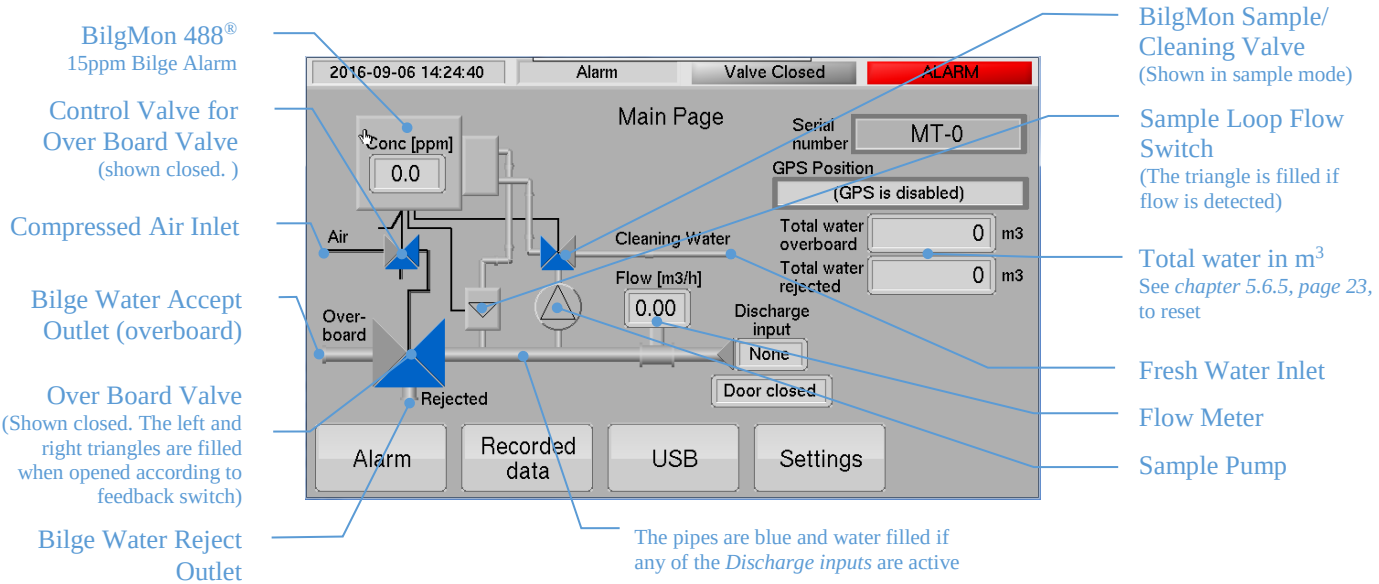


Figure 10. *Main Page*.

5.4 Active Alarms page

The *Active Alarms* page shows all alarms that are ACTIVE or RESET. Cleared alarms are not shown. **It is not possible to set the system in active mode and discharge bilge water unless all alarms have been cleared**.

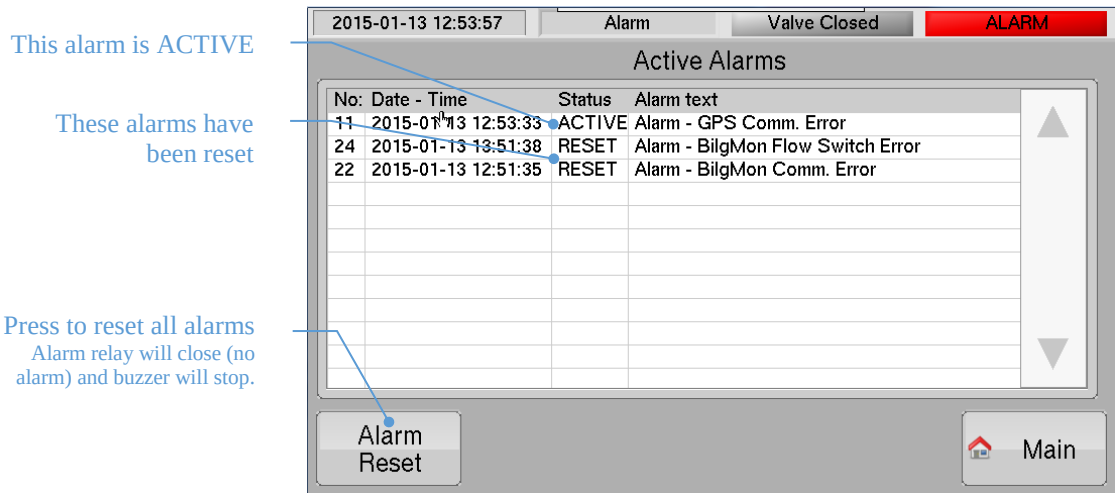


Figure 11. *Active Alarms* page.

Alarm status	Top of screen indicator	Alarm relay contact	Buzzer
At least one alarm is ACTIVE	ALARM / ALARM (Flashing between red/black)	Open circuit	On
All active alarms have been RESET	ALARM	Closed circuit	Off
No alarms	No Alarm	Closed circuit	Off
System is powered off	-	Open circuit	Off

Table 1. Alarm status and Alarm relay states.

See below for an explanation of the cause of each alarm.

5.4.1 Alarm – GPS Comm. Error (11)

Valid GPS (NMEA 0183) messages are not being received by the *Communication Unit*. Check that the GPS has been setup to output the RMC sentence. Check the signal cable *Cb3 (note: Not Cb03)* in *chapter 9, page 37.*

Set *GPS* to *off* through the settings screen, see *chapter 5.6.3 Settings – GPS, page 22,* if you want to run the system without a GPS.

5.4.2 Alarm – OBV open No Feedback (16)

The Overboard Valve (OBV) should be open, but it is closed according to sensor feedback. Check that pressurised air is available and that the manual air valve is open (placed on the inside, at the air connection). Also check that the *Control Valve for OBV* is working, see *Figure 2, page 7.*

5.4.3 Alarm – OBV Close No Feedback (17)

The Overboard Valve (OBV) should be closed, but it is open according to sensor feedback. Check that the *Control Valve for OBV* is not manually forced open (by turning a setscrew on the *Control Valve for OBV*).

5.4.4 Alarm – Door Open (18)

The MasterTrack 588® door is open. Close the door to clear the alarm. Set *Door Alarm* to *NO* through the settings screen (see *chapter 5.6.4 Settings – Door, page 22*) if you want to be able to run the system with the door open.

5.4.5 Alarm – Input Supply Fuse (19)

Check fuse F1 inside Communication Unit, see *chapter 7.4 Fuses, page 35.*

5.4.6 Alarm – Invalid Discharge Input (Both) (20)

Both discharge input 1 and discharge input 2 is active. Only one should be active at a time.

5.4.7 Alarm – BilgMon High Oil Content (21)

This alarm goes active if the oil content is above the alarm limit (default: 15 ppm) for a certain time (default: 120 sec). The alarm limit and the time delay can be changed on the BilgMon 488® unit (Settings -> Alarm settings, see instruction manual for BilgMon 488®).

5.4.8 Alarm – BilgMon Comm. Error (22)

The communication between BilgMon 488® and the Communication Unit is not working. Check that BilgMon 488® is powered. Check the communication cable Cb03 *(note: Not Cb3)*, in *chapter 9 Electrical Drawings, page 37.*

If this alarm occurred after installing a new BilgMon 488® unit, make sure it has a serial output (the bottom PCB inside BilgMon 488 should be marked *BILGBASMD* in the lower left corner) and that "Curro mode" is set to "serial 4800 8N1" (Settings -> Curro mode, see instruction manual for BilgMon 488®).

5.4.9 Alarm – BilgMon No Flow (23)

The *Sample Loop Flow Switch*, see *Figure 2, page 7*, does not detect flow in the sample loop even though a *Discharge Input* was active. The LED indicator on the *Sample Loop Flow Switch* is red if no flow is detected and green if flow is detected.

This Alarm can occur if air is trapped in the BilgMon 488® sensor. Carefully unscrew the white cap on top of the BilgMon 488® sensor a few turns in order to let the air out.

5.4.10 Alarm – BilgMon Flow Switch Error (24)

The *Sample Loop Flow Switch* detected flow in the sample loop even though none of the *Discharge Inputs* are active. Check the flow switch in the sample loop. The LED indicator on the *Sample Loop Flow Switch* is red if no flow is detected and green if flow is detected.

5.4.11 Alarm – Printer… (31-39)

Open the lid to the *Communication Unit* by unscrewing two screws. Check if there is paper in the printer and that the lid is properly closed. Check that the three printer cables are properly connected. Printer must be unscrewed with 4 pcs of hexagon head screws (2.5mm tool), in order to access the cables.

The printer can be disabled, see *chapter 5.6.2 Settings – Printer, page 21.*

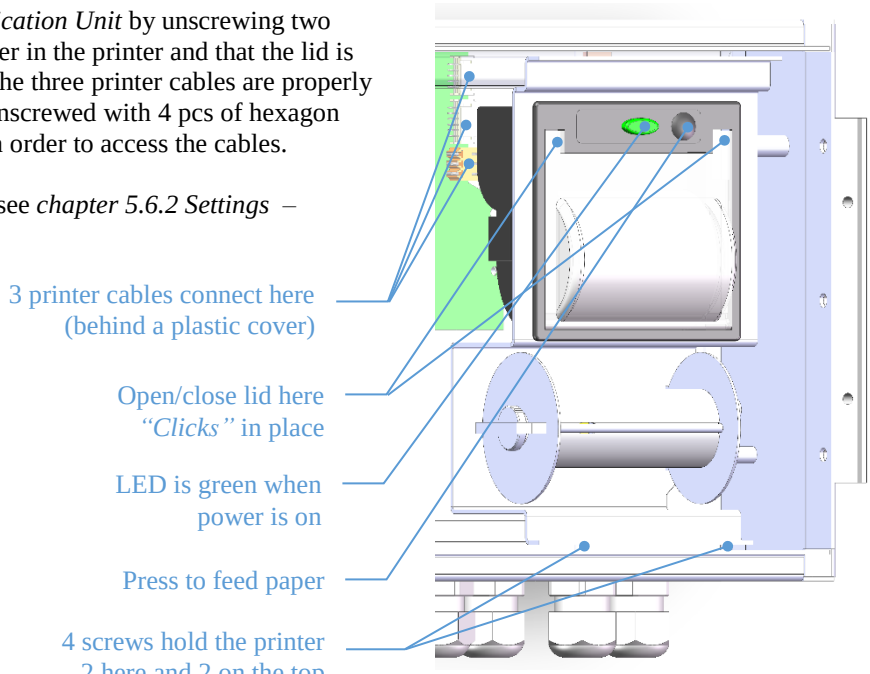


Figure 12. Paper printer.

5.4.12 System – Setup File/Read/Write error (1/2/3)

An error occurred while the computer tried to read/write the stored settings. This error can occur if the system was powered off while the *Communication Unit* was starting up. **The system should never be powered down while loading up.**

Please review *all* settings (some may be corrupted), see *chapter 5.6 Settings Page 21*. When all settings have been reviewed, please edit and save at least one setting. This will force the computer to re-write all settings in the memory and the alarm will be cleared if the problem was resolved.

5.4.13 System – Communication error Computer Power (6)

The communication between the CPU/Display PCB (SP4000_UP) and the bottom PCB (MTPOW) is not working. Open the lid to the *Communication Unit* by unscrewing two screws. Make sure that the flat cable inside the *Communication Unit* is properly mounted with both ends of the cable completely pushed in. If the flat cable is completely pushed in and the alarm has still not been cleared, please follow these steps:

1) Turn off MasterTrack 588®, by pressing *Emergency Stop* on the door.
2) Disconnect the flat cable inside the *Communication Unit* in both ends.
3) Investigate the connectors and the flat cable and make sure that there are no signs of damage.
4) Connect the flat cable again. Make sure to press the connectors all the way in and that both "locking arms" are in the locked position.
5) Turn on MasterTrack 588®, by rotating the *Emergency Stop* on the door.

5.5 Recorded data Page

Go to the *Recorded data* page by pressing [Recorded data] on the Main Page.

All important events are logged and can be viewed from the page *Recorded data*. Recorded data is stored in a non-volatile memory and can hold approximately 3.000.000 events. Optionally a paper printer can also be installed in the computer unit, see *chapter 5.7 Paper Printer (optional), page 27*. The paper printer prints the same information as stored in *Recorded Data. Table 2* on the next page explains all events that are logged in the *Recorded Data* and printed on the paper.

Recorded data can be copied to a USB-memory stick. See *chapter 5.8 Saving data on a USB stick, page 28*.

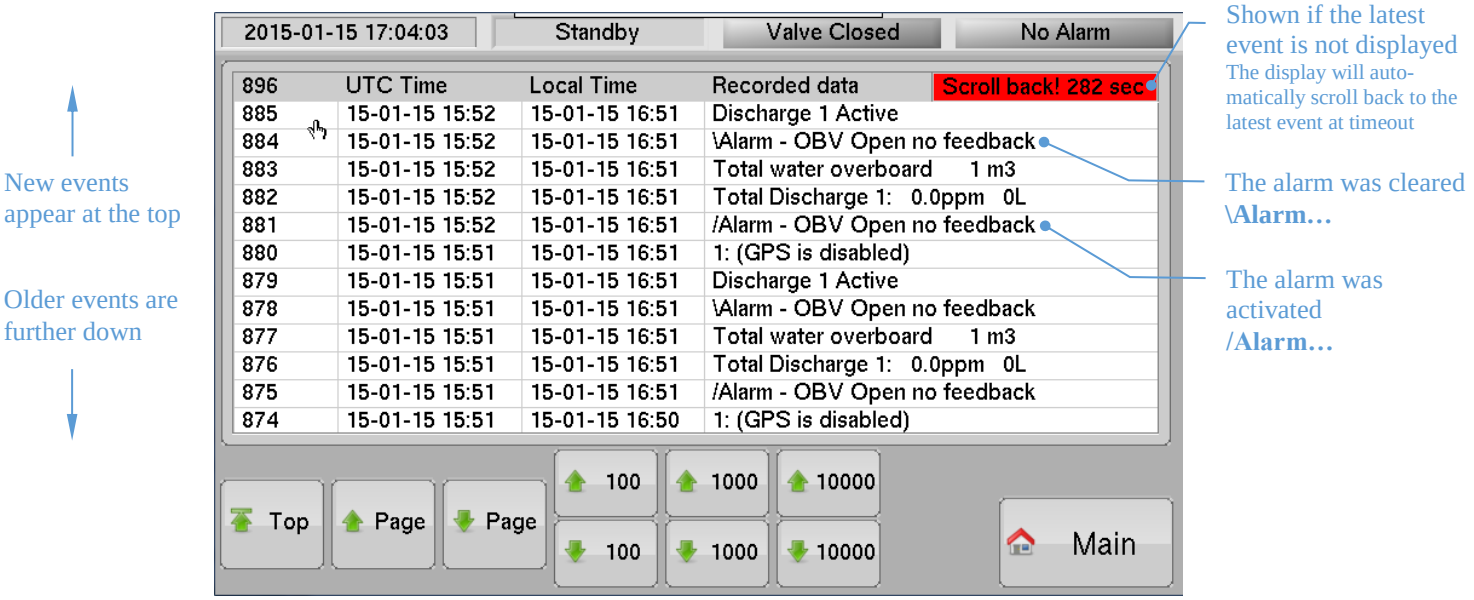


Figure 13. *Recorded Data* page.

Event in Recorded data	Explanation
/Alarm …	An alarm occurred. See Active alarm page for an explanation of the different alarms. System state changed to *Alarm* (See *Figure 4, page 9*).
\Alarm …	An alarm
Power Off. yyyy-mm-dd hh.mm.ss Power On. yyyy-mm-dd hh.mm.ss BilgMon s/n 000A-1873 (00A8) BilgMon Sensor s/n 000B-1815 (00B2) Serial: MT-101, Version: 1.00 Flow meter has = 1.389 [ml/pulse] Conditioning time = 30 [sec] Door Alarm Enabled Paper Printer Enabled GPS Enabled	This event is logged when communication has been established with BilgMon 488® after turning the power on. 1st and 2nd row shows the date and time for power off and power on. 3rd and 4th row shows serial number and software versions for the BilgMon 488® master unit and sensor unit respectively. 5th row shows serial number of the overall system and the software version. Consecutive rows show the current settings.
OBV Opened	The Over Board Valve was opened (according to sensor feedback).
OBV Closed	The Over Board Valve was closed (according to sensor feedback).
Discharge 1 Active 1: 5742.5195N 01158.3775E	Discharge input 1 was activated. System state changed to *Active* (*See Figure 4, page 9*). *
1: 5742.5195N 01158.3775E 1.0ppm 166L	Over Board discharge (from input 1) for the last 10 minutes. Current GPS position: Latitude (57º 42.5195' North) and longitude (011º 58.3775' East). Average oil content in ppm (1.0) and discharged water in litres (166) for the last 10 minutes. System state is *Active* (See *Figure 4, page 9*). *
1: 5742.51N 01158.37E (V) 1.0ppm 166L	Over Board discharge (from input 1) for the last 10 minutes. Current GPS position: Latitude (57º 42.51' North) and longitude (011º 58.37' East). "(V)" means that the GPS has bad reception and reports status=Void, *"Navigation receiver warning".* Average oil content in ppm (1.0) and discharged water in litres (166) for the last 10 minutes. System state is *Active* (See *Figure 4, page 9*). *
1: (GPS disabled) 2.2ppm 166L	Over Board discharge (input 1) for the last 10 minutes. GPS position is not available because GPS is disabled. Average oil content in ppm (2.2) and discharged water in litres (166) for the last 10 minutes. System state is *Active* (See *Figure 4, page 9*). *
Total water overboard 123 m3 Total Discharge 1: 1.5ppm 498L	This event is logged when the discharge input has been deactivated for 15 minutes. 1st row shows Total water overboard (Since the unit was installed). 2nd row shows Total discharge (from input 1) since the event "Discharge 1 Active" was displayed. Average oil content in ppm (1.5) and discharged water in litres (498) for the whole session. *
BilgMon Simulation Enabled	BilgMon 488 entered simulation mode (see instruction manual for BilgMon 488®).
BilgMon Simulation Disabled	BilgMon 488 left simulation mode (see instruction manual for BilgMon 488®).
Flow meter has = 1.389 [ml/pulse] Conditioning time = 30 [sec] Door Alarm Enabled Paper Printer Enabled GPS Enabled	The new setting is logged whenever it is changed by the user.
Door Opened	The MasterTrack 588® door was opened.
Door Closed	The MasterTrack 588® door was closed.
Output test: Pump relay	The sample pump relay was activated via "Output Test" on the settings screen. Relay deactivates automatically after 10 seconds.
Output test: Alarm relay	The Alarm relay was activated via "Output Test" on the settings screen. Relay deactivates automatically after 10 seconds.
Output test: OBV relay	The OBV relay was activated via "Output Test" on the settings screen. Relay deactivates automatically after 10 seconds.
Output test: Extra relay	The Extra relay was activated via "Output Test" on the settings screen. Relay deactivates automatically after 10 seconds.
Output test: Buzzer	The buzzer was activated via "Output Test" on the settings screen. Buzzer deactivates automatically after 10 seconds.
BilgMon Cleaning Started	*BilgMon Sample/Cleaning Valve* switched to cleaning, i.e. the BilgMon sensor is flushed with water.
BilgMon Cleaning Stopped	*BilgMon Sample/Cleaning Valve* switched back to sample.

*Analogous for discharge input 2 (replace "1" with "2" everywhere).

Table 2. Events that occur on the *Recorded data* page and on the printed paper.

5.6 Settings Page

Go to the Settings page by pressing [Settings] on the Main Page.

5.6.1 Settings – General

The general tab shows the serial numbers and software versions of the whole system, the BilgMon 488® Master and BilgMon 488® Sensor. Slide LCD Intensity sideways to change the brightness of the screen.

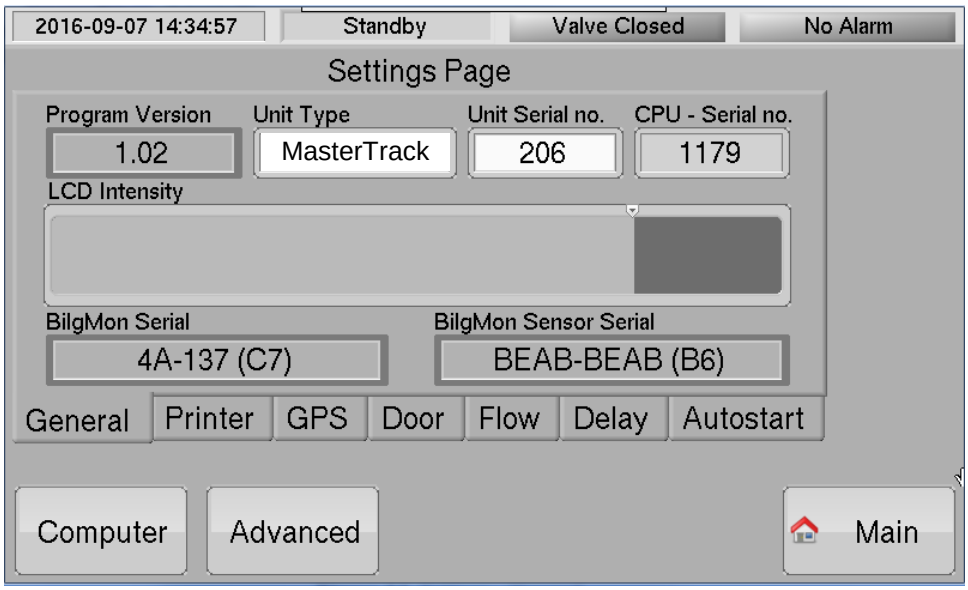


Figure 14. *Settings - General.*

5.6.2 Settings – Printer

Change *PaperPrinter* to *NO* to disable the paper printer (for example if no paper is available). Check the three cables to the printer if any errors are active. The printer must be dismounted with four screws (hexagon socket, size 2.5mm) in order to access the printer cables.

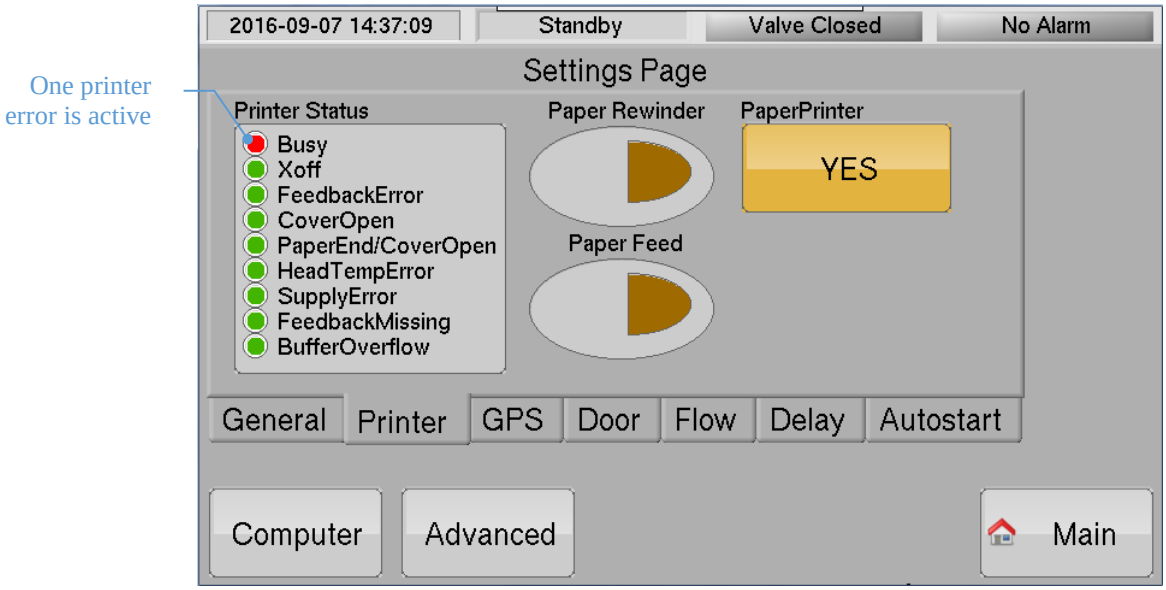


Figure 15. *Settings - Printer.*

5.6.3 Settings – GPS

Change *Auto GPS* to *NO* in order to disable the GPS input. Do this if no GPS is available. The GPS position is shown as latitude and longitude in degrees, minutes and fractions of minutes.

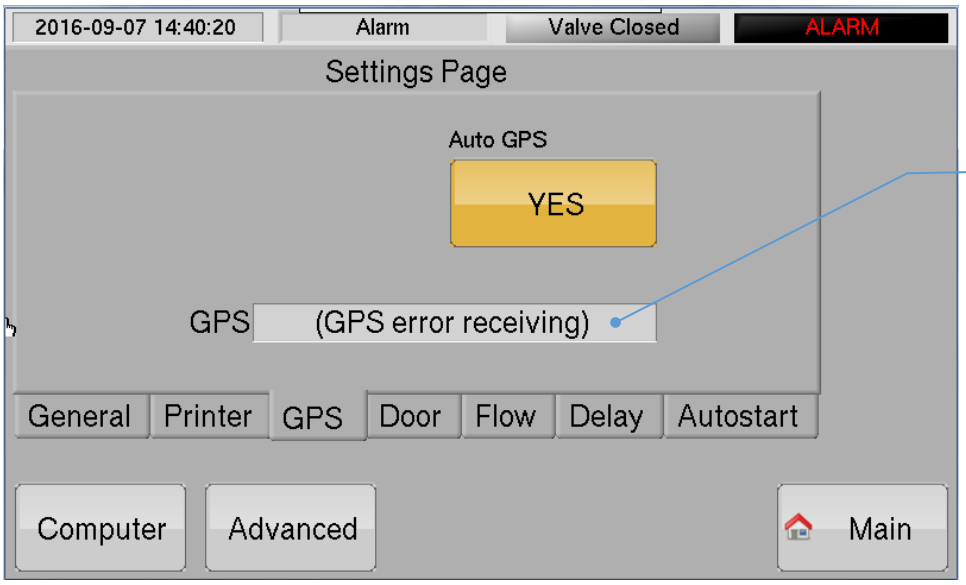


Figure 16. *Settings - GPS.*

5.6.4 Settings – Door

Change *Door Alarm* to *NO* in order to disable the door alarm. *Door opened/closed* will be logged in recorded data even if the *Door Alarm* is disabled.

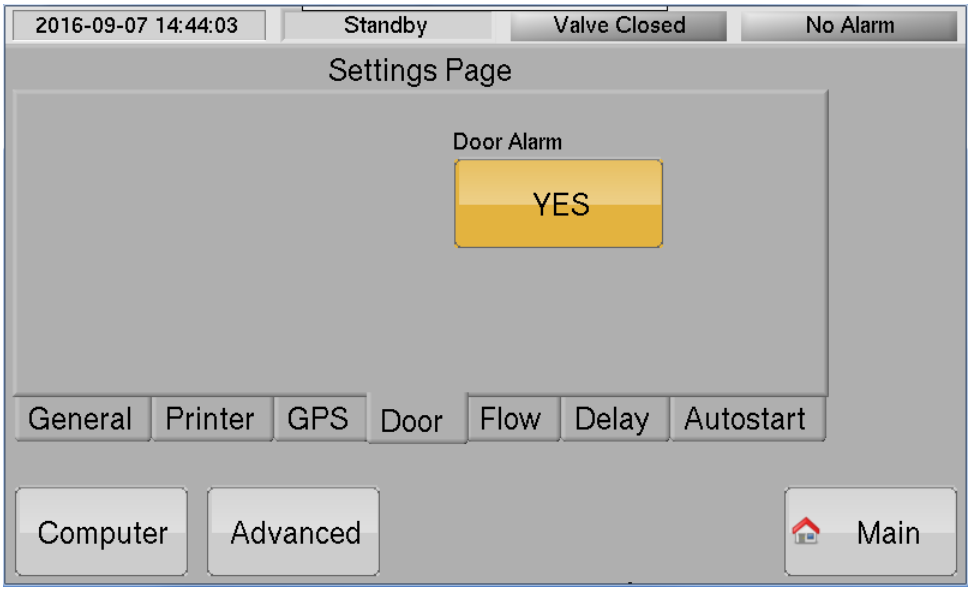


Figure 17. *Settings - Door.*

5.6.5 Settings – Flow

Here you can change the calibration value for the flow meter. Press "Clear Total water overboard" in order to clear both "Total water overboard" and "Total water rejected" on the main screen.

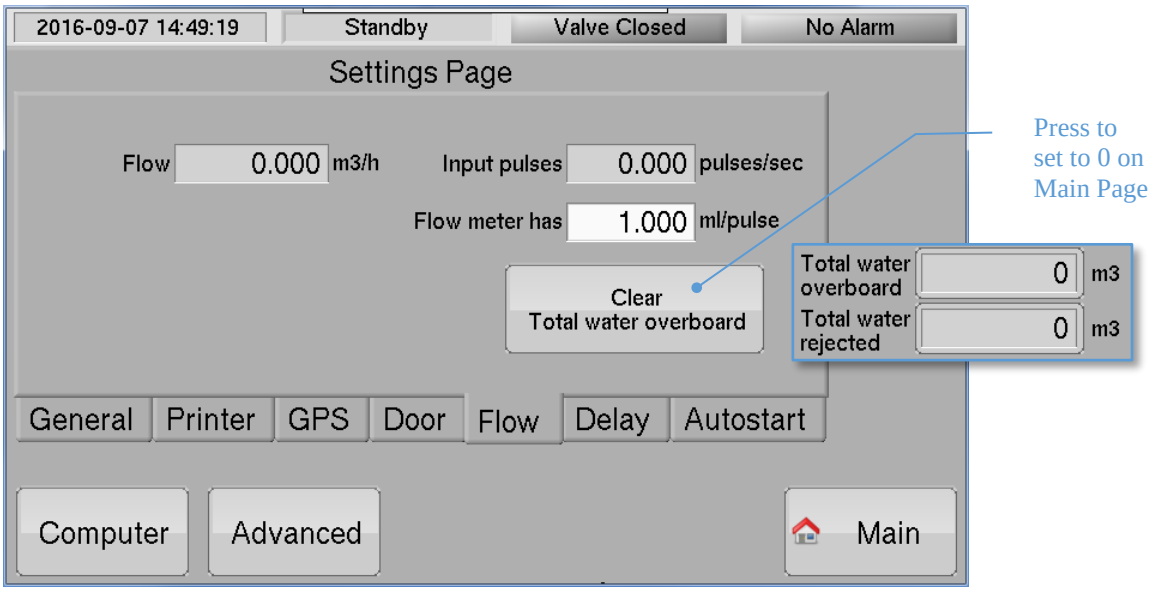


Figure 18. *Settings – Flow*.

5.6.6 Settings – Delay

Conditioning time is an extra delay when going from *Standby* to *Active* mode in order to allow the water to fill all pipes after the separator pump has started.

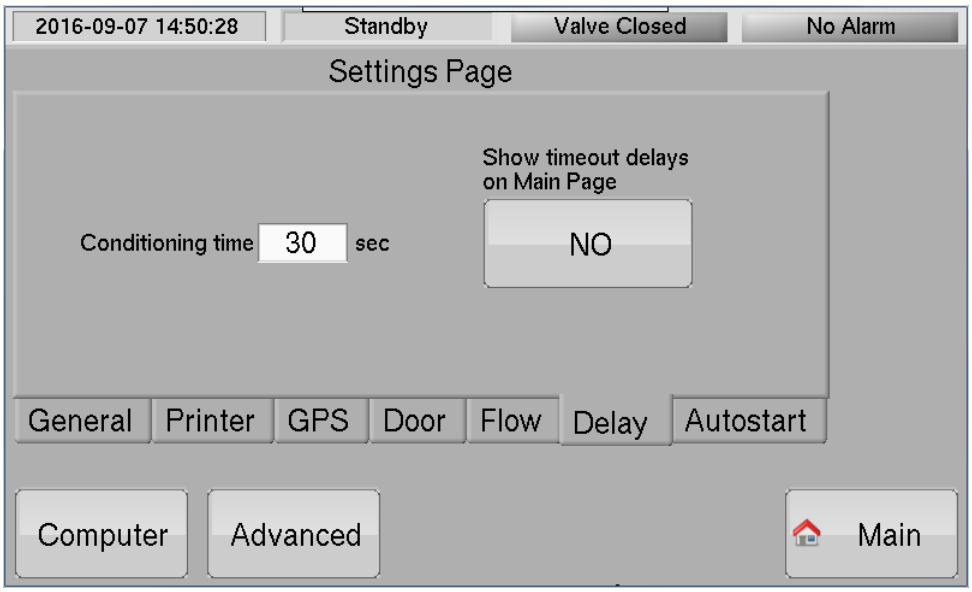


Figure 19. *Settings – Delay*.

5.6.7 Settings – Autostart

The system is normally started with the electrical input *Discharge input 1* or *2*. The system can also be started automatically when flow is detected by setting *Autostart Enabled* to *ON*. The *Austorstart limit* and *delay* can be changed by the user. Discharge, which is started by autostart, is registered as Discharge input 1.

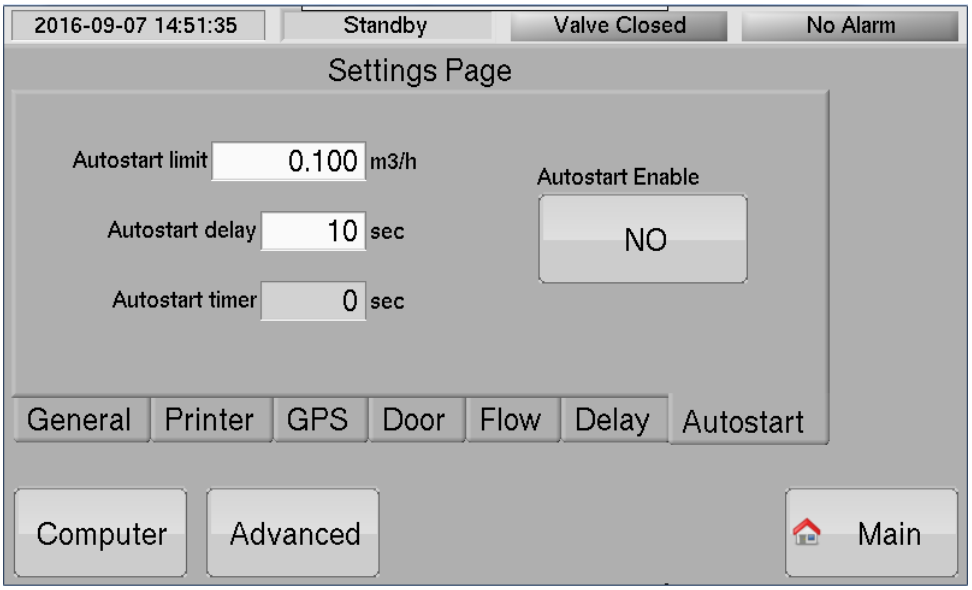


Figure 20. *Settings – Autostart.*

5.6.8 Settings – Computer

First press Settings on the *Main Page* and then press Computer

5.6.9 Settings – Computer – USB

Use this menu to upgrade the software of the unit. Put the software on a USB stick and insert it into the *Communication Unit*.

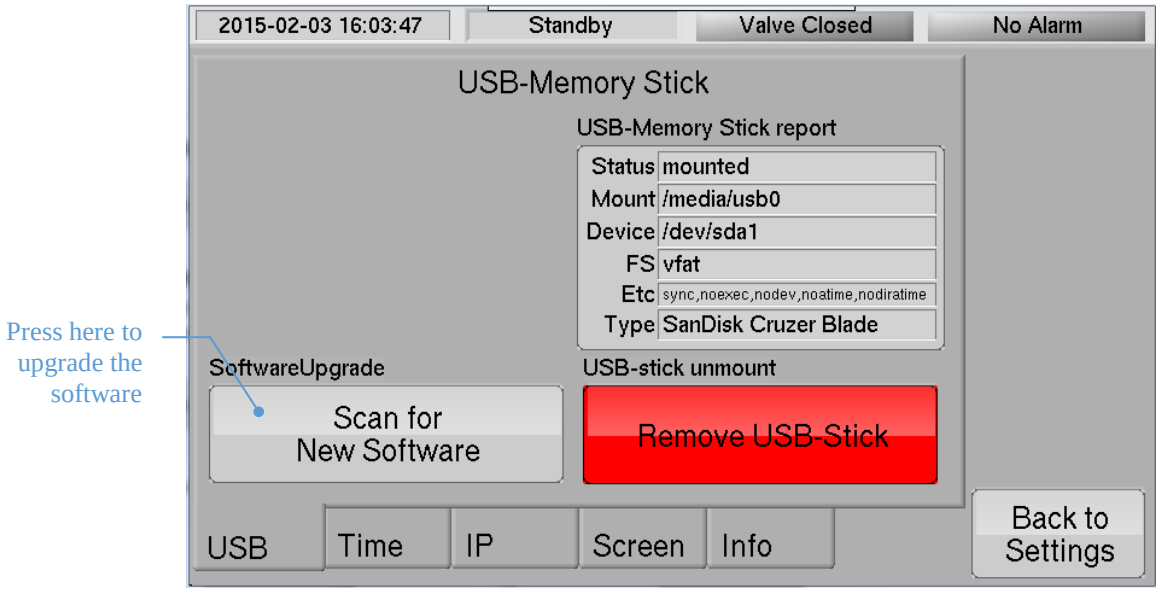


Figure 21. Menu for upgrade the software.

5.6.10 Settings – Advanced

Most users will not use the *Advanced* menu. *Settings - Advanced - MT_power – I/O & Test* is however useful in order to troubleshoot the inputs and the relay outputs.

First press Settings on the Main Page and then press Advanced

A very simple password is required in order to enter the *Advanced* menu. The password is 2.

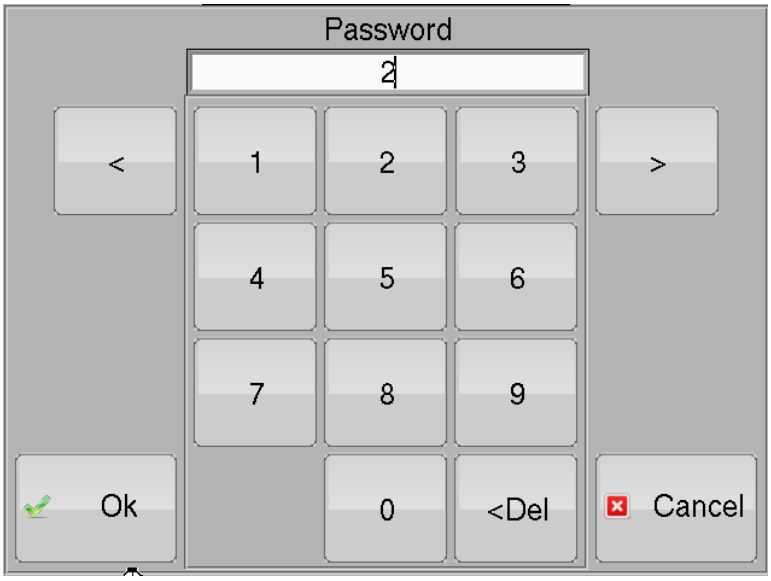


Figure 22. Enter password *2* to enter Settings – Advanced.

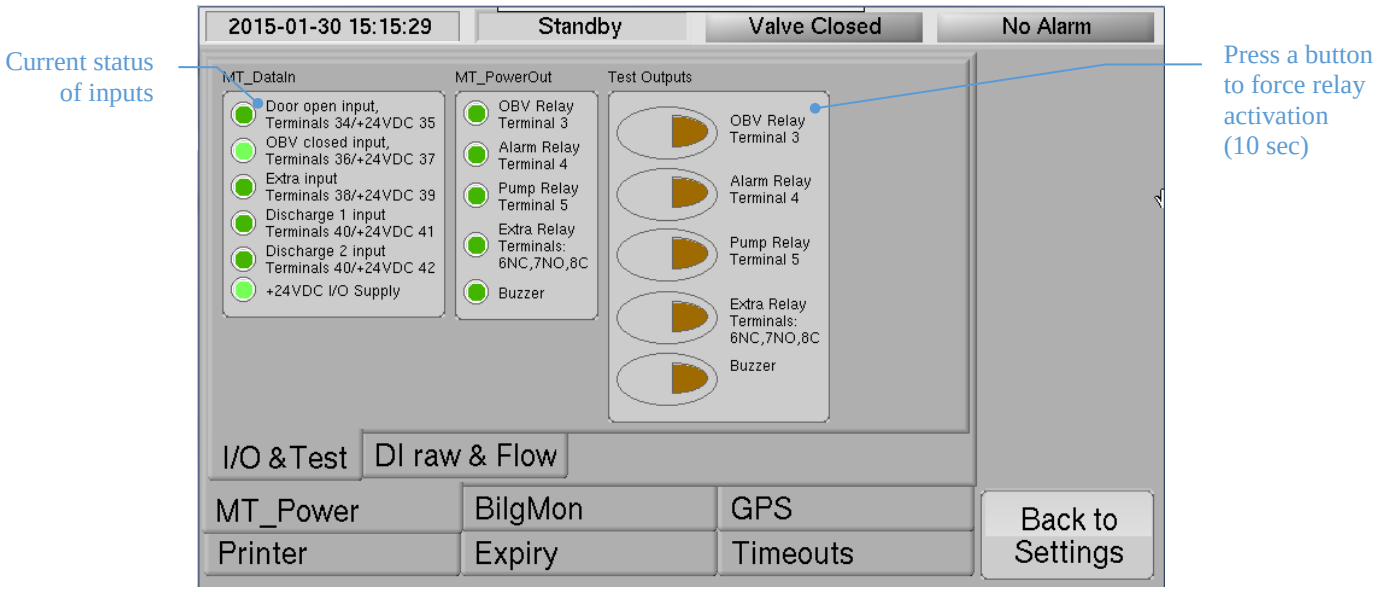


Figure 23. Settings – Advanced – MT_Power – I/O & Test:
Use this menu to see the state of the inputs and to test the relay outputs.

5.7 Paper Printer (optional)

The same information that is stored in the *Recorded data*, is also printed on the paper printer. The paper travels downwards when printed so the latest printout is found on the top of the paper.

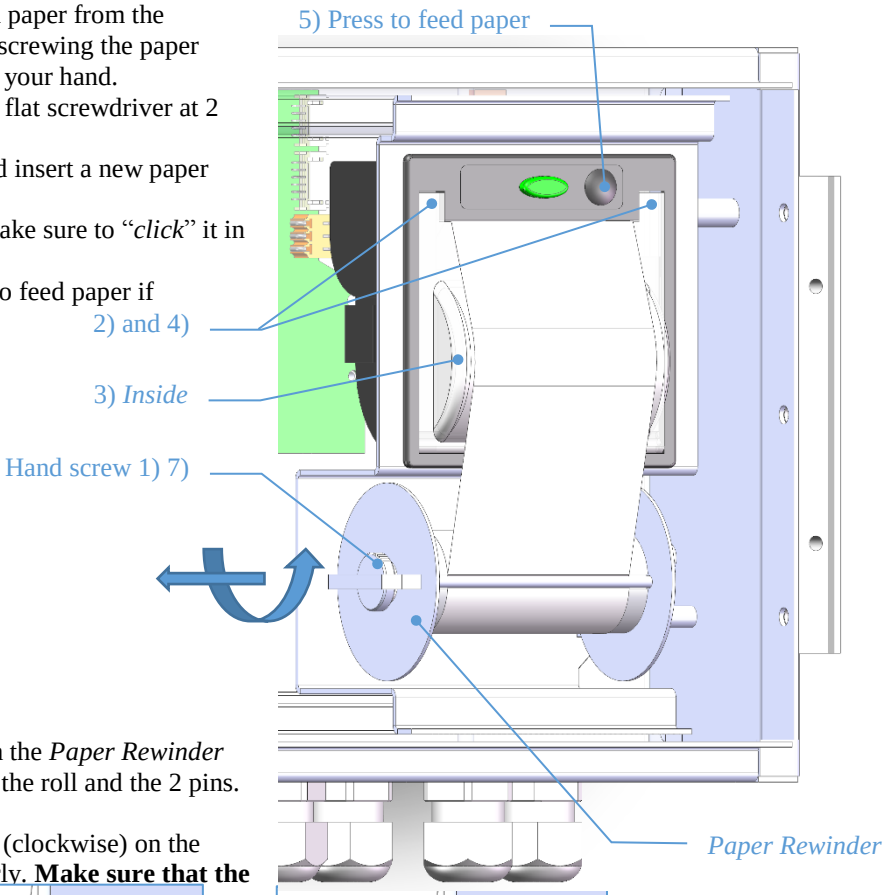
Most events are printed on two lines. The first line contains line number, UTC time and local time in brackets. The second line (below the first) shows the actual event (for example */Alarm – Door Open*). All the possible events are shown in **Analogous for* discharge input 2 (replace "1" with "2" everywhere).

Table 2, *page 20*.

5.7.1 Changing printer paper

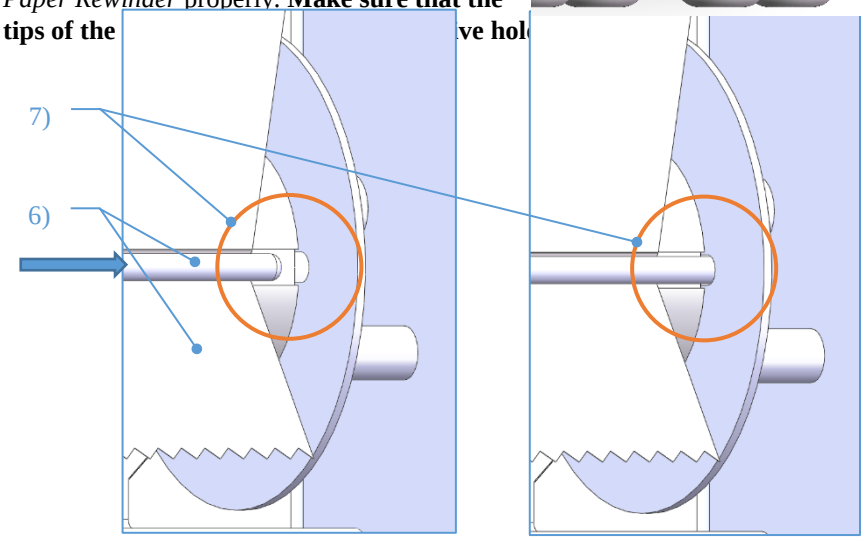
Alarm – Printer Paper End/Cover Open is active if there is no paper left or if the lid to the paper roll is not properly closed. Follow these steps in order to change the paper roll:

1) Remove the old printed paper from the *Paper Rewinder*, by unscrewing the paper holder completely with your hand.
2) Open the lid by using a flat screwdriver at 2 points.
3) Remove the old roll and insert a new paper roll.
4) Close the printer lid. Make sure to "*click*" it in place properly.
5) Press the black button to feed paper if necessary.



6) Fasten the new paper in the *Paper Rewinder* by jamming it between the roll and the 2 pins.

7) Hand tighten the screw (clockwise) on the *Paper Rewinder* properly. **Make sure that the tips of the ve hol**



5.8 Saving data on a USB stick

The recorded data is stored in a non-volatile memory and can hold approximately 3.000.000 events.

The recorded data and/or the settings can be copied to a USB memory stick. Use a USB stick with a Windows FAT32 file system (most sticks are preformatted with FAT32).

1) Insert a USB memory stick.

1) Go to the USB page by pressing  on the Main Page.

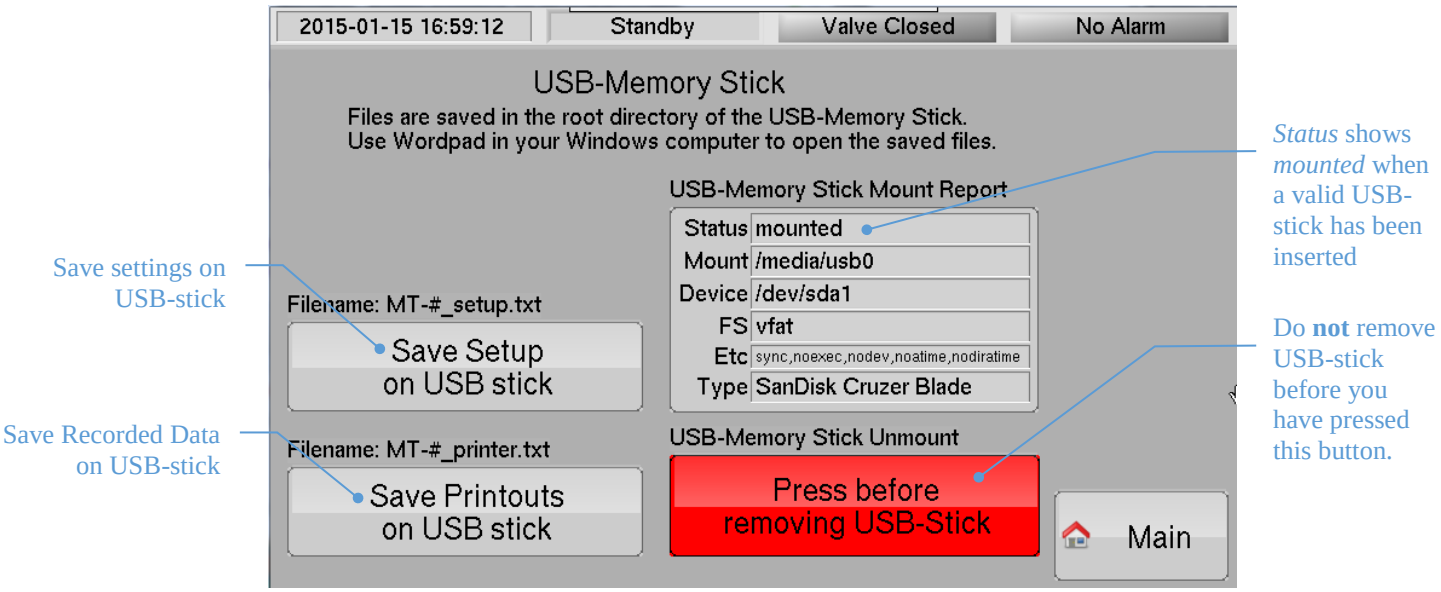


Figure 24. Screen as shown when a valid USB memory stick has been inserted.

5.9 Connecting a GPS

The GPS should follow the *NMEA 0183* standard (version 2.0-3.0). The GPS can be connected according to the *NMEA 0183* standard or via *RS-422*. *RS-422* is recommended since it is less susceptible to noise. Connect the GPS to the terminals specified for cable Cb3, see *chapter 9 Electrical Drawings page 37*. **The GPS most be setup so that it outputs the RMC sentence.** Do not forget to enable the GPS input via the *Settings page* after connecting the GPS, see *chapter 5.6.3 Settings – GPS, page 22*.

5.9.1 Connecting a GPS according to NMEA 0183 standard

The red termination switch should be set to the right (termination disabled), see *Figure 25*. Connect the GPS cable to the NMEA IN terminals marked *A* and *B*. The shield of the cable can be connected to the terminal marked *GND_B* (the shield should only be connected on one end of the cable).

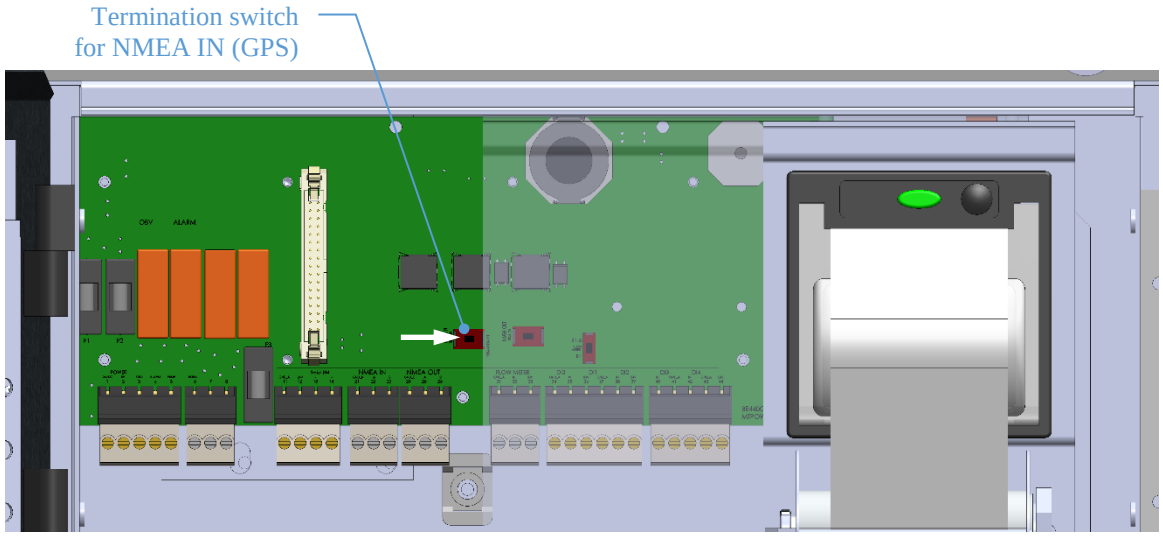


Figure 25. RS-422 termination disabled (switch set to the right).

5.9.2 Connecting a GPS via RS-422

The red termination switch determines if the RS-422 signal is terminated or not, see *Figure 25* and *Figure 26*. Termination should only be enabled if MasterTrack 588® is the last (or only) NMEA receiver connected to the GPS via RS-422, see *Figure 27*.
Connect the RS-422 cable to the NMEA IN (GPS) terminals marked *A* and *B*. The shield of the cable can be connected to the terminal marked *GND_B* (the shield should only be connected on one end of the cable).

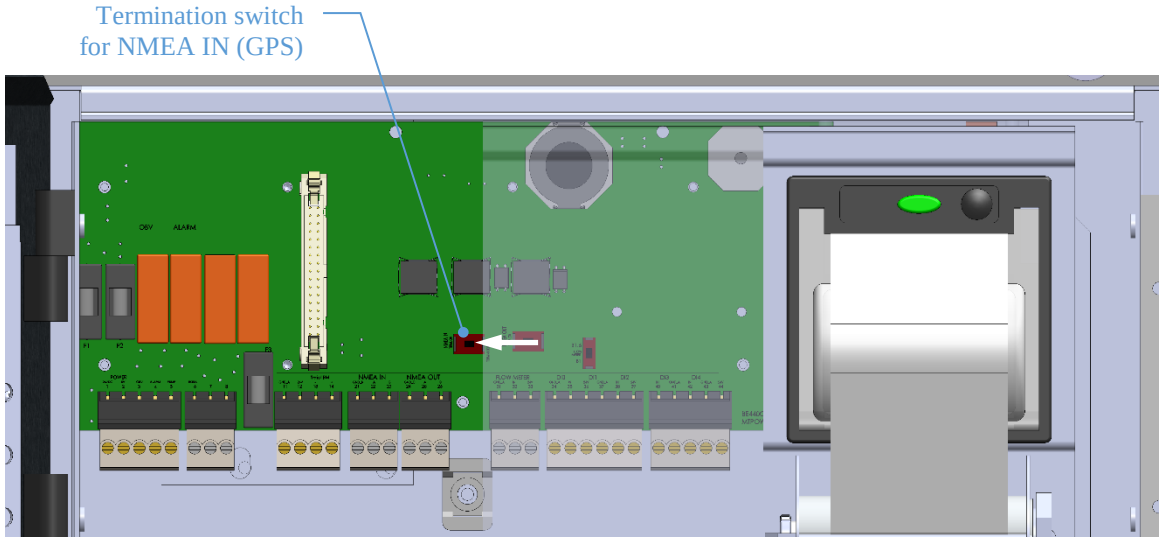


Figure 26. RS-422 termination enabled (switch set to the left).

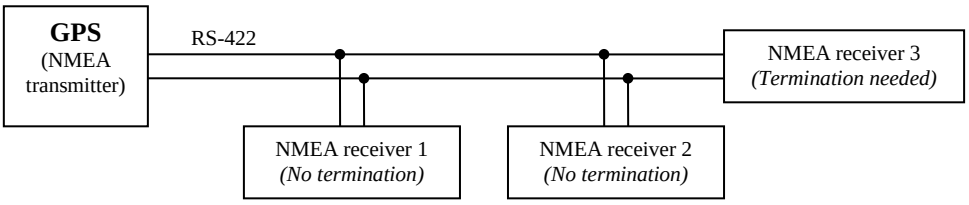


Figure 27. Termination should only be used by the last (or only) NMEA receiver.

6 Forcing the Overboard Valve (OBV) open

In an emergency, it is possible to force the Overboard Valve (OBV) to open. Use a flat screwdriver and turn the screw on the *Control Valve for OBV* 90º clockwise.
NOTE: Instrument air must be available for this to work. The communication unit will log that OBV was opened and the alarm will activate.

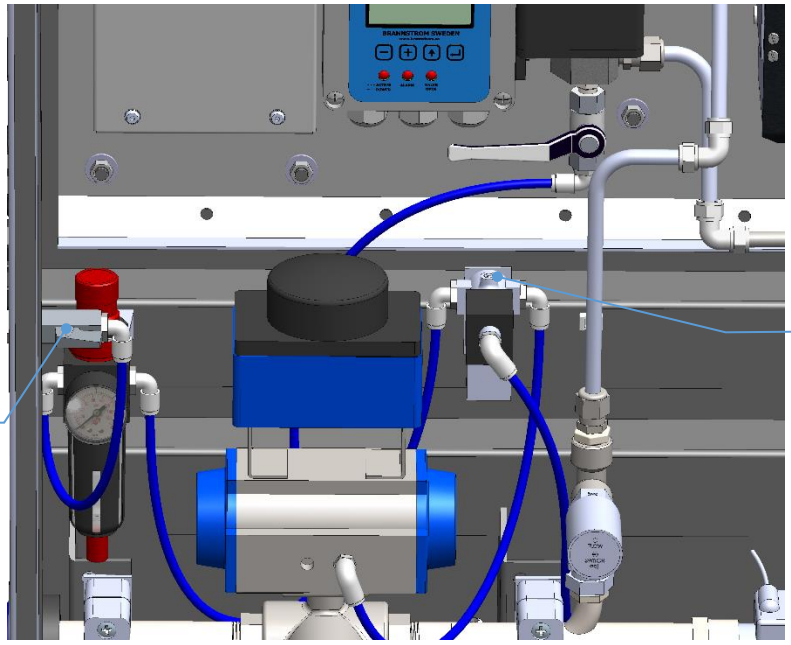


Figure 28. Turn screw to force OBV to open.

7 Troubleshooting

7.1 Resolving Alarms

Chapter 5.4 Active Alarms page 16 explains the causes of alarms and how to resolve them.

7.2 Relay outputs

The relays can be tested (forced active) by going to the menu *Settings - Advanced - MT_power – I/O & Test*, see *5.6.10 Settings – Advanced, page 26*. This menu will also show the current status of the inputs (Door and OBV sensors).

7.3 Incorrect flow

7.3.1 Model B1

Is the flow shown on the screen 0 or seems incorrect?

- Check that the cable to the flow meter (see Cb05, *chapter 9 Electrical Drawings*) is connected and not damaged.
- Check that the switch (only on circuit board MTPOW with version C or later) inside the communication unit is set downwards. See *Figure 30*.
- Check the indicator LED on the flow meter. It can be either RED or GREEN (no light = no power).
    - GREEN light continuously on -> No flow detected.
    - GREEN light flashing -> Flow detected (faster flashing = higher flow rate).
    - RED light (one flash every 2 sec) -> No water detected.
    - RED light (groups of 2-4 flashes, 2 sec apart) -> Error (contact distributor for technical support).

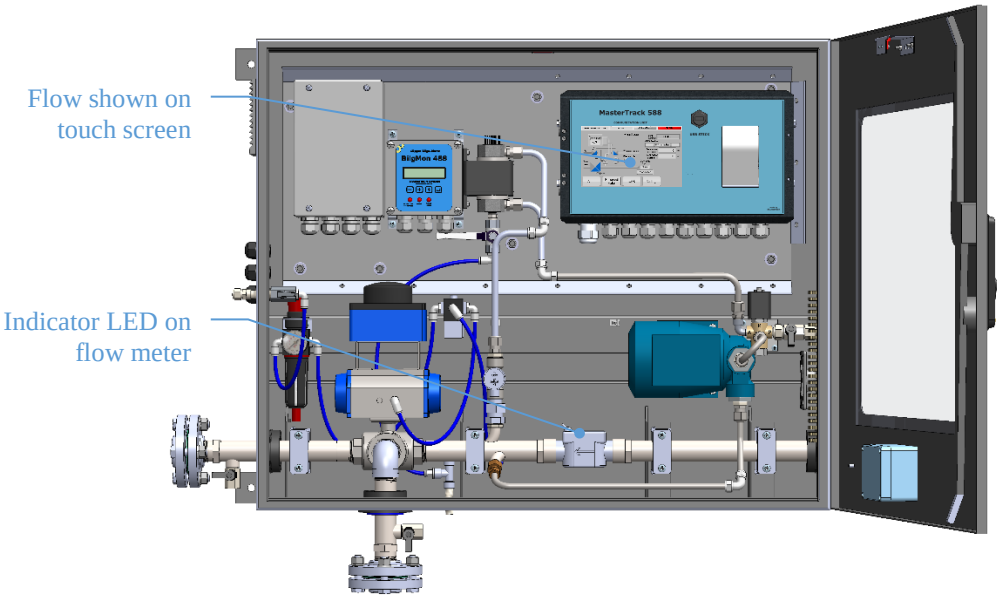


Figure 29. Flow shown on model B1.

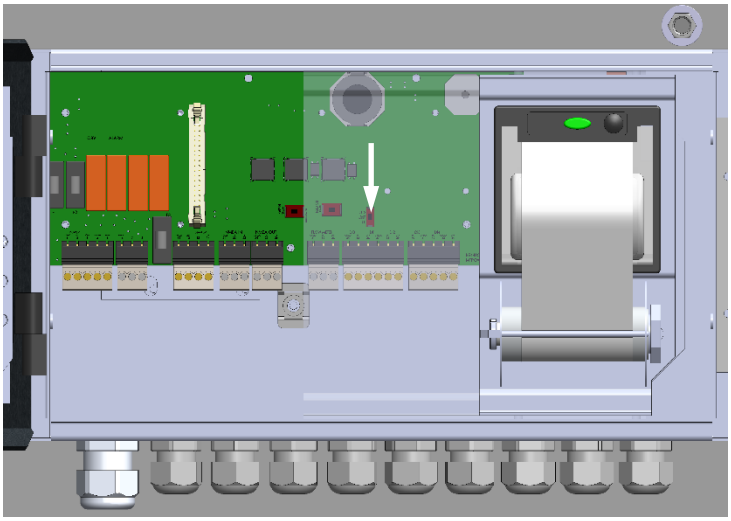


Figure 30. Flow meter switch should be set downwards (B1).

7.3.2 Model B1.5

The flow shown on the touch screen and the flow shown on the flowmeter should be the same. If the flow shown on the touch screen is 0 while the flow on the flow meter is higher, then check the following:

- Check that the cable to the flow meter (see Cb05, *chapter 9 Electrical Drawings*) is connected and not damaged.
- Check that the switch (only on circuit board MTPOW with version C or later) inside the communication unit is set upwards. See *Figure 32.*

If the flow shown on the touch screen is >0, but incorrect, then adjust "Flow meter has…", see *chapter 5.6.5 Settings – Flow 23*.

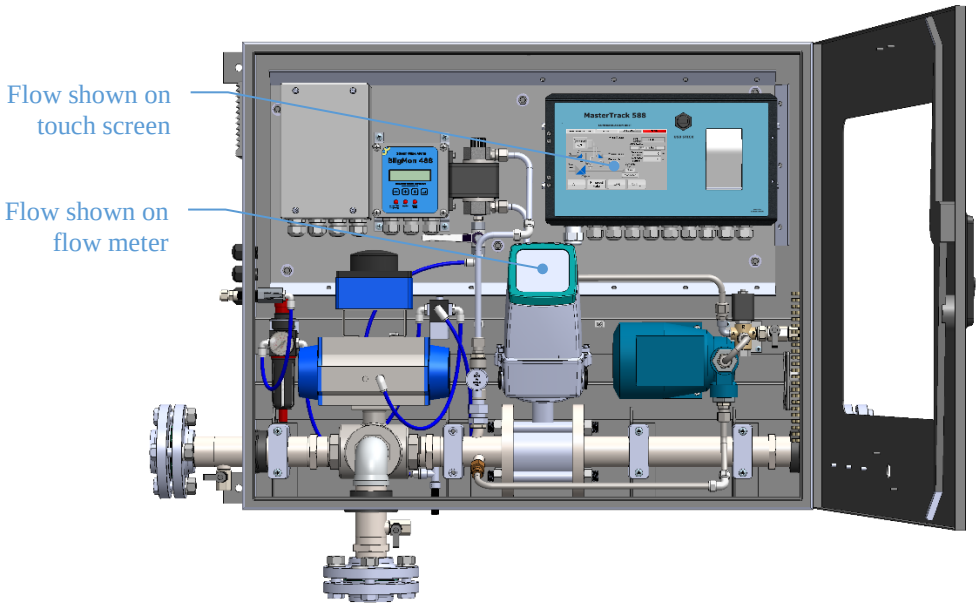


Figure 31. Flow shown on model B1.5.

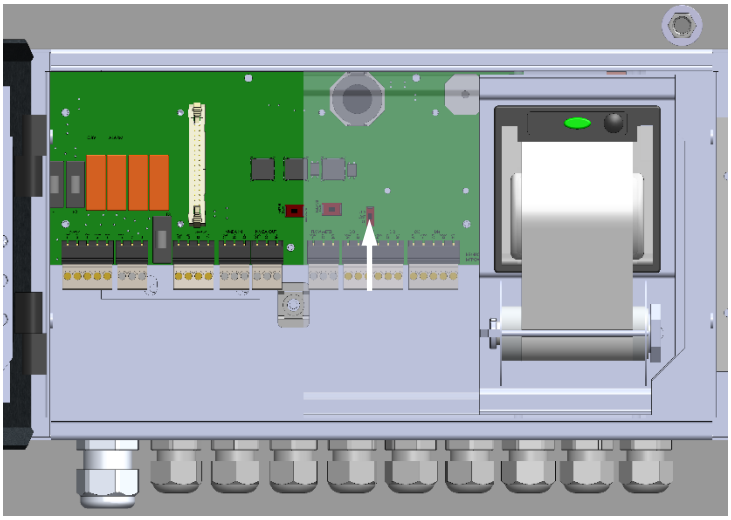


Figure 32. Flow meter switch should be set upwards (B1.5).

7.4 Fuses

Check that all fuses are ok if the unit is not working as expected. All fuses are 5x20 mm glas fuses.

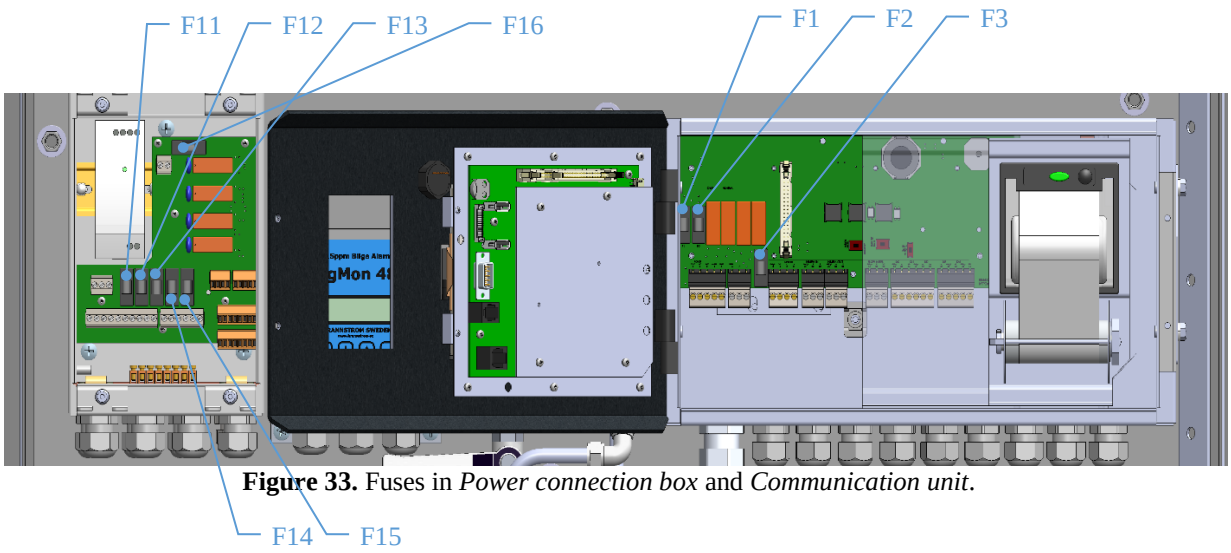
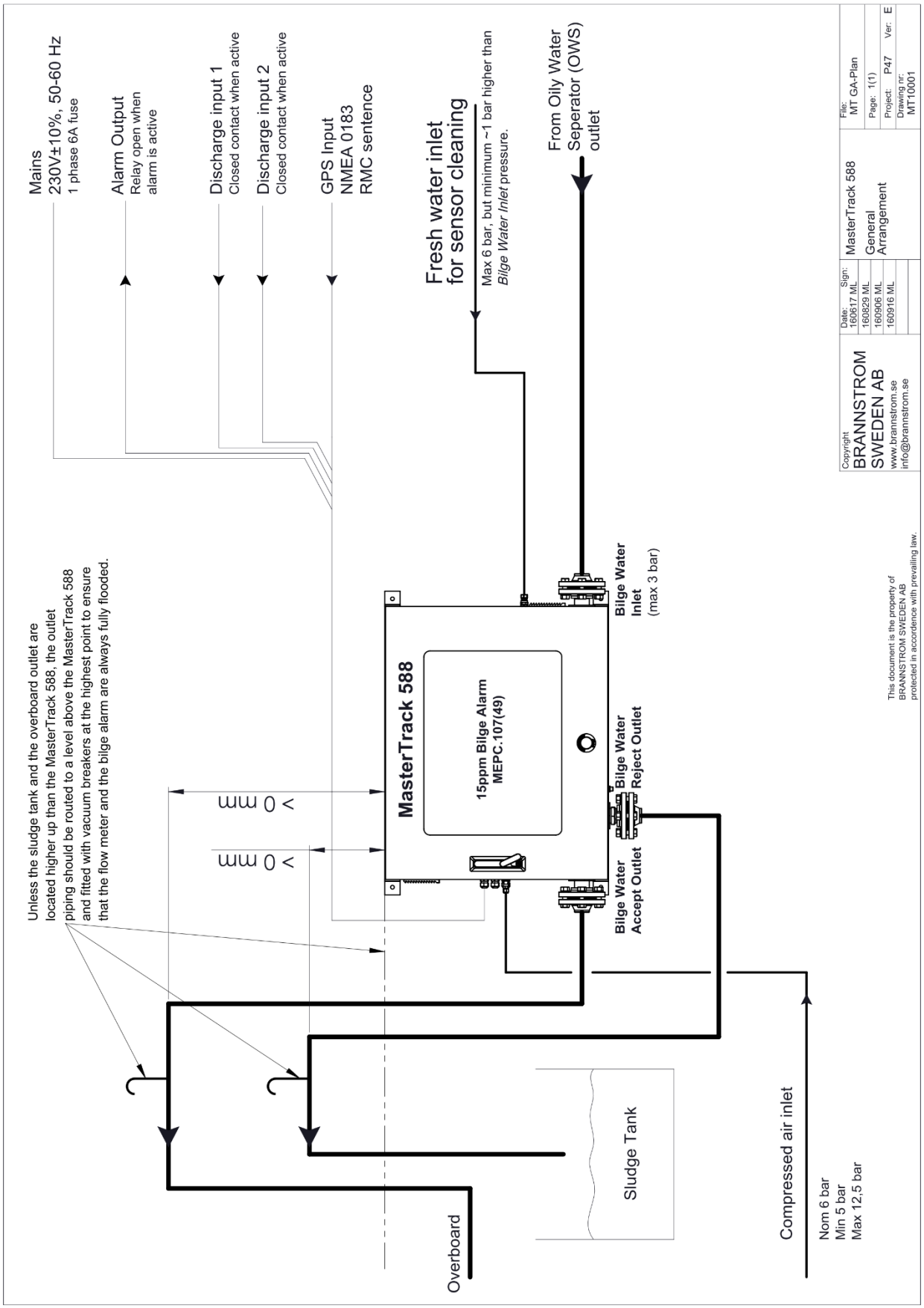


Figure 33. Fuses in *Power connection box* and *Communication unit*.

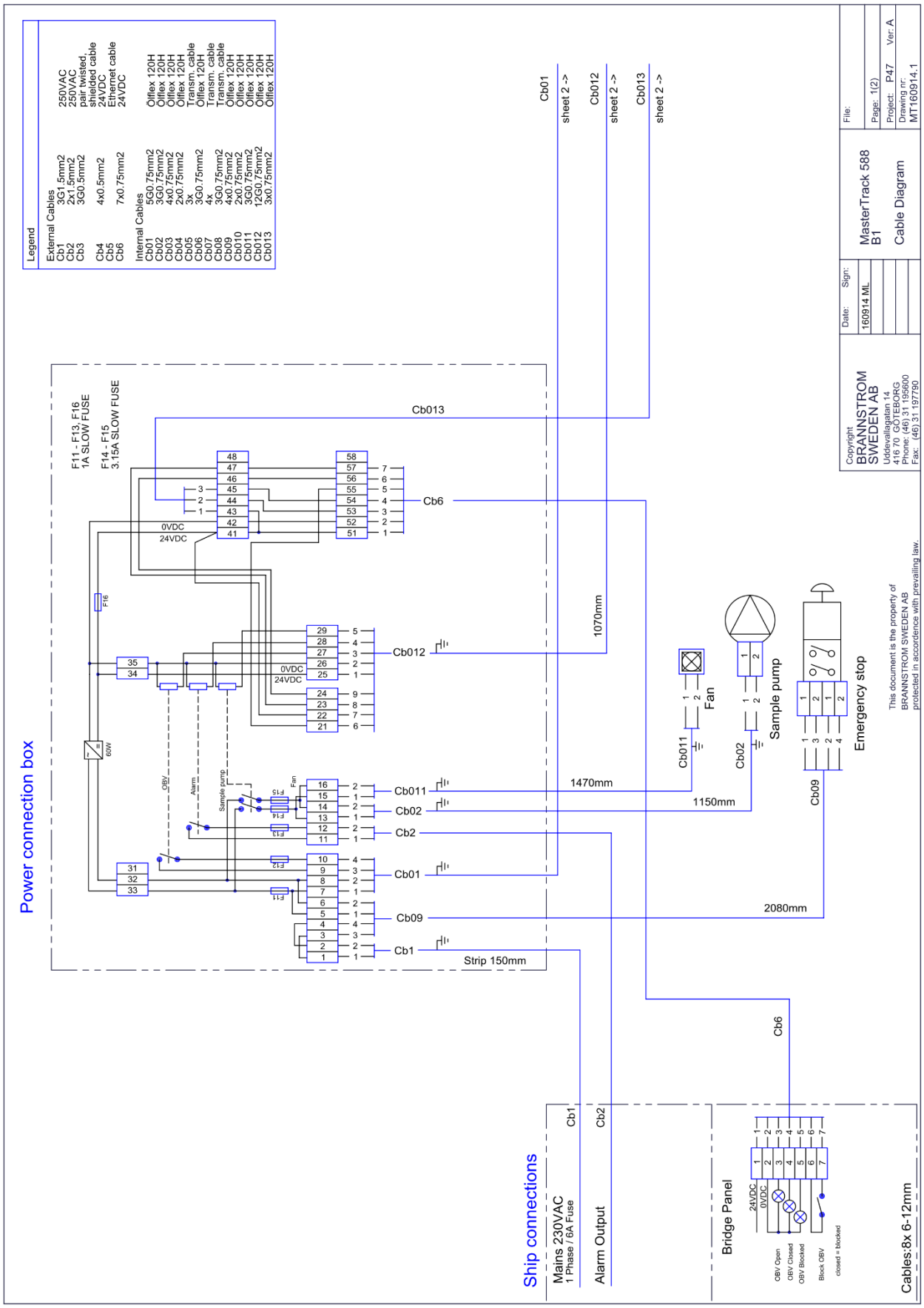
Fuse number	***Function***	***Type***
F1	Relays	1A slow burn (5x20mm)
F2	Communication unit	1A slow burn (5x20mm)
F3	Bridge panel (OBV Blocked)	1A slow burn (5x20mm)
F11	Communication unit & Bridge panel	1A slow burn (5x20mm)
F12	Over Board Valve	1A slow burn (5x20mm)
F13	Alarm output	1A slow burn (5x20mm)
F14	Sample pump & Fan	3.15A slow burn (5x20mm)
F15	Sample pump & Fan	3.15A slow burn (5x20mm)
F16	Bridge panel	1A slow burn (5x20mm)

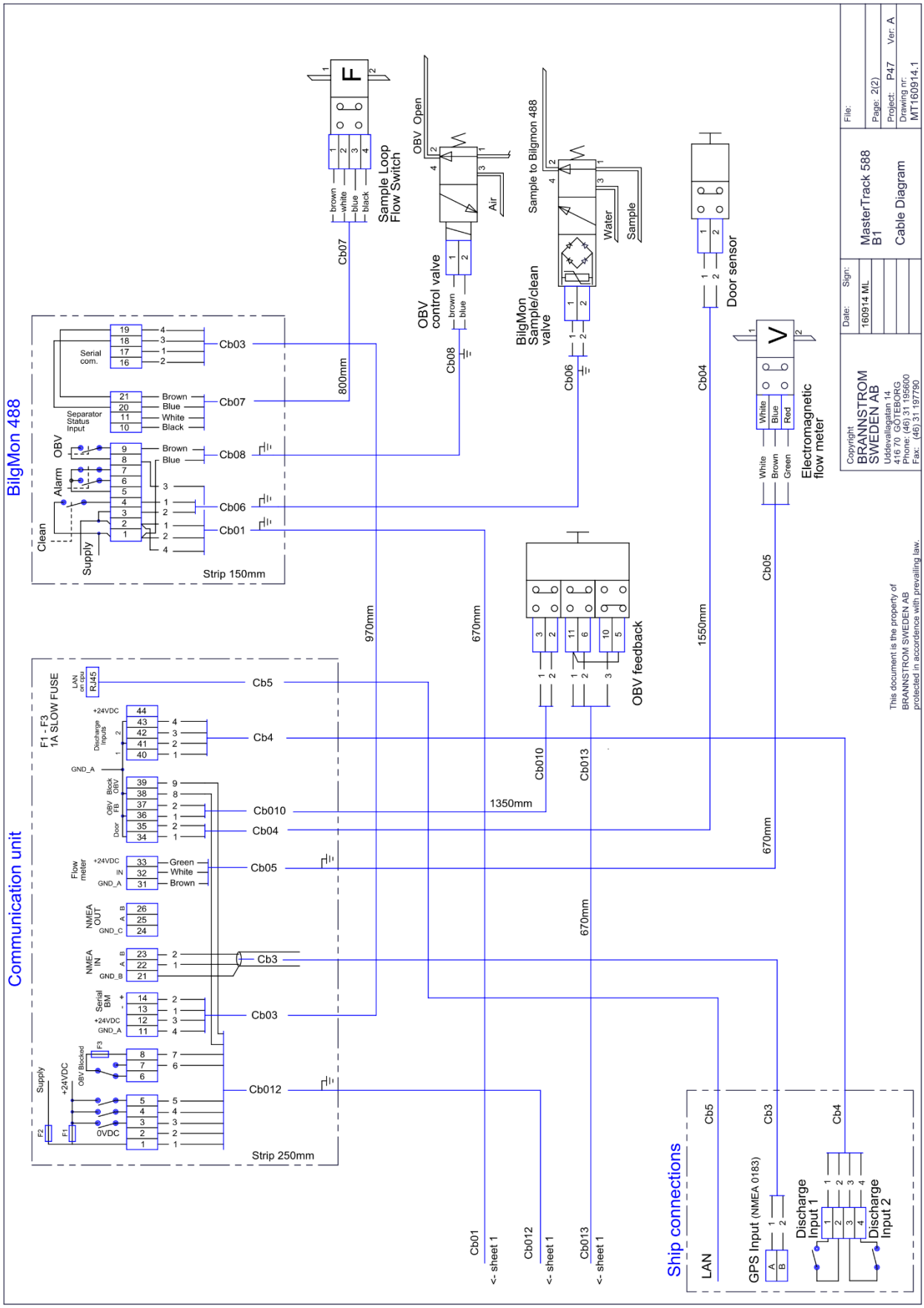
8 General Arrangement Drawing



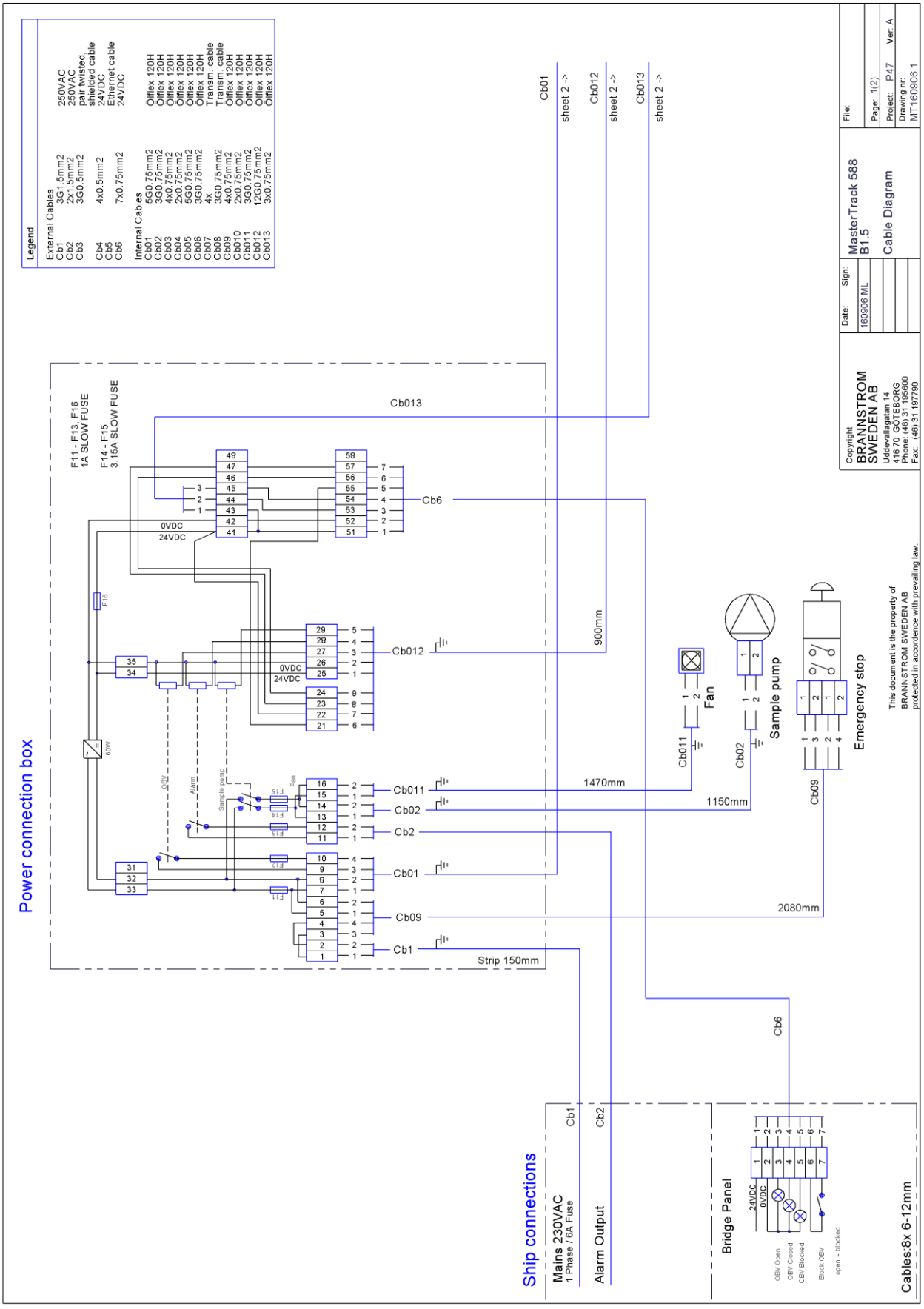
9 Electrical Drawings

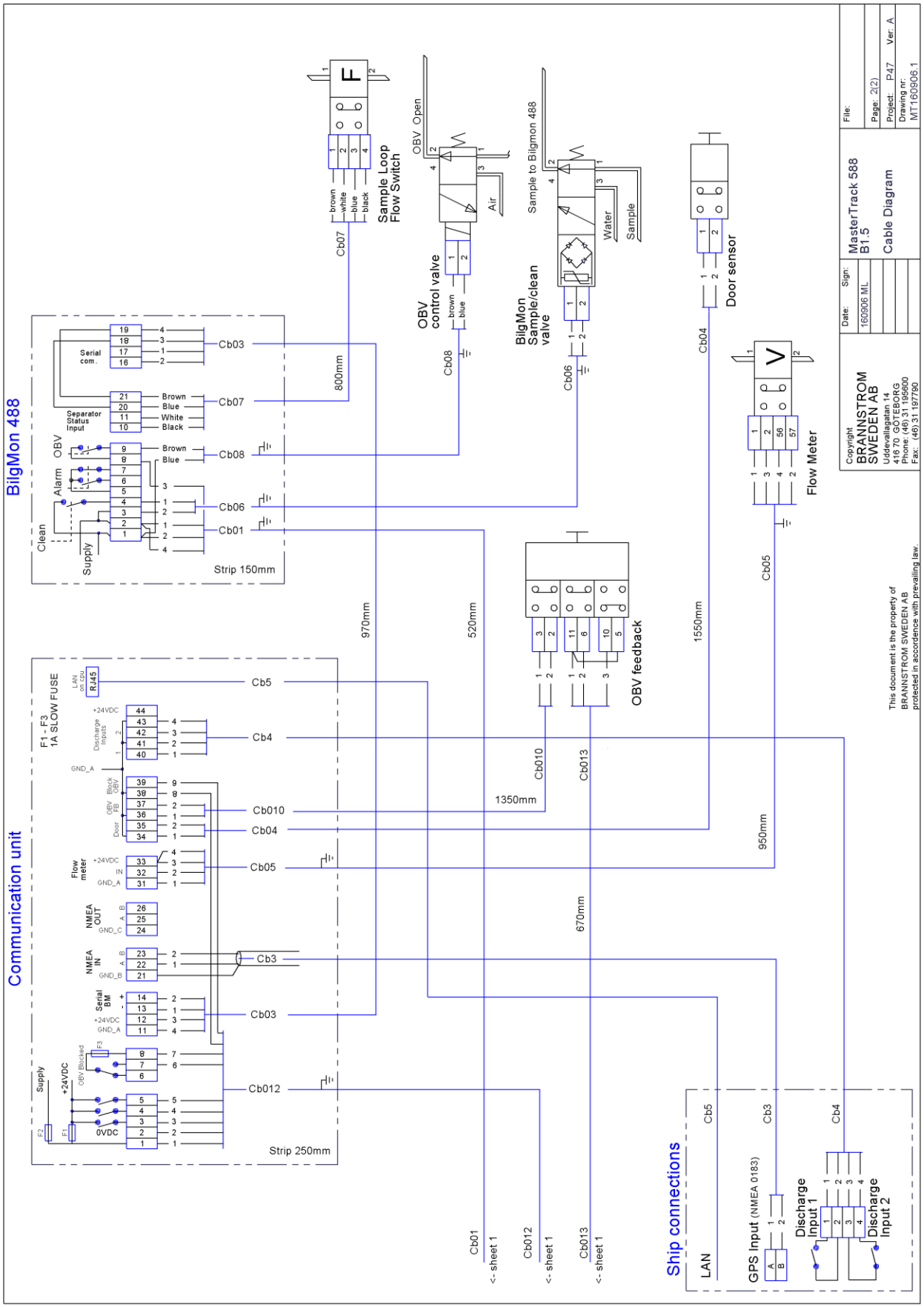
9.1 Model B1





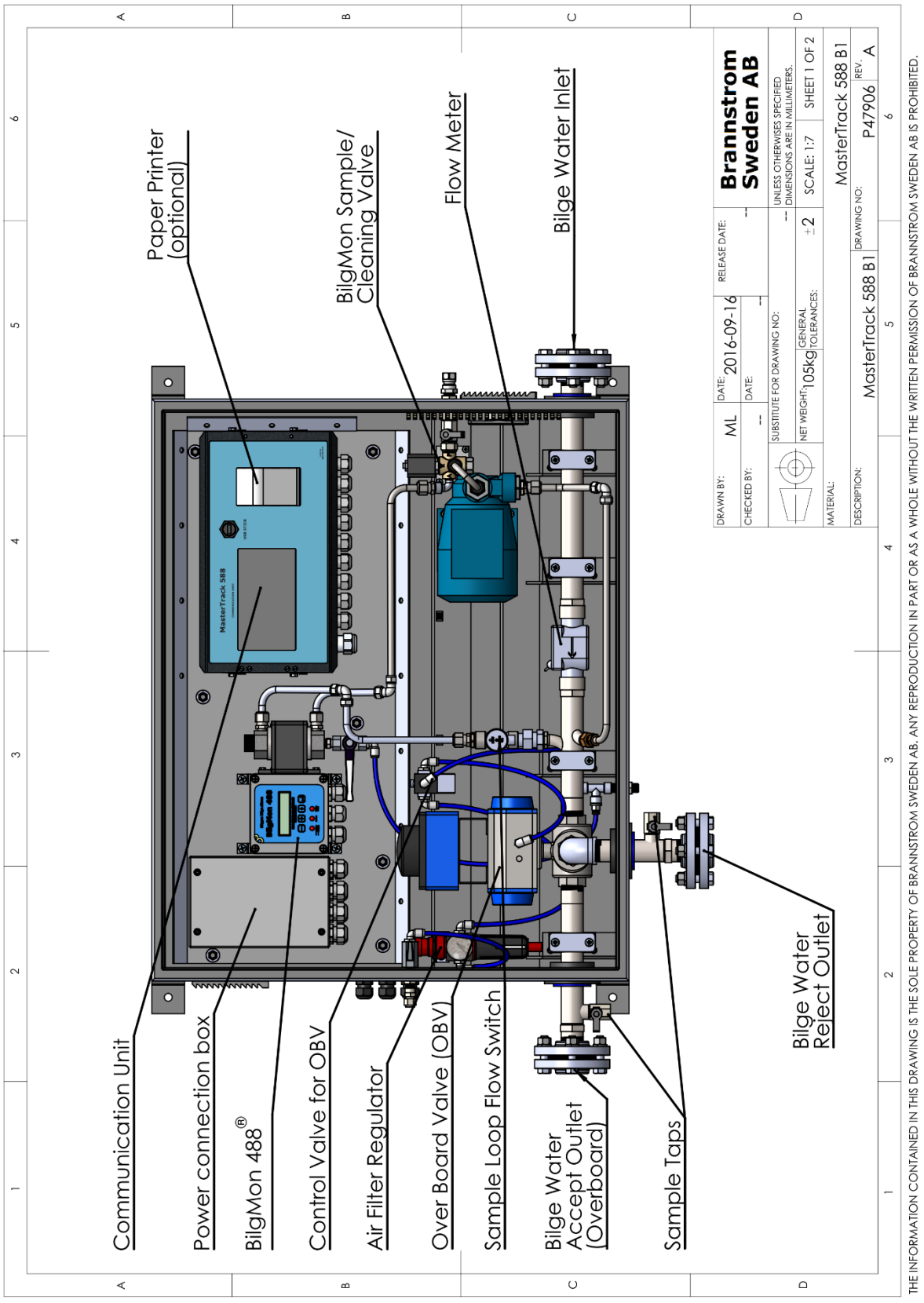
9.2 Model B1.5

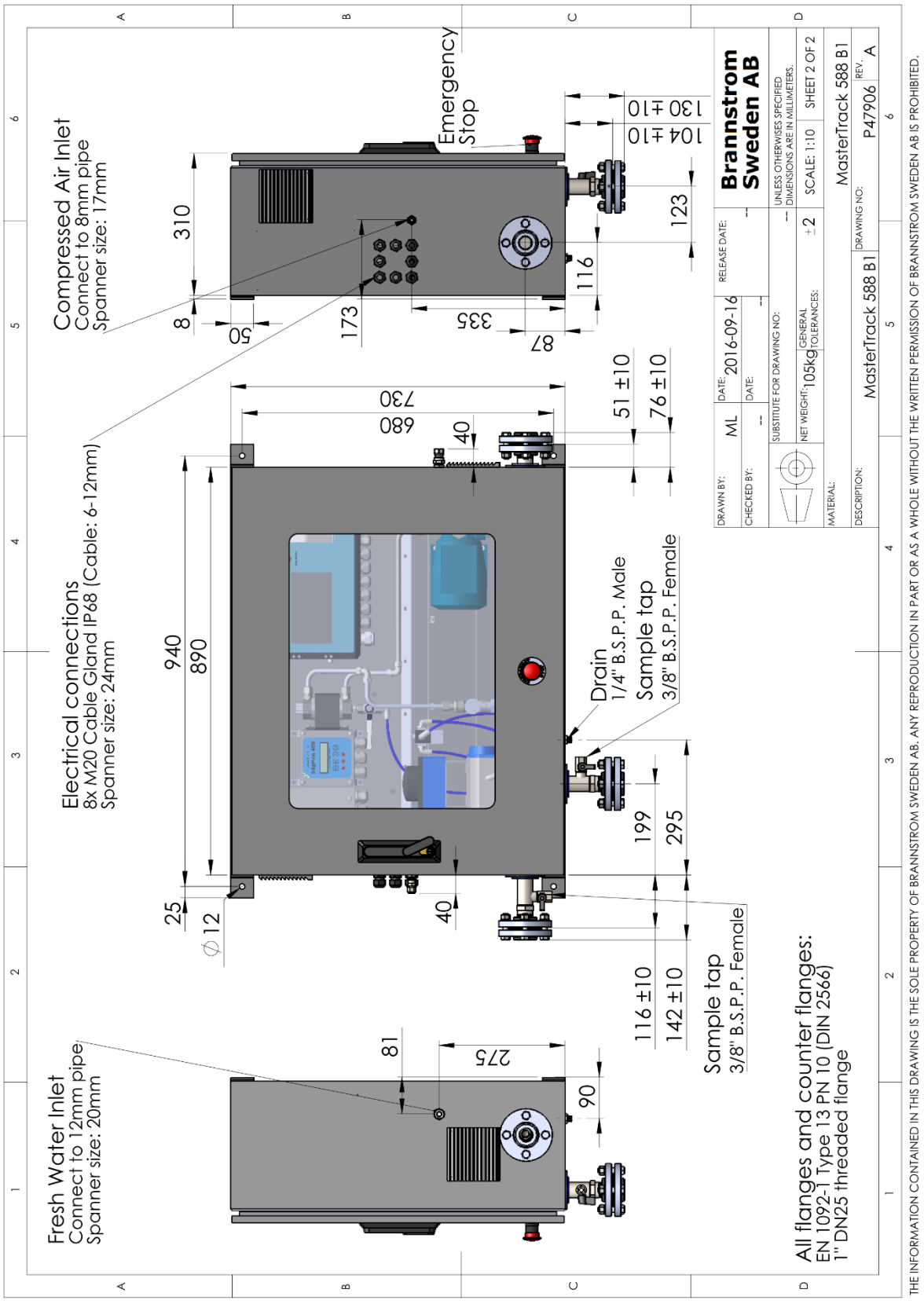




10 Mechanical Drawings

10.1 Model B1





10.2 Model B1.5