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Operations and Technical manual for Oil Discharge Monitoring Equipment

CleanTrack 1000 B

(Revision 2.20xf55g for Software version 2.20x)

Content

1. Introduction

The Oil Discharge Monitoring System, CleanTrack 1000 B, has been designed to provide means of monitoring, recording and controlling the ballast discharge in accordance with the requirements in Resolution MEPC.108(49) as amended by MEPC.240(65) and MEPC.1/Circ.858.

The requirements of the MARPOL Convention are that all oil tankers with a gross tonnage of 150 GRT and above must have an oil discharge monitoring and control system installed with an automatic overboard valve control system.

The requirements in Resolution MEPC.108(49) as amended apply to tankers with a date of keel laying or equivalent stage of construction of 1st of January 2005 or later. Tankers with a keel laid before 1st of January 2005 should comply either with these new or the older Guidelines and Specifications.

Discharge limits are set at 30 liters per nautical mile (fixed) and a total discharge limit in liters (to be set by the user) equaling 1/30,000 part of the particular cargo of which the residue formed a part. The unit has also a 15 ppm mode intended for clean ballast.

The recording device is formatted electronically as mentioned in MEPC.108(49) chapter 6.9.1. Recorded data is stored in a non-volatile memory and can hold approximately 3,000,000 printouts. Optionally a paper printer can also be installed in the computer unit.

In addition to this equipment manual, the ship builder, installation contractor or whoever is commissioned by the ship owner to do it, will prepare ship specific documentation in the form of a manual covering the parts not covered by this equipment manual. For details see MEPC.108(49) sections 9.3 – 9.8 and 11.1.4 – 11.1.6.

2. Important Notes

2.1. Warning

Always follow occupational health and safety rules on the ship.
Also, please note that the equipment contains voltages, which are hazardous to health.
Before doing any work to any parts of the equipment, make sure the parts are completely disconnected from electrical power, pressure, flow and other hazards.

2.2. Component Replacement/Repair

Placement of security seals on critical components is to prevent tampering by unauthorized personnel. Replacement or repair of this equipment should only be carried out under guidance of Brannstrom Sweden AB.

2.3. Disclaimer and Conditions

All information provided by Brannstrom Sweden AB about this equipment is given in good faith and is based on the best knowledge available at the particular time. No responsibility is, however, assumed for possible inaccuracies or omissions.

The content of this manual may be copied as required for operational use on the vessel in which the equipment is installed. This Manual must not be copied, in full or in part, for disclosure to third part.

The software incorporated in the equipment is furnished on a strictly “as is” basis. The software is proprietary to Brannstrom Sweden AB. The disclosure of the software coding is not allowed. The software may not be copied in whole or part.

2.4. Main news in software version 2.20x compared to version 2.12.

1. It can be upgraded to handle 5 more bio-fuel blends to a total of 10 bio-fuel blends.
2. It listens to more GPS NMEA 0183 sentences, in addition to RMC also GLL, GGA and VTG.
3. It supports version 4.10 of GPS NMEA 0183 sentences.
4. Manual “Oil concentration” selection disables start of the sample pump and ignores readings from the Measuring cell.
5. It can monitor feedback from the sample pump start/stop contactor.
6. It can monitor feedback from a sample pump motor manual on/off switch. Switch is not in scope of delivery.
7. It has an optional alarm for freezing risk of water in the Measuring cell.
8. It has programmable feedback timeout for two overboard valves.
9. If the converting unit is fitted with the optional sample pump motor heating to avoid moisture in “StandBy” mode, it can control the heating and monitor the motor voltage, current, cos φ, frequency, and overheating. Documentation for this feature is delivered with special orders only.
10. For specially built computer units with an optional Modbus RTU serial communication channel, it can communicate with the cargo control system. Documentation for this feature is delivered with special orders only.
11. For specially built computer units with an optional RS422 serial communication port to send printout data to a listener. Documentation for this feature is delivered with special orders only.
12. It has settings for optional control of the slop tank valve separately using the relay output normally intended to control the overboard valve no. 2. Documentation for this feature is delivered with special orders only.
13. Automatically recorded data compressed from 9 lines to 6 lines (MEPC.108(49) Chapter 6.9.2).
14. Naming of oil types closer to naming in applicable IMO resolutions.
15. Flow alarms are no longer generated while flow is in manual mode (“Manual Flow” is activated).

2.203

16. For optional extended converting unit only: New setting “Extended-NoLim” in property “ConvertingUnitType” with limited motor alarms.

2.204

17. For optional extended converting unit only: “Disable Motor check” disables motor windings ptc alarms also. Voltage of an activated heater is shown on top screen indications, “StandBy” -> “StandBy, xxV”.

2.205

18. The less accurate software clock is updated from the more accurate hardware clock every hour.

2.206

19. GPS coordinates are recorded whenever the “Manual Override Overboard Valve” is changed.

2.2061

20. Indicate a low or high signal from the flow meter and speed log with the text “Lo/Hi” in the color amber. Please see **7.2.4. Status** page **53**.

2.5. Updates in this manual.

A detail information about changes in this manual compared to the previous manual, version 2.12k, is not meaningful as there are too many details, computer menus and certificates that are changed, removed or added. Instead the mail functional changes have been listed above and the main changes in the manual are listed below.

Version 2.20x -> 2.20xc:

1. New “Declaration of Conformity”, issued 2019-01-02. Chapter **12.1. Declaration of Conformity** page **165**.
2. Upgrade of details changed in software version 2.204. Changes for optional extended converting unit only.

Version 2.20xc -> 2.20xd:

1. New “Declaration of Conformity”, issued 2019-01-02. Chapter **12.1. Declaration of Conformity** page **165**.

Version 2.20xd -> 2.20xe:

1. New “Declaration of Conformity”, issued 2019-09-12. Chapter **12.1. Declaration of Conformity** page **165**.
2. New certificate “Certificate: MED-D”, issued 2019-09-12. Chapter **11.1. Certificate: MED-D** page **149**.
3. “internal parts” added for clarification in chapter **9.5. Verification of accuracy and access to restricted parts** page **94**.
4. Recommendations for “Every 5 years” included in chapter **9.4. Periodic Checks and Servicing** page **93**.

Version 2.20xe -> 2.20xf2:

1. Included input for optional manual switch in chapter **3.2. Scope of Supply and System Supplies** page **10**.
2. Updated **5. Start/Stop procedure** page **39**.
3. Text for “PumpMotorDisconnect” updated in chapter **7.8.9. System Configuration, Alarms&Extras** page **72**.
4. Some update of text in chapter **8. Fault-finding** page **83**.
5. Updated text in chapter **9.4. Periodic Checks and Servicing** page **93**.
6. Updated drawing **10.10.2. Electrical cable diagram for bulkhead mounted sample pump** page **140**.
7. New revision for **12.6. Pressure transmitter, Danfoss** page **181**.
8. New revision for **12.7. Pressure transmitter, Siemens** page **186**.
9. New revision for **12.9. Flow meter, Fuji** page **198**.
10. New Exd. sample pump documents as the manufacturer has changed name from “Elprom” to “Orange1”, see **12.10.1. Orange1 instructions** page **201** and **12.10.2. Orange1 Certificate, EPT 17 ATEX 2588 X** page **205**.

Version 2.20xf2 -> 2.20xf3:

1. New type approval issued 2020-03-01. Chapter **11.3. Type Approval, Germany** page **155**.

Version 2.20xf3 -> 2.20xf4:

1. New type approval issued 2020-03-01. Chapter **11.2. Type Approval, DNV-GL** page **151**.
2. Updated drawing **10.10.1. Electrical cable diagram for electrical Ex. motor sample pump** page **139**.
3. Temperature limits notation in **5.1. General information before Start-up** page **39**.
4. New chapter **12.12. Supplementary instructions, sample pump with mechanical seal** page **214**.

Version 2.20xf4 -> 2.20xf5:

1. New appendix to “Certificate: MED-D”, issued 2020-06-11. Chapter **11.1. Certificate: MED-D** page **149**.

Version 2.20xf5 -> 2.20xf52:

1. New “Declaration of Conformity”, issued 2020-09-29. Chapter **12.1. Declaration of Conformity** 1 and 2 pages after page **165** for **“Measuring Cell type CTB11”** and **“Oil Monitor interface type Z11”**.

Version 2.20xf52 -> 2.20xf53:

1. New “Declaration of Conformity”, issued 2021-10-20. Chapter **12.1. Declaration of Conformity** page **165**.

Version 2.20xf53 -> 2.20xf54:

1. Updated drawing **10.4. SPP-100 Sample pump with Ex. motor** page **120**.
2. Updated drawing **10.3.1. Analyzing Unit skid with Ex. motor Sample pump** page **105**.

Version 2.20xf54 -> 2.20xf55:

1. New “Declaration of Conformity” and “ATEX Certificate” for Siemen’s pressure transmitter. Chapter **12.7. Pressure transmitter, Siemens** page **186**.
2. Refers to Ex. Certificates in chapter **3.2. Scope of Supply and System Supplies** page **10**.
3. New revision for **12.8. Flow meter, Siemens** page **191**.

4. Details and numbering in the chapter **5. Start/Stop procedure** page **39**.
5. New ATEX documents for air driven sample pump, see chapter **12.11. Sample Pump, Speck pump with Gast air motor** pager **211**.

Version 2.20xf55 -> 2.20xf55b:

1. Indicate a low or high signal from the flow meter and speed log with the text “Lo/Hi” in color amber instead of the text “Fail” in color red, software 2.2061 and later.

Version 2.20xf55b -> 2.20xf55c:

1. Updated “Declaration of Conformity”, issued 2021-10-11. Chapter **12.1. Declaration of Conformity** 1 and 2 pages after page **165** for **“Measuring Cell type CTB11”** and **“Oil Monitor interface type Z11”**.
2. Declaration of conformity for Speck sample pump with Gast air motor included. Complete instructions included only for units with this sample pump.
   See chapter **12.11.1. Declaration of Conformity, Speck, Gast** page **211**.
3. Versions (details) of some drawings updated in chapter **10. Figures and Drawings** page **97**.

Version 2.20xf55c -> 2.20xf55d:

1. Updated “Certificate: MED-D” issued 2021-10-20, chapter **11.1. Certificate: MED-D** page **149**.
2. Updated “Declaration of Conformity”, issued 2022-12-09, chapter **12.1. Declaration of Conformity** page **165**.
3. Updated “Declaration of Conformity”, issued 2022-09-26,
   chapter **12.2. Declaration of Conformity, Measuring Cell** page **166** and
   chapter **12.3. Declaration of Conformity, Zener Barrier** page **168**.
4. New ATEX certificates for the zener barrier pcb and the measuring cell. Chapter **12.4. ATEX Certificate Zener Barrier PCB page 170 and 12.5. ATEX Certificate Measuring Cell page 176.**

Version 2.20xf55d -> 2.20xf55e:

1. New type approval issued 2023-01-23. Chapter **11.6. Type Approval, NK** page **162**.

Version 2.20xf55e -> 2.20xf55f:

1. New IMO Certificate issued 2023-04-21, chapter **11.4. IMO Certificate, CCS** page**157**.
2. New type approval issued 2023-04-21, chapter **11.5. Type Approval, CCS** page **159**.

Version 2.20xf55f -> 2.20xf55g:

1. Upgraded power supply fuse F5 on Zener Barrier PCB, chapter **9.8.5. Fuses** page **96**.
2. Updated fuses in recommended spare parts, chapter **9.9. Recommended Spare parts** page **96**.
3. Updated details in drawing **CTB10001p sheet 3, Computer Unit with open door** page.**99**.

3. Specification

3.1. Description

Type	CleanTrack 1000 B
Application	Oil Discharge Monitoring and Control System for Oil Tankers in accordance with MEPC.108(49) as amended by Resolution MEPC.240(65), approved for Crude oils and Petroleum products as well as for 10 types of Bio-fuel blends in accordance with MEPC.1/Circ.761 as revised.
Range	0 - 1000 ppm
Accuracy	According to MEPC.108(49)
Sample Flow rate	240 liters/hour to 900 liters/hour depending on sample pump model.

Clean water connection (optional):

Flow rate	Intermittently 200 to 600 liters/hour depending on sample pump model and water pressure. Clean water is only used at Discharge Start and Stop. Approximately 6-20 liters per Start/Stop (when applicable).
Pressure	max. 5 bar min. 0.5 bar higher than the pressure in the overboard line at the sample outlet connected point.

3.1.1. Function and main parts

Purpose and function of the CleanTrack 1000B.
On an oil tanker the CleanTrack 1000B monitors and controls the discharge of oily water from a slop tank to the sea according to MARPOL Annex I regulation 34, and it is specified in detail in IMO resolution MEPC.108(49).
When water is pumped from the slop tank into the discharge pipe, it can be diverted either back to the slop tank via a slop tank valve, or over board to the sea via an overboard valve.
Normally the overboard valve is closed and the slop tank valve is open, diverting the water back to the slop tank. The water can be diverted to the sea only when the CleanTrack 1000B enables opening of the overboard valve.
The CleanTrack 1000B samples water from the discharge pipe and measures the oil content of it. The CleanTrack 1000B also receives info about the ship's speed (from the ship's speed log or the GPS), the water flow rate from a flow meter in the discharge pipe, and the ship's position (from the GPS). Based on this info, the CleanTrack 1000B calculates the instantaneous discharge rate of pure oil per nautical mile, and the total quantity of pure oil discharged. The instantaneous rate of discharge of oil content must not exceed 30 liters per nautical mile, and the total quantity of oil discharged into the sea must not exceed 1/30000 of the total quantity of the particular cargo of which the residue formed a part.
When start pumping water from the slop tank, the water is diverted back to the slop tank. When the CleanTrack 1000B has determined that none of the above discharge limits are exceeded, it enables diverting the water into the sea. When any of the discharge limits are reached, or there is a failure of the CleanTrack 1000B or any of the external signals are missing, the overboard valve is automatically closed and the slop tank valve is opened. These events and the corresponding ship's position are recorded by the CleanTrack 1000B.

The unit consists of 4 main parts:
A Computer unit intended to be installed in the cargo control room or in an equivalent nonhazardous area. The computer unit controls and receives data from the other CleanTrack components. This information is treated for computing and control purposes and is documented in the unit`s memory required by IMO. The other parts of the system are controlled from the computer unit. It also receives positioning data from the GPS. This computer unit contains the parts and functions defined by IMO resolution MEPC.108(49) as the "Control section", "Control unit", "Discharge interlock" and "Overboard discharge control".
A Converting unit intended to be installed in the engine room or other suitable nonhazardous area. The converting unit receives and transmits electrical signals from the analyzing unit to the computer unit. It contains electrical power supply and zener barriers for the analyzing unit, a 2 wire 4 – 20 mA input for the pressure transmitter and two, 2 wire 4 – 20 mA inputs for flow meters. The sample pump and optional fresh water flushing control is also controlled by the converting unit.
An Analyzing unit intended to be installed in the pump room or other hazardous cargo area. The analyzing unit contains the measuring cell and the pressure transmitter that monitors the sample flow through the measuring cell. The pressure transmitter measures the pressure on the outlet of the sample pump and is used to protect the pump from blockages or starvation.
The distance between the sampling probes and the analyzing unit should be as short as possible. The maximum distance depends on the sample pump and the pipe diameter.
This analyzing unit corresponds to the "Oil content meter" as defined by IMO resolution MEPC.108(49).
A Sample pump of impeller type, to be installed close to the analyzing unit and normally in the pump room. The sample pump prepares and feeds the sample from the overboard line to the measuring cell.
The sample pump can be of 3 main types. Depending on type is can be mounted in the hazardous area or on the bulkhead between the engine room and the pump room.

1) With an air driven motor for mounting in hazardous area zone 1.
2) With a flameproof Exd motor for mounting in hazardous area zone 1.
3) Bulkhead mounted type with the electrical motor in the non-hazardous area (E/R) and the pump in the hazardous area (P/R) zone 0 or zone 1.

3.1.2. Measuring principle

The measuring principle of the CleanTrack 1000B is based on a combination of light transmitted and light scattering in four different angles. The sample water stream is homogenized in the sample feed pump and is passed through a quartz glass tube where it is exposed to a light beam. The light transmitted and scattered in the selected angles is dependent on the type and amount of contaminates in the water stream. Signals from non-oil contaminants can be compensated for due to their different light scattering characteristics.

3.2. Scope of Supply and System Supplies

The CleanTrack 1000B parts:

1. Computer unit, 1 pc.
2. Converting unit, 1 pc.
    a. Standard - for all electric motor sample pumps.
    b. Standard Air - for air motor sample pump.
    c. Extended - optional and for SPP-100 sample pump only.
3. Analyzing unit, 1 pc.
    a. Skid with sample pump having explosion proof electric motor.
    b. For external sample pump.
        1. Compact cabinet.
        2. Freestanding items with measuring cell hood.
    c. Built in sample pump having air motor.
4. Sample pump, 1pcs
    a. Explosion proof electric motor, normally mounted on skid in pump room.
    b. Electric motor mounted on bulkhead, engine room/pump room.
    c. Air motor, normally mounted inside analyzing unit.
5. Flow meter(s) – (Normally yard supply, supplied on request).
6. Sample probe(s) including valves and inlet filter – (Normally yard supply, supplied on request).
7. Overboard valve and Slop tank valve – (Normally yard supply, supplied on request).
8. Pneumatic control box for Overboard and Slop tank valves – (Normally yard supply, supplied on request).
9. Miscellaneous.

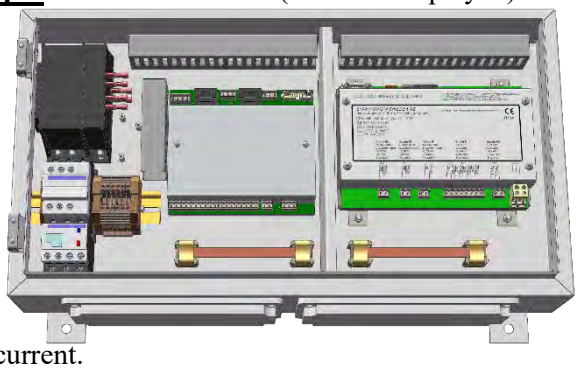
1. Computer unit:

Voltage	85-265 VAC
Frequency	50/60 Hz
Consumption	30 W
Ingress Protection	IP42
Ambient Temp.	5 - 50 °C
Weight	~7 kg
Dimensions	approx. 370 x 210 mm

2. Converting unit:

2.a. Standard - for all Electric Motor Sample Pumps:

(door not displayed)

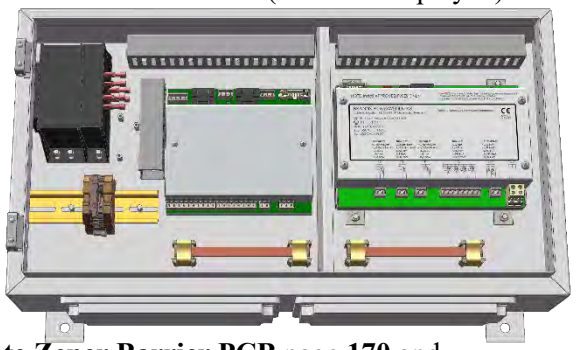


Voltage	380 or 440 VAC 3-phase ±10%, transient ±20%
Frequency	50/60 Hz
Consumption	120 W (exclusive pump)
Ingress Protection	IP54
Ambient Temp.	5 - 50 °C
Weight	~14 kg
Dimensions	approx. 550 x 360 x 130 mm
Color	RAL-7035
Motor protection relay	Suitable for sample pump motor current.
Details and Ex.	See chapter **12.4. ATEX Certificate Zener Barrier PCB** page **170** and chapter **12.1. Declaration of Conformity** page **165.**

Or;

2.b. Standard Air - for Air Motor Sample Pump:

(door not displayed)



Voltage	110 or 220 VAC ±10%, transient ±20%
Frequency	50/60 Hz
Consumption	120 W
Ingress Protection	IP54
Ambient Temp.	5 - 50 °C
Weight	~14 kg
Dimensions	approx. 550 x 360 x 130 mm
Color	RAL-7035
Details and Ex.	See chapter **12.4. ATEX Certificate Zener Barrier PCB** page **170** and chapter **12.1. Declaration of Conformity** page **165.**

Or;

2.c. Extended - Optional for SPP-100 Sample Pump only:

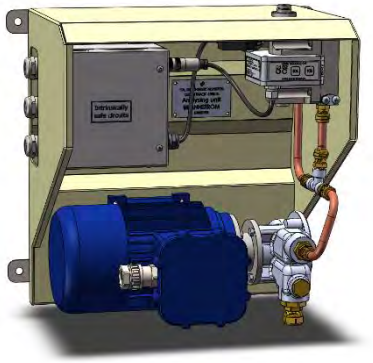
(door not displayed)

Voltage	440 VAC 3-phase ±10%, transient ±20%
Frequency	60 Hz
Consumption	120 W (exclusive pump)
Ingress Protection	IP54
Ambient Temp.	5 - 50 °C
Weight	~14 kg
Dimensions	approx. 550 x 360 x 130 mm
Color	RAL-7035
Motor protection relay	Suitable for SPP-100 sample pump motor current.
Details and Ex.	See chapter **12.4. ATEX Certificate Zener Barrier PCB** page **170** and chapter **12.1. Declaration of Conformity** page **165.**

Please note, this is an optionally equipped converting unit and it can only be used together with the SPP-100 sample pump. It has the capability of heating the sample pump motor with about 15 W and it can also monitor the voltage between 2 phases, current of all 3 phases, the power factor and the resistance of the PTC resistors in the motor windings. If unit is powered through a frequency converter measurement might be faulty.
For setting, see chapter **7.8.9. System Configuration, Alarms&Extras** page **72**.
See also drawing **CTB10003 sheet 4 of 4, Converting Unit** page **104**.

3. Analyzing unit types:

3.a. Skid with Sample Pump, Ex. proof Electric Motor:



(Voltage is supplied via converting unit)

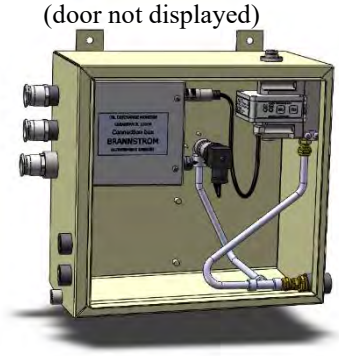
Voltage	440 VAC 3-phase
Frequency	60 Hz
Power Consumption	0.66 kW
Sample flow	600 l/h (nominal)
Sample Temp.	0 - 65 ºC
Ambient Temp.	-20 - +55 ºC
Weight	~35 kg
Dimensions	approx. 350 x 410 x 250 mm
Color	RAL-7035

See 4.a. below for more information about the Sample pump

Or:

3.b. For External Sample Pump:

(door not displayed)



3.b.1. Compact Cabinet:

Sample flow	240-900 l/h (depending on sample pump)
Sample Temp.	0 - 65 ºC
Weight	~10 kg
Ingress Protection:	IP56
Ambient Temp.	-25 - +55 ºC[1]
Dimensions	approx. 350 x 410 x 250 mm
Color	RAL-7035

or:

3.b.2. Freestanding items with measuring cell hood:

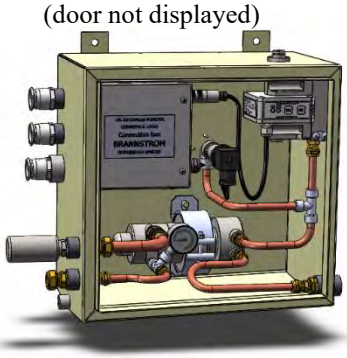
(Intended for retrofit installation inside an existing cabinet)
(Existing sample pump and pressure transmitter to be used)

Sample flow	240-900 l/h (depending on sample pump)
Sample Temp.	0 – 65 ºC (depending on sample pump)
Ingress Protection	IP56
Ambient Temp.	-25 - +55 ºC

Or:

3.c. With built in Sample Pump, Air Motor:

(door not displayed)



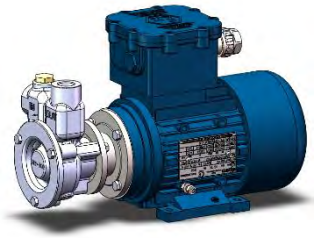
Air pressure	5.2 bar
Air consumption	~30 Nm³/h
Sample flow	240 l/h (nominal)
Sample Temp.	0 - 65 ºC
Weight	~18 kg
Ingress Protection:	IP56
Ambient Temp.	+1 - +40 ºC[1]
Dimensions	approx. 350 x 410 x 250 mm
Color	RAL-7035

See 4.c. below for more information about the Sample pump

[1] If the sample temperature is higher than the ambient high temperature limit, the limit becomes lower or the cabinet should be ventilated.

4.a. Sample pump SPP-100 with Explosion proof electric motor:

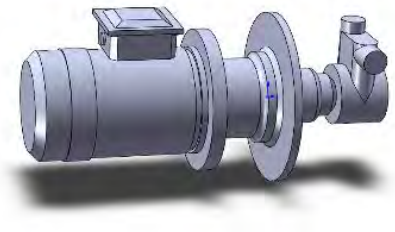
Supply voltage	400 VAC,50 Hz / 440 VAC,60 Hz 3-phase
Current	1.4 A / 1.5 A
Power Consumption	0.55 kW / 0.66 kW
Cos φ	0.78
Speed	2840 rpm / 3400 rpm
Sample flow	600 l/h (nominal)
Sample temp.	0 - +65 ºC
Ambient temp.	-20 - +55 ºC
Ingress Protection	IP66
Weight	~11.5 kg
Dimensions	approx. 300 x 140 x 200 mm
Details and Ex.	See chapter **10.4. SPP-100 Sample pump with Ex. motor** page **120** and **12.10. Sample Pump, SPP-100 with Orange1 explosion proof motor** page **201**.



4.b. Sample pump Nikuni 32MED22/Matre P06 for Bulkhead mounting:

Note that different motors might be used for these pumps over and technical data might differ slightly from the ones given below. Please read the marking plate of the actual motor.

Supply voltage	380-420 VAC,50 Hz / 440-480 VAC,60 Hz 3-phase
Current	4.53 A / 4.74 A
Power Consumption	2.2 kW / 2.53 kW
Cos φ	0.86
Speed	2850 rpm / 3440 rpm
Sample flow	900 l/h (nominal)
Sample temp.	0 - +65 ºC
Ambient temp.	0 - +40 ºC
Ingress Protection	IP55
Weight	~59 kg
Dimensions	approx. 600 x 280 x 410 mm
Details	Nikuni: See chapter **10.5. Nikuni Sample pump for Bulkhead mounting** page **122**. Matre: See chapter **10.6. Matre Sample pump for Bulkhead mounting** page **125**.



4.c. Sample pump Speck Y-2951 with Air driven Gast motor:

Air pressure	5.2 bar
Air consumption	~30 Nm³/h
Sample flow	240 l/h (nominal)
Sample Temp.	0 - +65 ºC
Ambient Temp.	+1 - +40 ºC[2]
Ingress Protection:	IP56
Weight	~2.2 kg
Dimensions	approx. 190 x 80 x 80 mm
Details and Ex.	See chapter **12.11. Sample Pump, Speck pump with Gast air motor** page **211**.

[2] If sample temperature is higher than the ambient temperature limit the limit becomes lower or cabinet should be ventilated.

3.2.1. Parts always included in the Analyzing unit

Measuring Cell (including its mounts):

Design Pressure	10 bar
Ingress Protection	IP56
Ambient Temp.	-25 - +55 ºC
Sample Temp.	0 - 65 ºC
Orifice on outlet	Ø 2.5, 3.5 or 4.3 mm (Speck Y-2951: Ø2.5 mm; SPP-100: Ø3.5 mm; Nikuni 32MED22/Matre P06 Ø4.3 mm)
Details and Ex.	See chapter **12.5. ATEX Certificate Measuring Cell** page **176**

Connection Box, (for intrinsically safe circuits only):

Ingress Protection	IP56
Ambient Temp.	-25 - +55 ºC

Pressure transmitter:

Maker	Siemens
Type	7MF1567–3CB01-1AA1
Ingress Protection	IP65
Ambient Temp.	-25 - +85 ºC
Sample Temp.	0 - +120 ºC
Measuring range	0-16 bar (4-20ma, 2-wire 24VDC loop powered)
Sample connection	G½" mail thread
Length	approx. 115 mm
Details and Ex.	See chapter **12.7.2. ATEX Certificate, Siemens** page **189**.

Alternative pressure transmitter:

Maker	Danfoss
Type	MBS 4251-2211-1AB08
Ingress Protection	IP65
Ambient Temp.	-40 - +100 ºC
Sample Temp.	0 - +125 ºC
Measuring range	0-16 bar (4-20ma, 2-wire 24VDC loop powered)
Sample connection	G½" mail thread
Length	approx. 135 mm
Details and Ex.	See chapter **12.6.2. ATEX Certificate, Danfoss** page **182**.

General pressure transmitter requirements:

Type	4-20mA, (2-wire 24VDC loop powered)
Ingress Protection	as for the particular application.
Ambient Temp.	-25 - +55 ºC
Sample Temp.	0 - +65 ºC
Measuring range	0-16 bar (any range 0-10 bar to 0-25 bar can be used)
Sample connection	G½" male thread
Ex. Class	must comply with the particular hazardous area

3.3. System Interfaces

This section contains a list over electrical interfaces in the system with an electrical sample pump.
More details about these signals' setup can be found in chapter **7.8. Setup of parameters** page **68** and about their connections in chapter **10.10. Electrical** page **139**.

Description	Type	Unit	Subunit	Terminal
Mains, Computer unit	85-265VAC, 50/60Hz, 1-phase	Computer	Power unit	1, 2
Mains, Converting unit	440VAC, 60Hz, 3 phase/ 380VAC, 50Hz, 3 phase	Converting	Power terminals	41-43
Communication, internal	Modbus RTU, RS485	Computer/ Converting internal	Comp. I/O Conv. I/O Zener Barrier	17-19 21-23
Communication, internal	Ex[3], patented	Converting/ Analyzing/ internal Analyzing	Zener Barrier/ Connection box/ Measuring cell	ZMC 1, 2/ Header Socket
Communication, external (optional)	Modbus RTU, RS485	Computer	Comp. I/O	44-46
Flow meter inputs ZF1 ZF2 CVF	 Ex[4], 4-20mA, active,24VDC Ex[4], 4-20mA, active,24VDC 4-20mA, passive	 Converting Converting Converting	 Zener Barrier Zener Barrier Conv. I/O	 ZF1 ZF2 CVF
Pressure transmitter input (internal)	Ex[5], 4-20mA, active,24VDC Cable, preinstalled	Converting/ Analyzing/ Analyzing	Zener Barrier/ Connection box/ Pressure transm.	ZP 7, 8 2, 1
Overboard valve control EL1 EL2	 Relay, potential free Relay, potential free	 Computer Computer	 Power unit Power unit	 3, 4 5, 6
Manual override output	Relay, potential free	Computer	Power unit	7, 8, 9
Alarm output	Relay, potential free	Computer	Power unit	10,11,12
GPS receiver	NMEA 0183, 4800 baud	Computer	Comp. I/O	21-23
VDR transmitter (optional)	RS422, 4800 baud	Computer	Comp. I/O	41-43
Overboard valve position input EL1 EL1-INV (open indicate open) EL1-ZD1 EL2 EL2-INV (open indicate open) EL2-ZD2	 12 VDC, 10mA 12 VDC, 10mA Ex[6], 7 VDC, 10mA 12 VDC, 10mA 12 VDC, 10mA Ex[6,]7 VDC, 10mA	 Computer Computer Converting Computer Computer Converting	 Comp. I/O Comp. I/O Zener Barrier Comp. I/O Comp. I/O Zener Barrier	 26, 27 26, 27 ZD1 28, 29 28, 29 ZD2
Speed log input	12 VDC, 10mA	Computer	Comp. I/O	30, 31
El. Sample pump control	Contactor 440 VAC	Converting	Power terminals	44-46
Fresh water valve control	Relay, 24 VAC	Converting	Conv. I/O	3, 4
Sample select control S1 S2	 Relay, 24 VAC Relay, 24 VAC	 Converting Converting	 Conv. I/O Conv. I/O	 5, 6 7, 8
Feedback for optional manual Sample pump motor switch	12 VDC, 8mA	Converting	Conv. I/O	13, 14
Sample pump contactor feedback	12 VDC, 8mA	Converting	Conv. I/O	15, 16
High oil temp sample pump	12 VDC, 8mA	Converting	Conv. I/O	17, 18
Overcurrent input, internal	24 VAC	Converting	Conv. I/O	26, 27
Manual fresh water valve position input	Ex[6,] 7 VDC, 10mA	Converting	Zener Barrier	ZD4

Unit and Subunit locations: item, cabinet
Computer unit, Power unit: d1, **CTB10001p sheet 3, Computer Unit with open door** page **99**
Computer unit, Comp. I/O d5
Converting unit, Power Terminals d3, **CTB10003 sheet 3 of 4, Converting Unit** page **103**
Converting unit, Conv. I/O d5
Converting unit, Zener Barrier d6
Analyzing unit, Connection box d1, **CTB10015 sheet 3 of 3, Analyzing unit skid with electrical Ex. motor sample pump** page **107**
Analyzing unit, Measuring cell d2
Analyzing unit, Pressure transmitter d4

[3]Interface for intrinsically safe communication between the Zener barrier and the Measuring cell.
[4]Interface for intrinsically safe flow meter only.
[5]Interface for intrinsically safe pressure transmitter only.
[6]Interface for intrinsically safe potential free contact.

4. Installation

This chapter contains advice for the installation of CleanTrack 1000 B equipment on board tankers. The advice given in this chapter is of general validity and should be supplemented with a detailed installation specification for the particular ship. Additionally, all applicable regulations regarding the installation standard, issued by the relevant authorities and classification society must be followed.
For instance, if CENELEC applies, compliance is required with EN 60079-14 and EN 60079-17.

4.1. Computer Unit

4.1.1. Mechanical

Refer to drawings/chapters:

- CTB10030 sheet 1, chapter **10.1. Computer Unit** page **98**. Both wall and panel mount options are shown.
- **P3715090 sheet 1, Computer Unit panel mount instructions** page **100**.

The Computer Unit is installed in the cargo control room or an equivalent dry and non-hazardous area.

4.1.2. Electrical

Refer to one of the drawings below:

- CTB110204.1el, chapter **10.10.1. Electrical cable diagram for electrical Ex. motor sample pump** page **139**.
- CTB110204.1bh, chapter **10.10.2. Electrical cable diagram for bulkhead mounted sample pump** page **140**.
- CTB110204.1pn, chapter **10.10.3. Electrical cable diagram for air motor sample pump** page **141**.

Supply voltage should be single phase 110/220VAC, 50-60Hz.
(Computer unit work on voltages 85 – 265VAC).
Power consumption 30VA.
The power supply should be equipped with a main switch, or if specified, a detachable connector.
The fuse size should be 6A.

The alarm relay is normally open. An activated alarm is indicated with an open relay, which means that the alarm is activated when the power supply fails.

Data communication between Computer Unit and Converting Unit, Cb5:

Type:	RS485	
Baudrate:	19200 baud.	
Length:	≤1200 meters.	(Might be shorter depending on cable used, see RS485 standards.)

4.2. Converting Unit

4.2.1. Mechanical

Refer to drawing:

- CTB10003 sheet 1, chapter **10.2. Converting Unit** page **101**.

The Converting Unit should be mounted vertically in a non-hazardous area, normally in the engine room, as close as possible to the Analyzing Unit at the other side of the bulkhead. The unit should be provided with enough space to open the cabinet door.

4.2.2. Electrical

Refer to drawings:

- **CTB10003 sheet 2 of 4, Converting Unit** page**.102.**
- **CTB10003 sheet 3 of 4, Converting Unit** page **103.**
    - Item d7 = equipotential rail, in the text below.
    - Item d8 = PE rail, in the text below.

For electrical explosion proof motor sample pump:

- **CTB10907 sheet 1 of 1, GA-plan with skid Ex. motor sample pump** page **131**.
- **CTB10917 sheet 1 of 1, GA-plan with skid Ex. motor sample pump and flushing** page **132**.
- **CTB10908 sheet 1of 1, GA plan with free standing Ex. Motor sample pump** page **133**.
- **CTB110204.1el, electrical cable diagram for electrical Ex. motor sample pump** page **139**.

For electrical bulkhead penetration sample pump:

- **CTB10906 sheet 1 of 1, GA-plan with bulkhead penetrating Sample pump** page **134**.
- **CTB10916 sheet 1 of 1, GA-plan with bulkhead penetrating Sample pump and flushing** page **135**.
- **CTB110204.1bh, electrical cable diagram for bulkhead mounted sample pump** page **140**.

For air motor sample pump:

- **CTB10901 sheet 1 of 1, GA-plan with air motor sample pump** page **136**.
- **CTB10911 sheet 1 of 1, GA-plan with air motor Sample pump and flushing** page **137**.
- **CTB10903 sheet 1 of 1, GA-plan with pilot-controlled air motor sample pump** page **138.**
- **CTB110204.1pn, electrical cable diagram for air motor sample pump** page **141**.

Refer also to the document “INSTRUCTIONS Oil Monitor interface type Z11”

- Chapter **4.9. Zener Barrier Instructions and Replacement** page **26.**

The power supply should be equipped with a main switch, or if specified, a detachable connector. Fuse size should be 3 x 10A for Converting Units equipped to supply electrical motor sample pumps and a 6A fuse for air motor sample pumps. Check that the supply voltage corresponds to the voltage specified on the label below the mains terminals.

An optional manual on/off switch can be installed in the safe area on Cb2 between the converting unit and the sample pump. And an additional normally closed help contact can then be monitored by the unit.

Shields of cables for intrinsically safe equipment in both hazardous and non-hazardous area should normally be electrically connected to earth at one point only, normally in the non-hazardous area end of the circuit loop. This requirement is to avoid the possibility of the screen carrying a possibly incentive level of circulating current in the event that there are local differences in earth potential between one end of the circuit and the other.

All shields of Cb7 and other cables for intrinsically safe equipment connected to the Zener Barrier PCB should be connected to earth. This is made via the equipotential rail (see CTB10003 sheet 3 page 103, item d7) located below the Zener Barrier PCB at the right side in the Converting Unit. The rail is from factory connected to the PE rail (see CTB10003 sheet 3 page 103, item d8) located at the low left side in the Converting Unit. The PE rail shall be connected to ground/earth (and the equipotential rail is then also connected to ground/earth).

If another earthing system is preferred for the cable shields of the intrinsically safe equipment the equipotential rail should be disconnected from the PE rail and instead connected to the preferred earthing system.
Connections must satisfy the requirements of the relevant classification society.

Keep Cb7 and other cables connected to intrinsically safe circuits separated from non-intrinsically safe circuit cables.

Data communication between Converting Unit and Analyzing Unit, Cb7:
Baudrate: 19200 baud.
Length: ≤50 meters.

4.3. Analyzing Unit

4.3.1. General drawings

For item numbers and piping of a typical arrangement refer to drawing:

- **CTB10601 sheet 1 of 1, Partnames of typical arrangement** page **130**.

The Analyzing Unit/Measuring Cell should be mounted vertically and lower than the sample outlet probe, to safeguard a positive pressure in the sample water system at all times.
For draining possibilities of the sample piping arrangement, the drain valve, item 42, should be the lowest point.
A separate draining possibility for the pump head of the sample pump is needed for some pump types.

4.3.2. Mechanical

For skid mounted electrical Ex. Motor sample pump refer to drawings/chapters:

- Chapter **10.3.1. Analyzing Unit skid with Ex. motor Sample** pump page **105**.

For free standing electrical Ex. Motor sample pump refer to drawings/chapters:

- Chapter **10.4. SPP-100 Sample pump with Ex. motor** page **120**.

For electrical bulkhead penetration sample pump refer to drawings/chapters:

- Chapter **10.3.2. Analyzing Unit with external Sample pump** page **108**.
- Chapter **10.5. Nikuni Sample pump for Bulkhead mounting** page **122**.
- Chapter **10.6. Matre Sample pump for Bulkhead mounting** page **125**.

For air motor sample pump refer to drawings/chapters:

- Chapter **10.3.4. Analyzing Unit with Air motor Sample pump** page **115**.

For retrofitting inside existing analyzing cabinet

- Chapter **10.3.3. Analyzing Unit with Freestanding items for External Sample pump** page **113**.
- Chapter **10.7. Connection box** page **127**.

The Analyzing Unit should be mounted in the pump room with 4 bolts welded clips on the pump room to engine room bulkhead as close as possible to the Converting Unit at the other side of the bulkhead or in an equivalent suitable location. The unit should be provided with enough space to open the cabinet door and enough space to facilitate cleaning of the Measuring Cell from above with a brush. There should also be space for operating the valve handles and taking grab samples.

The Analyzing Unit should be mounted lower than the sample outlet probe, to safeguard a positive pressure in the sample water system at all times.

Any valves having coated aluminum levers should be protected from falling objects.

4.3.3. Electrical

For skid mounted/free standing electrical Ex. Motor sample pump refer to drawings/chapters:

- Chapter **12.10.1. Orange1 instructions** page **201**
- **CTB110204.1el, electrical cable diagram for electrical Ex. motor sample pump** page **139**
- Chapter **10.3.1. Analyzing Unit skid with Ex. motor Sample** pump page **105**.
- Chapter **10.7. Connection box** page **127**

For electrical bulkhead penetration sample pump refer to drawings/chapters:

- **CTB110204.1bh, electrical cable diagram for bulkhead mounted sample pump** page **140**.
- Chapter **10.3.2. Analyzing Unit with external Sample pump** page **108**
- Chapter **10.7. Connection box** page **127**

For air motor sample pump refer to drawings/chapters:

- **CTB110204.1pn, electrical cable diagram for air motor sample pump** page **141**.
- **CTB10010 sheet 3 of 5, Analyzing unit with air motor sample pump** page **117**.
- **CTB10010 sheet 5 of 5, Analyzing unit with air motor sample pump** page **119**.
- Chapter **10.7. Connection box** page **127**

For retrofitting inside existing analyzing cabinet.

Mount a freestanding measuring cell mounted with its hood and a connection box on the backplane.
Refer to drawings/chapters:

- Use cable diagram above for the actual sample pump used.
- **CTB10601 sheet 1 of 1, Partnames of typical arrangement** page **130**.
- **10.3.3. Analyzing Unit with Freestanding items for External Sample pump** page **113**.
- Chapter **10.7. Connection box** page **127**

Refer also to the document "INSTRUCTIONS Measuring cell type CTB11"

- Chapter **4.10. Measuring Cell Instructions and Replacement** page **31** that also contains the drawings CTB10032, CTB10033 sheet 1 and CTB11036.

Check the Sample pump, the Measuring Cell and the Pressure transmitter documentation concerning intrinsically safety and that the equipment complies with the installation regulations for this particular hazardous area.

Connect Cb7, Cb3 and Cb3a to the Connection box. Terminate the Cables according to the electrical cable diagram for the actual sample pump used.

Shields of Cb7, Cb3 and Cb3a should all normally be connected to the equipotential rail in the Connection Box of the Analyzing Unit. The equipotential rail and shields are normally connected to earth in the nonhazardous area.

Cables Cb3 and Cb3a can also be directly wired from the flow meter to the Converting Unit without connections via the Connection box.

Make sure the Analyzing Unit and the Connection box is properly connected to earth according to the applicable regulations for this particular hazardous area.

If an electrical Ex Sample pump is used:
If a thinner cable, Cb2 is used than given in drawing **CTB10015 sheet 2 of 3, Analyzing unit skid with electrical Ex. motor sample pump** page **106** size down with a cable gland approved for the actual hazardous area and the pump temperature.
Make sure the frame of the explosion proof motor is properly connected to earth according to the applicable regulations for this particular hazardous area. Refer to maker's instruction chapter **12.10.1. Orange1 instructions** page **201** regarding connection of power supply and earth.

4.3.4. Inlet probe and Outlet stub

For basic convention requirements, see Resolution MEPC.108(49) chapter 6.3.

Refer to drawings in chapter **10.11. Sample probes** page **144**.

The inlet probe is mounted upstream of the outlet stub and the flow meter sensor should preferably be mounted between the inlet probe and the outlet stub. A positive water pressure must be available in the discharge line under all discharge conditions at the place where the inlet probe is located. The outlet probe shall be located higher than the analyzing unit outlet connection. The sample feed pump may be damaged if run dry for more than 10 seconds.

The sample valves and sample inlet filter should be located with adequate space and accessibility for servicing.

4.3.5. Piping of Sample Inlet and Outlet

Pipes: Tb11 and Tb13

For skid mounted/free standing electrical Ex. Motor sample pump refer to drawings/chapters:

- Chapter **10.9.2. GA-plan with Ex. motor Sample pump** page **131**.
- Chapter **10.3.1. Analyzing Unit skid with Ex. motor Sample** pump page **105**.

Recommended pipe dimensions for SPP-100 pump:

Pipe diameter	15x1 mm
Recommended maximum pipe length	10 m

According to response time calculations, maximum pipe length of Tb13 is 30 m. When using a long Tb13 pipe it is important to consider the pressure drop in Tb13, please see point 1.and 3. below in this chapter.

For electrical bulkhead penetration sample pump refer to drawings/chapters:

- Chapter **10.9.3. GA-plan with bulkhead penetrating Sample pump** page **134**.
- Chapter **10.3.2. Analyzing Unit with external Sample pump** page **108**.
- Chapter **10.5. Nikuni Sample pump for Bulkhead mounting** page **122**.
- Chapter **10.6. Matre Sample pump for Bulkhead mounting** page **125**.

Recommended pipe dimensions for Nikuni pump:

Pipe diameter	22x1 mm
Maximum pipe length	25 m (see points 1. and 3. below in this chapter)

For air motor sample pump refer to drawings/chapters:

- Chapter **10.9.4. GA-plan with Air motor Sample pump** page **136**.
- Chapter **10.9.5. GA-plan with pilot-controlled Air motor Sample pump** page **138**.
- Chapter **10.3.4. Analyzing Unit with Air motor Sample pump** page **115**.

Recommended pipe dimensions for air motor pump:

Pipe diameter	15x1 mm
Maximum pipe length	12 m (see points 1. and 3. below in this chapter)

***Other pipe dimensions than recommended above may be used but the 3 points below must be met at all time**:*

1. *A positive pressure must be secured in Tb13 to avoid starvation of the sample pump. Relevant pressure drop calculations should be made.*
2. *The Drain Valve should be the lowest point of the inlet and outlet piping for efficient draining to avoid freezing damage.*
3. *The sample flow time should be recalculated to each installation to make sure that the requirements regarding total system response time is satisfied. See chapter **4.6. Response time calculations** page **23**.*

The sample valves and sample inlet filter should be located with space for accessibility and servicing.

4.3.6. Piping for Fresh water (Option)

Pipe: Tb8

For skid mounted electrical Ex. motor sample pump refer to drawing:

- **CTB10917 sheet 1 of 1, GA-plan with skid Ex. motor sample pump and flushing** page **132**.

For electrical bulkhead penetration sample pump refer to drawing:

- **CTB10916 sheet 1 of 1, GA-plan with bulkhead penetrating Sample pump and flushing** page **135**.

For air motor sample pump refer to drawing:

- **CTB10911 sheet 1 of 1, GA-plan with air motor Sample pump and flushing** page **137**.

The pipe should be provided with a shut of valve close to the bulkhead penetration.
Bulkhead penetrations must satisfy the requirements of the relevant classification society.

The fresh water supply should be provided with one shut off and one vacuum check valve and one check valve. The fresh water temperature should not be lower than the sample water temperature. Suitable temperature is about 0º - 10º Celsius warmer than the sample water temperature. The water should, however, not be warmer than 65º Celsius.

The water consumption is about 200 to 600 l/h and is open about 45 seconds at start-up. It is also recommended to flush manually at closing down. This makes about 6-20 liters per start/stop.

The water pressure should not be higher than 5 bar and not less than 0.5 bar higher than the overboard line pressure at the sample outlet connection point.

4.3.7. Piping for Air motor (Air motor option only)

Pipe: Tb20

Refer to drawings/chapters:

- **CTB10601 sheet 1 of 1, Partnames of typical arrangement** page **130**.
- **10.3.4. Analyzing Unit with Air motor Sample pump** page **115**.

The supplied air should be clean and dry. The pressure is displayed on a pressure gauge inside the Analyzing Unit.
It is recommended to install a pressure regulator, a water trap and a filter.
Air pressure at the pump 5.2 bar
Air consumption, about 30 Nm³/h

Note: Before first startup it is important that eventual residues from air pipe cutting and other activities are removed before the pipe is connected to the analyzing unit or the Speck air sample pump. These residues might harm the motor of the Speck air sample pump.

Below table can be used as a guidance only for minimum pipe diameter for a given pipe length and a minimum initial pressure. The calculation is for a straight pipe, pressure drops at bends has not been taken in account. Make own calculations and have margin to allow the pressure regulator to work properly.

Pressure(final) = 5.2 bar (pipe inner diameter, [mm])

Pipe length, [m]	Initial pressure, [bar]																	
	5.6	5.8	6.0	6.2	6.4	6.6	6.8	7.0	7.2	7.4	7.6	7.8	8.0	8.2	8.4	8.6	8.8	9.0
100	17	15	14	14	13	13	12	12	12	11	11	11	11	10	10	10	10	10
95	16	15	14	13	13	12	12	12	11	11	11	11	11	10	10	10	10	10
90	16	15	14	13	13	12	12	12	11	11	11	11	10	10	10	10	10	10
85	16	15	14	13	13	12	12	12	11	11	11	11	10	10	10	10	10	10
80	16	15	14	13	13	12	12	11	11	11	11	10	10	10	10	10	10	9
75	16	14	14	13	12	12	12	11	11	11	10	10	10	10	10	10	9	9
70	15	14	13	13	12	12	11	11	11	11	10	10	10	10	10	9	9	9
65	15	14	13	13	12	12	11	11	11	10	10	10	10	10	9	9	9	9
60	15	14	13	12	12	11	11	11	11	10	10	10	10	9	9	9	9	9
55	15	14	13	12	12	11	11	11	10	10	10	10	10	9	9	9	9	9
50	14	13	13	12	11	11	11	10	10	10	10	10	9	9	9	9	9	9
45	14	13	12	12	11	11	10	10	10	10	10	9	9	9	9	9	9	8
40	14	13	12	11	11	11	10	10	10	10	9	9	9	9	9	9	8	8
35	14	12	12	11	11	10	10	10	9	9	9	9	9	9	8	8	8	8
30	13	12	11	11	10	10	10	9	9	9	9	9	8	8	8	8	8	8
25	13	12	11	10	10	10	9	9	9	9	9	8	8	8	8	8	8	8
20	12	11	11	10	10	9	9	9	9	8	8	8	8	8	8	7	7	7
15	12	11	10	9	9	9	9	8	8	8	8	8	7	7	7	7	7	7
10	11	10	9	9	8	8	8	8	7	7	7	7	7	7	7	7	6	6
5	9	9	8	8	7	7	7	7	7	6	6	6	6	6	6	6	6	6

4.4. Flow meter and Speed log

4.4.1. Flow meter general

"The monitoring system should comprise a flow rate indicating system to measure the rate of effluent being discharged into the sea."

Selection of flow meter type is optional. The flow meter should meet the following requirements according to IMO Resolution MEPC.108(49) chapter 6.4.

"A flow meter for measuring the rate of discharge should be installed in a vertical section of a discharge line or in any other section of a discharge line as appropriate, to be always filled with the liquid being discharged.

A flow meter should employ an operating principle suitable for shipboard use and, where relevant, which can be used in large diameter pipes.

A flow meter should be suitable for the full range of flow rates that may be encountered during normal operation. Alternatively, arrangements such as the use of two flow meters of different ranges or a restriction of the operational flow rate range may be necessary to meet this requirement.

The flow meter, as installed, should have an accuracy of ±10%, or better, of the instantaneous rate of discharge throughput the operating range for discharging the effluent. It might be necessary to limit the operational range of the discharge rate to achieve sufficient accuracy.

The design of the flow meter arrangements should have regard to the safety requirements of the space in which such metering arrangements are located."

Any flow transmitter, having an output signal of 4-20mA and that complies with the regulations that applie to the installation may be used. Follow the instructions for the selected flow meter.

Refer to chapter **7.8.2. ZF1 (Zener barrier flow input 1)** page **69**, **ZF2** and **CVF** for software programming.

4.4.2. BRANNSTROM standard flow transmitter.

Brannstrom Sweden has selected a flow transmitter that complies with the regulations and works well in the application.

See drawings:

- **CT891215.5, CleanTrack Flow meter unit, Vertical** page **146.**
- **CT900503.1, CleanTrack Flow meter unit, Horizontal** page **147.**

4.4.3. Speed log general

"The monitoring system should comprise a ship speed indicating device to give the ship's speed in knots."

The speed indication system should meet the following requirements according to IMO Resolution MEPC.108(49) chapter 6.5.

"The automatic speed signal required for a monitoring system should be obtained from the ship's speed indicating device[7] by means of a repeater signal. The speed information used may be either speed over the ground or speed through the water, depending upon the speed measuring equipment installed on board."

Refer to chapter **7.8.7. Speed** page **71** for software programming.

The speed log signal connected to CleanTrack 1000 B should be a pulse signal from a voltage free relay or switch. The pulse frequency should be proportional to the speed.
The data of the speed output signal should meet:

1. Minimum switch on or off time: 33 ms
2. Pulse frequency range: 45-250 pulses/nm.

[7] See "Recommendation on Performance Standards for Devices to Indicate Speed and Distance" (Annex to resolution A.824(19) as amended by resolution MSC.96(72)).

4.5. Paper Printer

Item d2 drawing **CTB10001p sheet 3, Computer Unit with open door** page **99**.

An optional paper printer module containing a paper printer and a paper rewinder can be installed in the Computer Unit. The module is fastened with 4 screws on the right side of the computer unit.
Electrically two cables from the printer and one from the rewinder is connected to the CUIO PCB at the bottom of the Computer Unit.

Printer manages thermal roll paper with heat-sensitive side on outside of roll.
Paper roll width: max 58 mm.
Paper roll diameter: max 50 mm.

4.6. Response time calculations

The overall response time should not be more than 40 seconds according to IMO Resolution MEPC.108(49) chapter 6.3.6.

The "*Overall response time*" includes the "*Response time of the installation*" and the "*Response time of the meter*".
"*Response time of the installation*" is the time to transport the fluid from the overboard pipe to the Measuring Cell. (The time it takes to transport the fluid in the Sample inlet pipe.)
"*Response time of the meter*" is the response time measured according to IMO Resolution MEPC.108(49) page 38.

The response time of the installation may be calculated by using the formula below:
(The example is for a sample pump with air driven motor.)

Response time of the sample piping = $\frac{A * L * 60 * 60}{Q}$ $[seconds]$

Where:
A = Cross sectional area of sample inlet pipe, $[m^2]$
L = Length of sample inlet pipe from sample probe to Measuring Cell, $[m]$
Q = Flow rate of Sample Pump, $[m^3/h]$

Response time of the oil content meter = 6.8 $seconds$

Example:
A (15 mm pipe) = $\pi r^2 = \pi * (\frac{0.013}{2})^2$ = 0.0001327 m^2
L = 10 m
Q = 0.240 m^3/h
Response time of the sample piping = $\frac{0.0001327 * 10 * 60 * 60}{0.240}$ = 19.9 $seconds$

Overall response time = $19.9 + 6.8 = 26.7$ $seconds$ *(maximum* 40 $seconds$ *allowed)*

Nominal flow of some sample pumps:

Sample pump with Ex motor (SPP-100)	600 *l/h*
Bulkhead mounted (Nikuni or Matre):	900 *l/h*
Sample pump with air driven motor:	240 *l/h*

4.7. First Start up Checklist

Very important that all electrical wires are properly tightened. A wire that falls on secondary side of the zener barriers or on an explosion proof electrical sample pump connection might cause serious damage.
Reference should also be made to chapter **6. Menu operations** page **42** and chapter **7. Menu layout** page **46.**

1. Check that the supply voltage, to be connected to the Converting Unit (Cb1) corresponds to the voltage mark, normally placed on lower left side inside the unit.
2. Check that all Zener Barriers are connected correctly (Cb7, Cb3 and optionally Cb3a). Verify that the intrinsically safe arrangements are in order for the cables. See chapter **4.11. Calculations on intrinsically safe arrangements** page **37**.
3. Check the Sample Pump connection (Cb2 or Cb4), communication to Computer Unit (Cb5) and eventual other connections to the Converting Unit PCB.
   If an explosion proof electrical sample pump is used:
   - check the motor frame to be connected to earth and that a correct cable gland is used and tightened.

   If an electrical motor bulkhead sample pump is used:
   - check and/or refill oil in pump shaft seal. See chapter **9.7. Sample Pump Shaft seal oil refilling** page **94**.

   If an air motor sample pump is used:
   - it is important that eventual residues from work with the air pipe and other activities are removed from the piping before the pipe is connected to the analyzing unit or the Speck air sample pump. These residues might harm the motor of the Speck air sample pump.
   - drain the water trap and adjust the pressure regulator until the pressure gauge in the Analyzing Unit cabinet shows 5.2 bar. See drawing: **CTB10010 sheet 5 of 5, Analyzing unit with air motor sample pump** page **119,** item d6.
4. If an electric sample pump is used, check the setting of the overcurrent relay to correspond to the current of the electrical sample pump motor. See item d1 of drawing: **CTB10003 sheet 3 of 4, Converting Unit** page **103**.
5. Connect mains to the converting unit and check that at least one light emitting diode on top right of both PCB's in the unit are lit or flashing.
6. Check that the supply voltage to be connected to the Computer Unit (Cb8b) corresponds to the voltage mark, normally placed on the lower left side inside the unit.
7. On the Computer unit also check connections for valve(s) (Cb8a) and feedback(s) (Cb13), for communication to Converting Unit (Cb5), GPS input (Cb29) and Log input (Cb12) if speed log is used.
8. Connect mains to the computer unit. After a few seconds 2 different "Brannstrom Sweden" will appear on the screen before the screen goes black again and about 2 minutes later the Cleantrack1000B software appears.
9. The following should be set up or checked at the Computer Unit, refer to chapter **7.8. Setup of parameters** page **68**.
   - Sample pump selected.
   - Flushing water configuration.
   - Manual override settings.
   - Converting unit type setting.
   - Valve control and feedback.
   - Pressure transmitter programming and limits.
   - Flow meter programming and limits.
   - Speed log programming and limits.
   - GPS input.
   - Printer option.

Check chapter **7.3. Alarm Table** page **54** for alarms and consult chapter **8. Fault-finding** page **83** for fault finding.

Communication is continuously going on between the Computer Unit, the Converting Unit and the Measuring Cell. This means that all communications must be in working order, if not communication alarms are generated.

If an air motor sample pump is used a second adjustment of the pressure regulator should be made while the sample pump is running. Setting the pressure gauge in the Analyzing Unit cabinet to 5.2 bar while the sample pump is running will also compensate for the pressure drop in the air pipe to the Analyzing Unit.

It should be checked that a running sample pump stops and activate a **"40 Alarm - High Work Pressure"** if a valve on the sample outlet line is closed.
It should be checked that a running sample pump stops and activate a **"41 Alarm - Low Work Pressure"** if a valve on the sample inlet line is closed.
To make suitable settings, see chapter **4.8. Pressure alarm settings** page **25** and chapter **7.8.5. Pressure** page **70**.

The pressure alarms above are important to avoid harming the Sample Pump unit, by pumping towards a closed valve (blockage) or pumping when dry (starvation). The pressure alarms are also important to detect a "loss of sample".

After finishing the first start-up it is recommended to save settings on a USB-stick. See chapter **7.5. USB** page **57**.

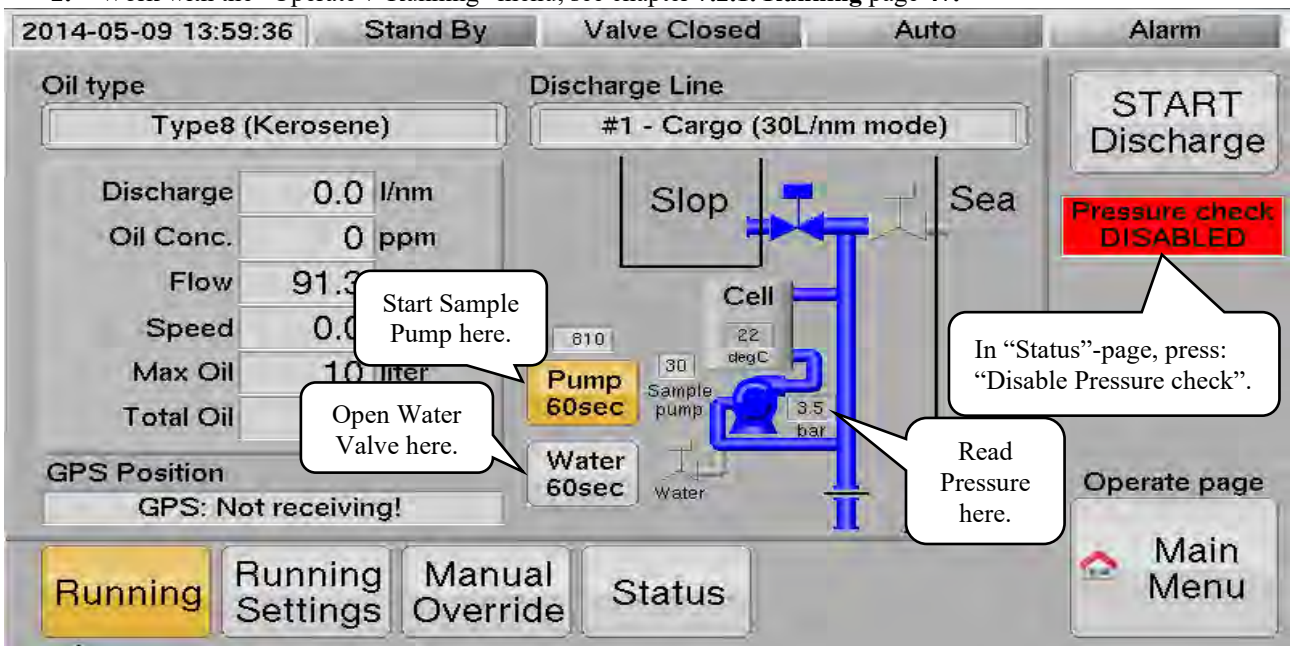
4.8. Pressure alarm settings

The pressure alarms are important to avoid to harm the Sample Pump unit, by pumping towards a closed valve or pumping when dry. The pressure alarms are also important to detect a "loss of sample". The calculations below show how to set these limits.

It should be checked that a running sample pump stops and activate a **"40 Alarm – High Work Pressure"** if a valve on the sample outlet line is closed.
It should be checked that a running sample pump stops and activate a **"41 Alarm – Low Work Pressure"** if a valve on the sample inlet line is closed.

If these settings need to be changed the status of the sample pump and its impeller should be checked.
Also check the measuring cell, the measuring cell outlet orifice and the inlet and outlet pipe for contamination.

1. Make the CleanTrack ready for "RUNNING" mode, see chapter **5.2. Start-up procedure** page **39** but without starting discharge. Ensure there is water in the overboard line, the sample inlet line and the sample pump so that the sample pump not is running dry.
2. Work with the "Operate"/"Running" menu, see chapter **7.2.1. Running** page **47.**



   Calculated pressure limits are inserted in the "Setup"/"Pressure"-page, see chapter **7.8.5. Pressure** page **70**.
3. In the "Status"-page select "Disable Pressure check", giving a flashing red indication at the right side.
4. With Sample Pump not running, read the Static Pressure from the overboard line,
   Pstatic = _____ bar (1). *0.5 bar (example values for* (1) *to* (8)*)*
5. Start the Sample Pump, read the Working Pressure,
   Pwork+Pstatic = _____ bar (2). *3.7 bar*
6. While the Sample Pump is running close a valve on the sample outlet, read the Closed Pressure,
   Pclose+Pstatic = _____ bar (3). *5.1 bar*
7. Subtract the static pressure to get work and close pressure:
   Pwork = (2) – (1) = _____ bar (4). *3.2 bar*
   Pclose = (3) – (1) = _____ bar (5). *4.6 bar*
8. Calculate the pressure increase when pumping against a closed valve,
   Pcloseinc = (5) – (4) = _____ bar (6). *1.4 bar*
9. High limit alarm should normally be set to work pressure multiplied by 0.4 the pressure increase,
   Pworkhigh = (4) + 0.4 * (6) = _____ bar (7). *3.8 bar*
   Set **"Sample High limit"** to this value, see chapter **7.8.5. Pressure** page **70**
10. Low limit alarm should normally be set to work pressure multiplied by 0.75.
    Pworklow = 0.75 * (4) = _____ bar (8). *2.4 bar*
    Set **"Sample Low limit"** to this value, see chapter **7.8.5. Pressure** page **70**
11. In "Status"-page select the earlier selected "Disable Pressure check", and the flashing red indication on the right side of the screen will disappear.
12. If the unit has automatic flushing, the same procedure can be repeated but with opening the Water Valve instead of starting the Sample Pump. The values to set are **"Water High limit"** and **"Water Low limit"**, they are set on the same page as the Sample limits are. These values might have to be changed when the pressure in the overboard pipe increases. The limits for fresh water are however not essential the same way as the sample limits are.
13. When finished following the relevant steps in the **5.3. Close down procedure** page **40**.

4.9. Zener Barrier Instructions and Replacement

Brannstrom Sweden AB
Roland Brännström
2012-07-03
ZB111205.1 rev B+, 5 pages.
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INSTRUCTIONS
Oil Monitor interface type Z11

Additional information
Comply with the regulations, which applies to the particular site in question, for installation and maintenance of electrical apparatus for explosive atmospheres. For instance, if CENELEC applies, compliance is required with EN 60079-14 and EN 60079-17.

Additional system information can be found in the Cleantrack manual.

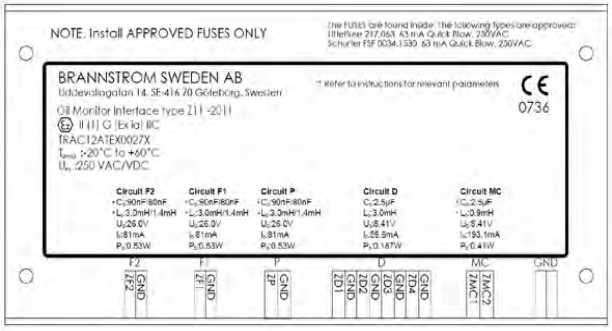
"Conditions of Use" for Ex Equipment or "Schedule of Limitations" for Ex Components:

The specifications detailed according to the section "Identification" below shall be observed.

1. The Z11 apparatus shall be placed only in a minimum IP54 approved enclosure if placed in outdoor environment and a minimum of IP20 if placed in a clean and dry environment for example indoors and office environments.
2. The reduced values of Co=80nF and Lo=1.4mH shall be applicable when the external circuitry connected to output circuits F1, F2 and P contains combinations of lumped capacitance and inductance.
3. Full value of the capacitance (Co) permitted and only 50% of the inductance (Lo) value shall be permitted if the external circuit at the MC output contains combinations of lumped capacitance and inductance greater than 1% of the permitted values of Co or Lo.

1

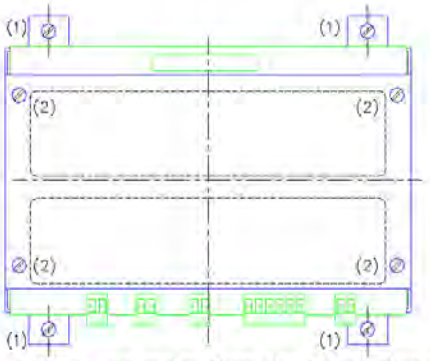
Identification.



Note: This instruction also applies to systems manufactured later then 2011. I.e. any number can appear instead of "2011".

2

Disengage the Oil Monitor Interface from the Converting unit.

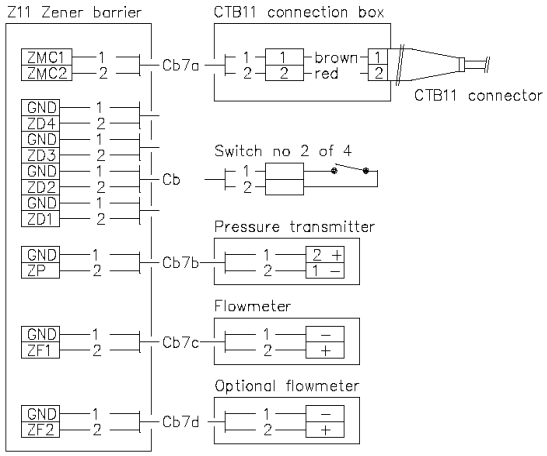


1. Disconnect mains from the Converting unit.
2. Disconnect the cable terminators from the Oil Monitor Interface.
3. Disconnect the ribbon-cable by pulling the two locker handles apart. Alternatively disconnect the terminals adjacent to the ribbon cable connector.
4. Disconnect GND.
5. Dismount the four screws (1) fixing the Oil Monitor Interface.

Install the Oil Monitor Interface in the Converting unit

6. Install the Oil Monitor Interface with four M4 screws (1).

Electrical connection.



7. Cut and isolate not used cores. Disconnect the cable terminators before connecting the cable cores in order to simplify work. Connect cable shields to earth rail. Fix the cables in order to make them resistant to vibrations.
8. Connect GND to earth rail. Use a 4mm2 plain stranded copper conductor. Fix the cable in order to make it resistant to vibrations.
9. Connect the ribbon cable. Make sure that the connector is in the correct position before it is pushed in. Secure the connector by pulling together the two latches.

Alternatively the connection can be made through adjacent disconnectable terminals, denoted 1 to 5, in accordance with following connection instructions:

1 Power supply 24VAC.
2 Power supply 0VAC.
3 RS422 A
4 RS422 B
5 RS422 GND.

NOTE: Connections to hazardous area is only allowed to the lower side of Z11.

4

Maintenance and repair.

10. The Oil Monitor interface Z11 is equipped with replaceable fuses. Disengage the lid by dismounting the four screws (2). Three fuses are to be found under the lid. From left to right the fuses protect circuits
* F2, F1 and P
* D
* MC
Only use fuses according to instructions on the lid.
Don't touch anything else under lid.

11. Put up the lid and remount screws (2).

Additional information to be noted:

AA) There are no serviceable parts in the Z11 Oil Monitor interface.

5

4.10. Measuring Cell Instructions and Replacement

Brannstrom Sweden AB
Roland Brännström
2011-07-03
CTB111214.1 rev B+, 3 pages.
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INSTRUCTIONS
Measuring cell type CTB11

Additional information
Comply with the regulations, which applies to the particular site in question, for installation and maintenance of electrical apparatus for explosive atmospheres. For instance, if CENELEC applies, compliance is required with EN 60079-14 and EN 60079-17.

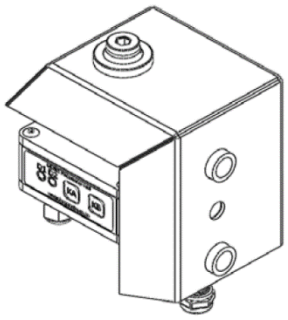
Additional system information can be found in the Cleantrack manual.

"Conditions of Use" for Ex Equipment of "Schedule of Limitations" for Ex Components:

The specifications detailed according to the section "Identification" below shall be observed.

1. The measuring cell has to be installed against a bulkhead or a wall in a console made out of stainless or painted mild steel according to the figure provided in the instruction manual or if necessary to be built in an enclosure.
2. The enclosure of the measuring cell must be earthed to avoid electrostatic discharges.
3. The connection cable capacitance shall not exceed 0.5µF and the cable inductance shall not exceed 0.70mH.

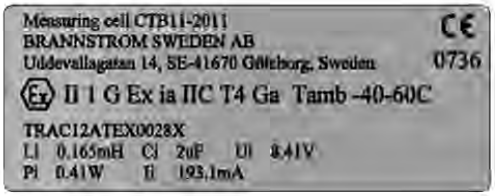
The housing of the measuring cell is partly made of aluminium and shall not be subject to



impacts or friction in order to avoid sparks.

1

Identification.



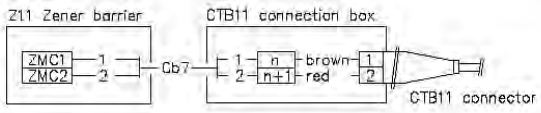
Note: This instruction also applies to systems manufactured later then 2011. I.e. any number can appear instead of "2011".

Installation of adaptor and connection box

1) Mount a console according to drawing CTB11036 on a vertical bulkhead. In order to obtain a double enclosure the upper right corner of an enclosure can form the console. The purpose of the consol is shown on drawing CTB10033 page 1.
2) A junction box for intrinsically safe circuits is placed close enough to the console. The distance is limited by the CTB11 0.5m cable length. Provide the junction box with a diameter 18mm hole. NOTE, the chassis connector is sealed with an O-ring. In order to obtain the proper degree of protection it is important that the surface of the enclosure around the hole has enough surface roughness.
A proposal of electrical connection is shown on CTB10033 page 1. Fit the inside of the junction box with 2 terminals close enough to the hole. Installation of a CTB10033_p1:d2 wire length shorter than 150mm from chassis connector to terminal bock CTB10033_p1:d1 is recommended. Any arrangement inside the junction box must comply to regulations, which applies to the particular site in question.
3) Mount the CTB11 adaptor with a M10x24 bolt.
4) The adaptor is equipped with three 1/4" BSP internally threaded holes for pipe connections. The hole on the top is for sample outlet. Any or both of the other holes is used for sample inlet. Install a plug in any unused holes.
5) The CTB11 adaptor can be earthed via the bulkhead or the connected pipes. If this is not the case the CTB11 adaptor has to be connected with an earth cable to the equipotential bonding system.

Electrical connection.

1) Install the chassis connector in the junction box.
2) Install cables according to the schematics below.



Electrical schematics

2

Assembling the CTB11 measuring cell to the adaptor.
See drawing CTB10032, Measuring Cell replacement.

1) Install the rubber seal.
2) Check that the measuring cell is equipped with the proper orifice flange.
3) Put in the two O-rings in the CTB11 adaptor.
4) Insert the top pipe of the CTB11 measuring cell in the rubber seal.
5) Mount the four screws intended to fix the CTB11 measuring cell to its adapter.
6) Connect the connector to the junction box.

Disassemble the CTB11 Measuring cell from the adaptor.
See drawing CTB10032, Measuring Cell replacement.

1) Close inlet and outlet sample valves.
2) Open the grab sample/drainage valve in order to empty the sample pipes.
3) Disconnect the connector from the junction box.
4) Remove the four screws fixing the CTB11 measuring cell to its adapter.
5) Pull out the top pipe of the CTB11 measuring cell from the rubber seal.

Additional information to be noted:

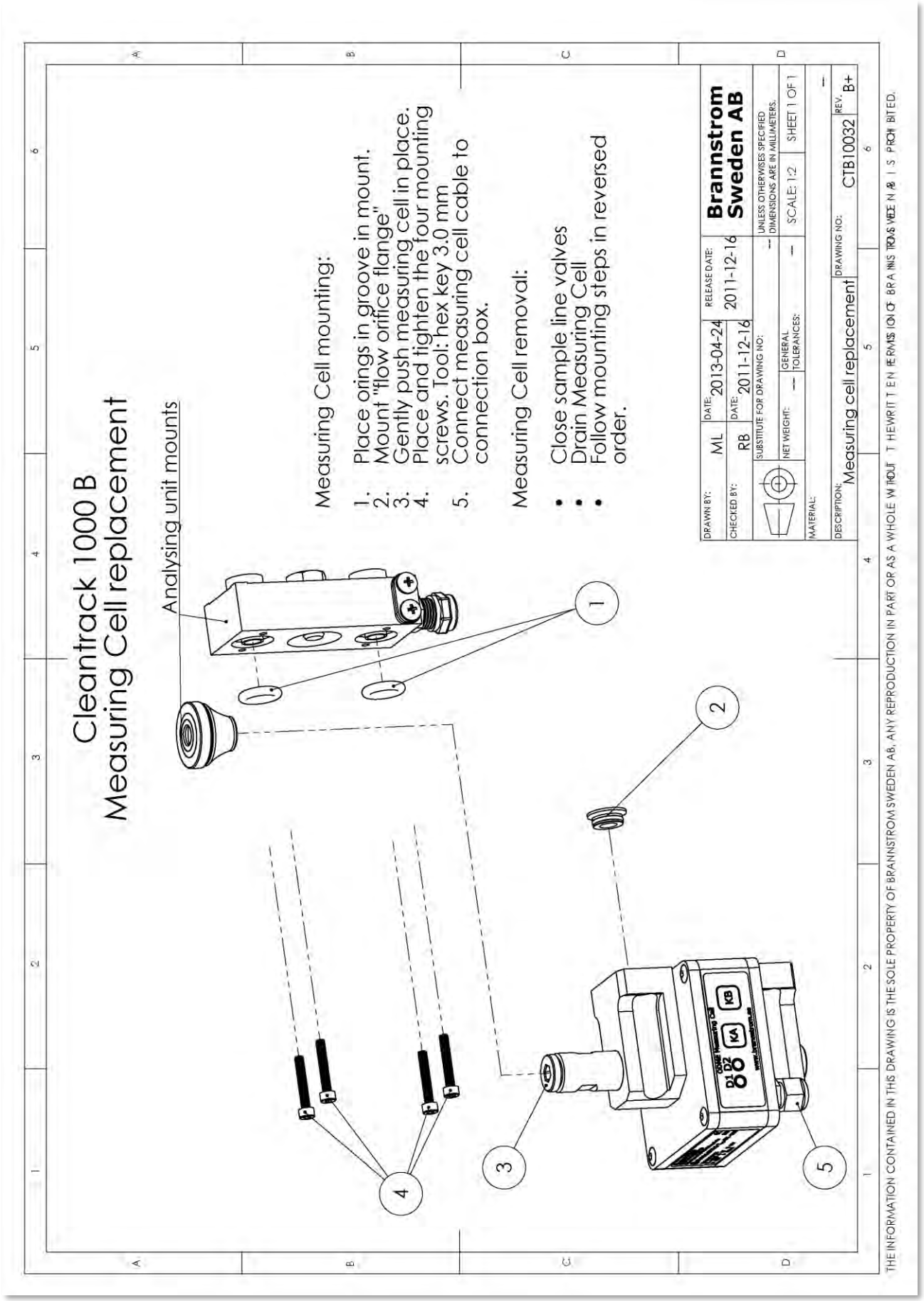
AA) If the unit after long time period is reacting abnormal, the glass pipe inside shall be cleaned manually by using the brush supplied in the spare part kit set.
When cleaning manually, make sure the system is depressurised, remove the top plug, and insert carefully the brush. Move up and down until the glass pipe is cleaned.

BB) The CTB11 measuring cell is equipped with two seals in the form of labels "Void if seal is broken". If any of the labels are broken the CTB11 measuring cell may NOT be used. The measuring cell may only be repaired by Brannstrom Sweden AB.

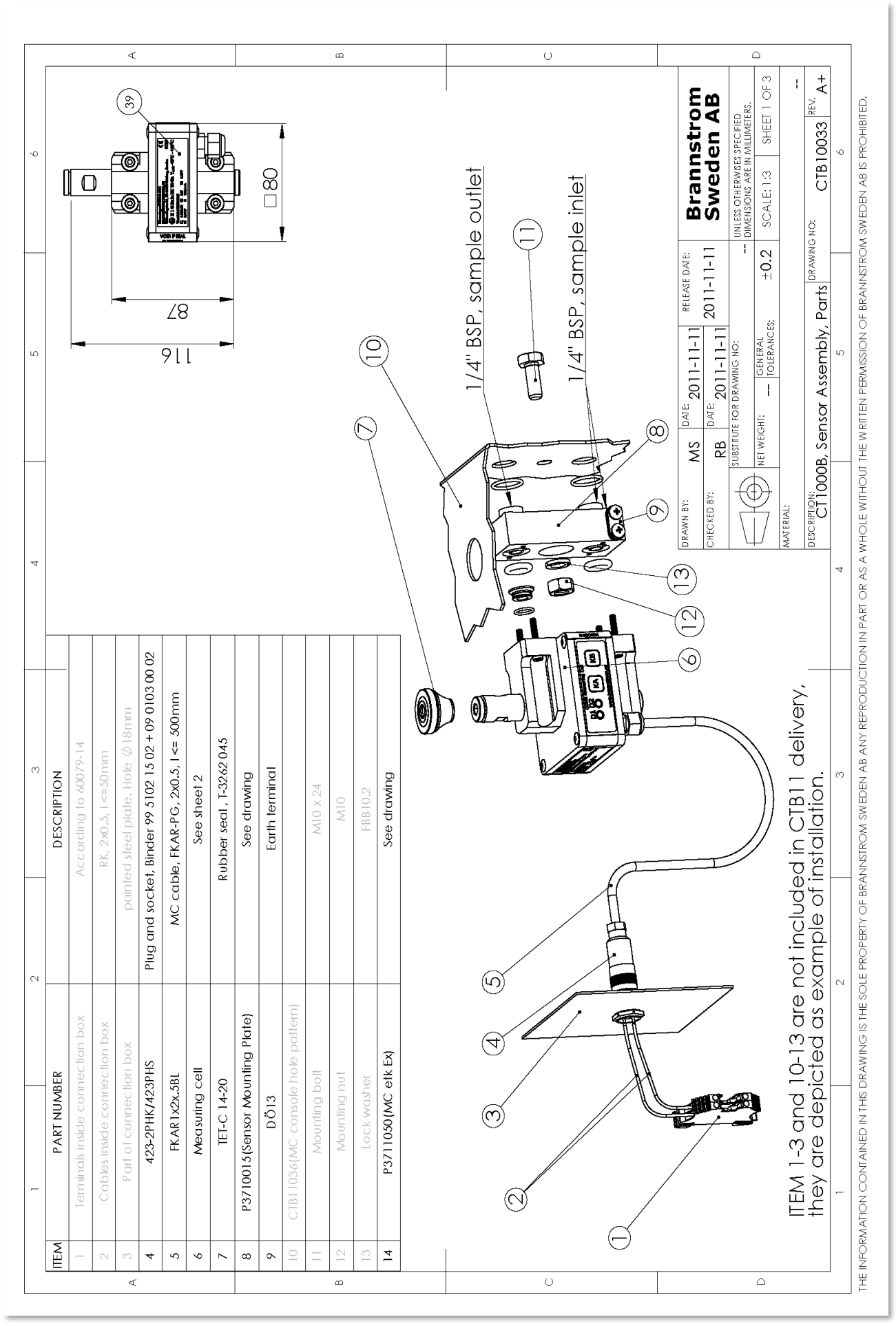
Attachments:
Drawing CTB10033 page 1, CT1000B Sensor assembly, parts.
Drawing CTB10032, Measuring Cell replacement.
Drawing CTB11036, MC console hole pattern.

3

4.10.1. Measuring Cell replacement (CTB10032)

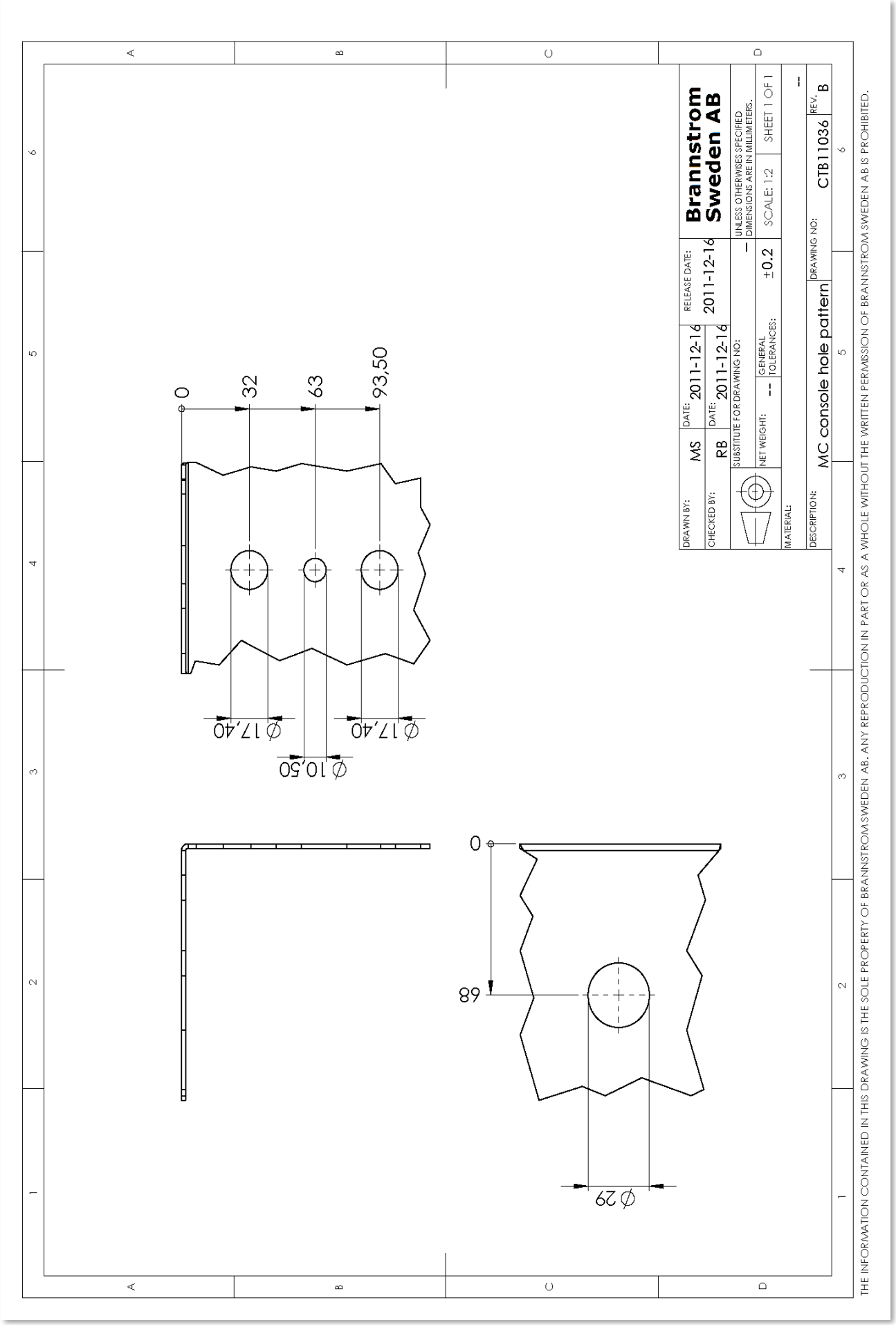


Drawing: CTB10033 sheet 1, Measuring Cell assembly and connection.



ITEM	PART NUMBER	DESCRIPTION
1	Terminals inside connection box	According to 60079-14
2	Cables inside connection box	RK, 2x0.5, l<=50mm
3	Part of connection box	painted steel plate, Hole Ø18mm
4	423-2PHK/423PHS	Plug and socket, Binder 99 5102 15 02 + 09 0103 00 02
5	FKAR1x2x.5BL	MC cable, FKAR-PG, 2x0.5, l<= 500mm
6	Measuring cell	See sheet 2
7	TEF-C 14-20	Rubber seal , T-3262 045
8	P3710015(Sensor Mounting Plate)	See drawing
9	DÖ13	Earth terminal
10	CTB11036(MC console hole pattern)	
11	Mounting bolt	M10 x 24
12	Mounting nut	M10
13	Lock washer	FBB10.2
14	P3711050(MC etk Ex)	See drawing

Drawing: CTB10036 sheet 1, Measuring Cell console hole pattern.



4.11. Calculations on intrinsically safe arrangements

This chapter is a guidance, and nothing but a guidance, on how to demonstrate the intrinsically safety margins of the installation. The installation engineer, and no one but the installation engineer, is responsible for the intrinsically safety of the installation. No responsibility is given for the data below. Correct data is printed on the actual included apparatus or its certificate.

The Zener barriers, ZBs, in the Converting Unit are arranged to supply 5 separate intrinsically safe circuits, ISC. The following data applies to zone IIC.

Table of entity parameters

Parameter	Circuit F2	Circuit F1	Circuit P	Circuit D	Circuit MC
Co	90nF/80nF	90nF/80nF	90nF/80nF	2.5µF	2.5µF
Lo	3mH/1.4mH	3mH/1.4mH	3mH/1.4mH	3mH	0.9mH
Uo	26V	26V	26V	8.41V	8.41V
Io	81mA	81mA	81mA	59.6mA	193.1mA
Po	0.53W	0.53W	0.53W	0.187W	0.41W

ISF2/F1 Intrinsically safe Flow meter.
- Values below from Fuji flow meter, type FCX-AIII or FCX-AII. See chapter **12.9. Flow meter, Fuji** page **198.**

ISP Intrinsically safe Pressure transmitter.
- Values below from Siemen's type 7MF156x.

ISD Intrinsically safe mechanical switch.
- Values below from an unspecified type.

ISMC Intrinsically safe Measuring Cell
- Values below from Measuring Cell type CTB11.

Note: The values for ISF2/F1, ISP and ISD depend on the actual apparatus.

Parameter	ISF2	ISF1	ISP	ISD	ISMC
Ci	26nF	26nF	0nF	0nF	2µF
Li	0.6mH	0.6mH	0mH	0mH	0.165mH
Ui	28V	28V	30V	28V	8.41V
Ii	94.3mA	94.3mA	100mA	100mA	193.1mA
Pi	0.66W	0.66W	0.750W	----	0.41W

Any apparatus should relate to the supplying zener barrier circuit in the following way:
$Pi \geq Po$
$Ui \geq Uo$
$Ii \geq Io$
$Co - Ci = Cm$
$Lo - Li = Lm$

Below follows Cm and Lm margins based on the circuit and apparatus data below:

Parameter	Circuit F2/ISF2	Circuit F1/ISF1	Circuit P/ISP	Circuit D/ISD	CircuitMC/ISMC
Cm	54nF	54nF	80nF	2.5µF	0.5µF
Lm	0.8mH	0.8mH	1.4mH	3mH	0,735mH
Ccable	200pF/m	200pF/m	200pF/m	200pF/m	200pF/m
Lcable	1µH/m	1µH/m	1µH/m	1µH/m	1µH/m

The Ccable and Lcable are typical values given in EN_60079-14, calculation for the actual cable in use shall be made.

Maximum cable length for Circuit F/ISF is 270m.
- If wiring is both in cable Cb3 and Cb7, values for actual length in both cables must be added.

Maximum cable length for Circuit P/ISP is 400m.
Maximum cable length for Circuit D/ISD is 3000m.
Maximum cable length for Circuit MC/ISMC is 735m.
- The maximum tested length of this cable, Cb7, is 100m.

Also check the temperature class of installed intrinsically safe apparatus and if the specified zone is acceptable.

Concerning cables to intrinsically safe equipment the writing in the standard, IEC 60079-14, is:

“12.2.2.2 Electrical parameters of cables

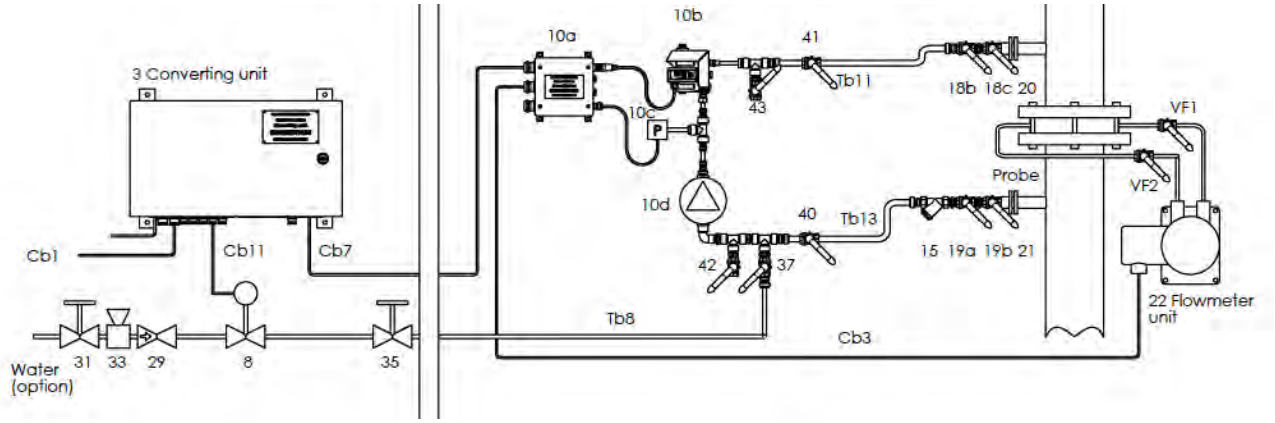
The electrical parameters (*C*c and *L*c) or (*C*c and *L*c/*R*c) for all cables used (see 12.2.5) shall be determined according to a), b) or c):

a) the most onerous electrical parameters provided by the cable manufacturer.

b) electrical parameters determined by measurement of a sample.
NOTE Annex C details a satisfactory method of determining the relevant parameters.

c) 200 pF/m and either 1 μH/m or 30 μH/Ω where the interconnection comprises two or three cores of a conventionally constructed cable (with or without screen).”

5. Start/Stop procedure



5.1. General information before Start-up

- ***Use protective goggles and follow normal occupational safety on a ship.***
- ***Prevent the sample pump from running dry or against a closed valve.***
- ***The ambient temperature and the sample water temperature must be within limits, see chapter* 3. Analyzing unit types: *page12*.**
- ***The overboard line must be filled with sample water.***
- ***Pressure settings correct according to chapter* 4.8. Pressure alarm settings *page* 25.**

5.2. Start-up procedure

1. Check the sample pump
   If the sample pump is powered by an electrical Ex. proof motor:
   - Check mounting and cable penetrations of the motor to be tightened and in order.
   - Check pump connections and fittings to be tightened and in order.

   If the sample pump is bulkhead mounted:
   - Check Sample Pump Shaft seal oil level.
     See chapter **9.7. Sample Pump Shaft seal oil refilling** page **94**.
   - Check pump connections and fittings to be tightened and in order.
   - Open the analyzing unit cabinets drain valve on the cabinets lower left side.

   If the sample pump is powered by an air motor:
   - Open the analyzing unit cabinets drain valve on the cabinets lower left side.
2. Inspect and clean the Inlet Sample Filter, pos 15. See chapter **9.6. Cleaning of Inlet Filter** page **94**.
3. Check that the Measuring Cell is mounted in its Analyzing unit docking position.
   It might have been removed for cleaning or service., see chapter **10.8. Measuring Cell replacement** page **129**.
4. Remove the Measuring Cell Cleaning Cap and brush the Measuring Cell pipe with the cell brush dipped in cleaning solution.
5. Check that the Flow Meter capillary Valves, pos VF1 and VF2 above are open.
6. Check that the Drain Valve and the Grab Sample Valve, pos 42 and 43 are closed.
7. Open all valves of the inlet pipe, pos 19a, 19b and 40.
8. Open the Grab Sample Valve, pos 43 slightly and bleed out any air until the inlet pipe Tb13, the Sample Pump and the Measuring Cell are filled with water from the overboard line.
9. Close the Grab Sample Valve, pos 43.
10. Check for leakages around the Measuring Cell and inside the Analyzing unit.
11. Open all valves of the outlet pipe, pos 41, 18b and 18c.
12. If automatic Fresh Water flushing is installed, check that Fresh Water Valves, pos 31, 35 and 37 are open.

13. Prepare the Converting unit/Sample pump.
    If the sample pump is powered by an electrical motor.
    - Check that power is connected to the Converting unit.

    If the sample pump is powered by an air motor:

    See chapter **10.9.4. GA-plan with Air motor Sample pump** page **136** and drawing **CTB10010 sheet 4 of 5, Analyzing unit with air motor sample pump** page **118**.
    - Check that the air motor Exhaust protection (muffler) is not clogged.
    - Open the valve, pos 44, between the Analyzing Unit and the Exhaust protection.
    - Drain the air supply water trap and check that all air supply valves are open. Check that the air pressure is 5.2 bar (on the Analyzing Unit air motor pressure gauge) when the Sample Pump is running.
    - Open valve, pos 32 after the air supply water trap and all other air supply valves.
14. Check that there are no alarms on the Computer unit, and if necessary, reset and fix the alarms.
15. Select "Discharge line", "Oil type" and check that "Total Quantity of Oil Discharge" is set to 1/30000 of previous cargo. Note that the "Total Quantity of Oil Discharge" should be reset only when starting a new cargo voyage (See MARPOL Annex I regulations).
    See chapter **7.2.2. Running Settings,** page **48**.
16. Press the "Start Discharge" key on the Computer Unit's "Operate" page and confirm start on the next popup window.
17. If automatic Fresh Water Control is installed: A flushing procedure of about 45 seconds can be selected first.

5.3. Close down procedure

1. Press the "Stop Discharge" key on the Computer Unit's "Operate" page and confirm stop on the next popup window.
2. If automatic Fresh Water flushing is installed, flush the Analyzing unit manually via the Computer unit menu.
3. Check that the overboard valve is closed.
4. Check that the sample pump has stopped.
   If the sample pump is powered by an electrical motor:
   - Check that the motor fan is not moving.

   If the Sample pump is powered by an air motor:
   - Check that no air flows out of the Exhaust protection (muffler).
5. If automatic Fresh Water flushing is not installed and the piping & analyzing unit has been contaminated, manually flush the Analyzing unit and the piping to the overboard pipe using a temporary flushing hose.
6. Close down Converting unit/Sample pump
   If the sample pump is powered by an electrical motor.
   a. Verify the Computer unit to be without any remaining alarm conditions and with power supply connected.[8]

      In case of alarm conditions or power supply failure, follow recommendations in chapter **8. Fault-finding** page **83**.
      Refer also to chapter **8.1. Malfunction of Computer/Converting unit** page **83** and actions further down in the chapter referring to separate alarms.
   b. Or, disconnect the power supply from the Converting unit.

   If the Sample pump is powered by an air motor:

   Refer to chapter **10.9.4. GA-plan with Air motor Sample pump** page **136**.
   - Close valve 32 and all other air supply valves.
   - Close the valve between the Analyzing Unit and the Exhaust protection, pos 44.

[8] *For units with software version higher than 2.200 and with sample pump feedback enabled. Other units should be upgraded.*

7. Close inlet and outlet valves, pos 40, 41, 19a, 19b, 18b and 18c.
8. If automatic Fresh Water is installed, close Fresh Water Valves, pos 31 and 35.
9. Close Flow Meter capillary Valves, pos VF1 and VF2.
10. Close the drain valve on the Analyzing Unit Cabinets lower left side.
    (Valid only for units with a closed analyzing unit cabinet).

5.4. Closing down for a longer time or preserving for sub-zero conditions

11. Check that steps in the **5.3. Close down procedure** above has been followed.
12. Check that flow Meter capillary Valves, pos VF1 and VF2 are closed. Bleed any water from the capillary pipes and the differential pressure transmitter. Carefully blow dry with air, make sure not to exceed the pressure ratings. For more details, see the DP transmitter maker's instructions.
13. Open the Drain and Grab Sample Valves, pos 42 and 43 and use compressed air to blow out any water from the piping. Drain the sample pump and blow out any remaining water with air. Drain any part of the fresh water piping (if installed) which could be subjected to sub-zero temperatures.
14. Close down Converting unit/Sample pump
    If the sample pump is powered by an electrical motor:
    - Disconnect power supply to the Converting unit, ***if:***
      point 6.a. is selected in the "Close Down Procedure" above and if uncertainty remains about keeping power supply to and noting and also fixing any alarms on the Computer unit.

    If the sample pump is powered by an air motor:
    - Check that all air supply valves are closed.
15. If power supply is disconnected to the Converting unit also the Measuring cell can be disconnected and removed. If so, clean it, and store it in a dark, dry and temperature-controlled location.
    Cover the measuring cell contact on the connection box, plug the top hole and seal pipe holes with a plate.
    See also chapter **10.8. Measuring Cell replacement** page **129**.

6. Menu operations

6.1. Main Menu and Top of Page indications

Important information is show on top of all menus, see below.

Running information:

- Grey “Stand By” — “No discharge going on, unit is not started. This is called the “StandBy” mode.
- Yellow “RUNNING” — Unit is started for discharge. The overboard valve is opened if the oil discharge rate is below 30 L/nm. This mode is called the “RUNNING” mode
- Yellow/Black “RUNNING” — Flushing at start-up or closing down.

Overboard valve information:

Note that the valve indication has to be fixed for a few seconds before the new position is recorded in “Recorded data”. This is to avoid printouts generated by glitches.)

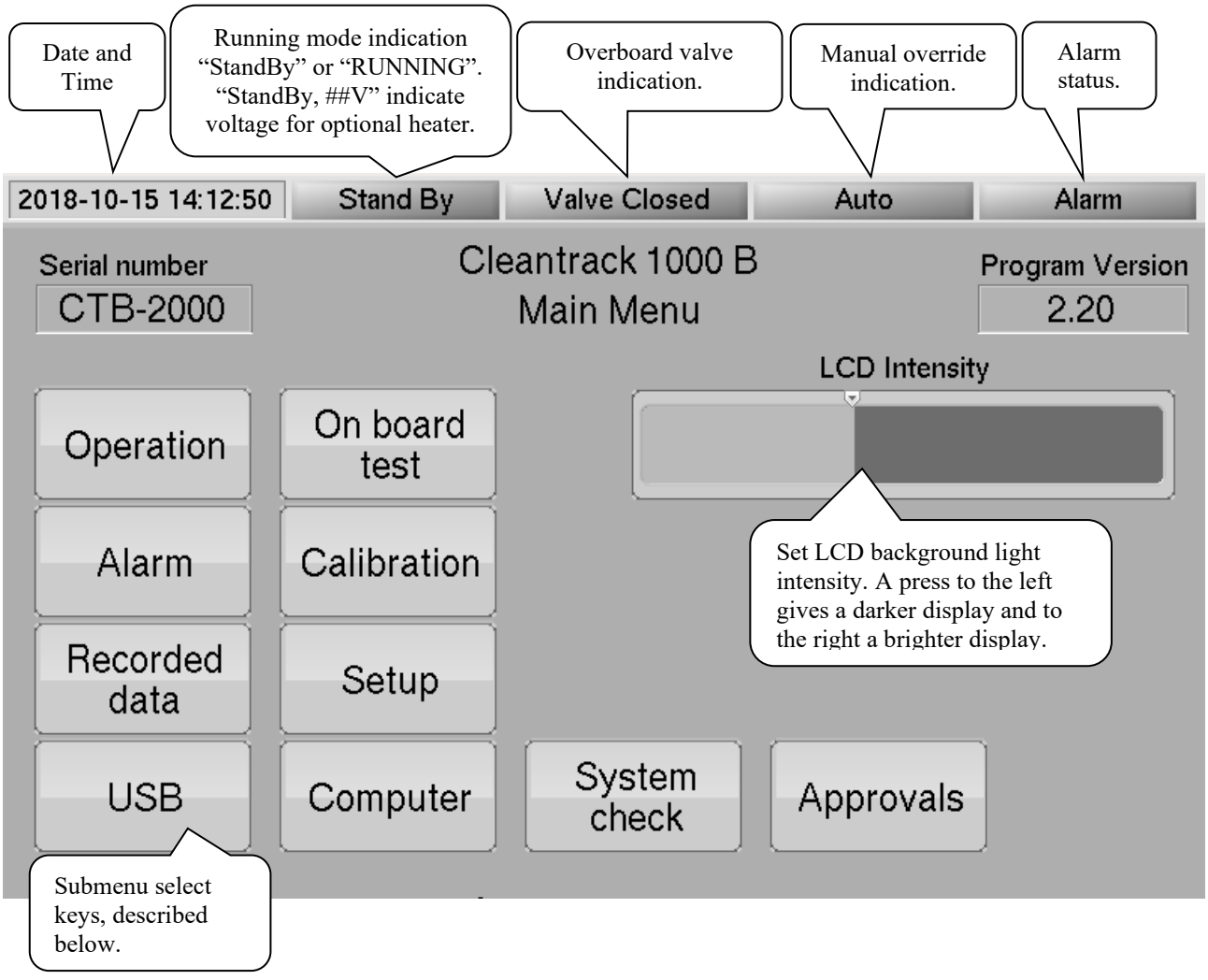
- Grey “Valve Closed” — Overboard valve is closed.
- Grey/Black “Valve Closed” — Overboard valve is closed but the output control is opening the valve.
- Yellow “VALVE OPEN” — Overboard valve is open.
- Yellow/Black “VALVE OPEN” — Overboard valve is open but the output control is closing the valve.

Manual Override information

- Grey “Auto” — Oil Concentration, Overboard valve control, flow, speed and position inputs are all in automatic mode.
- Red “Manual Override” — One or several of the above selections are in manual mode.

Alarm status:

- Grey “Alarm” — No alarms are active.
- Red “ALARM” — Active alarms that has been reset.
- Red/Black “ALARM” — At least one active alarm that has not been reset.



6.2. Edit Numeric values

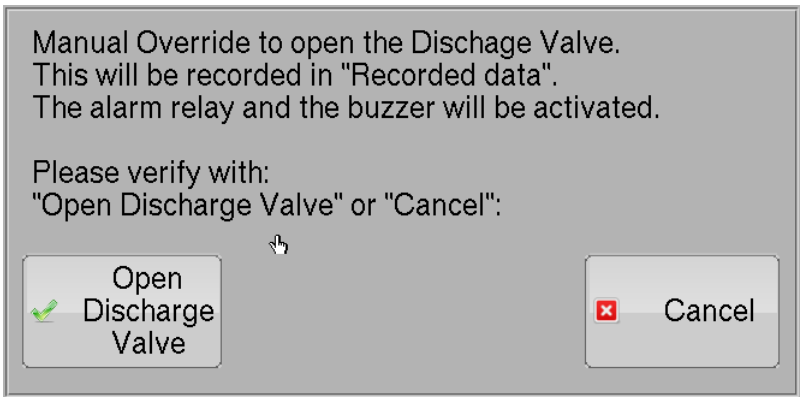
Values with white background are set values and can be changed.
Press the indicated value with the tip on your finger and a Numeric Keyboard pops up.
Normally the present value and text to indicate the selection are displayed on the Numeric Keyboard.

This example shows the “Speed High limit” being set to 20.0 kn.
After the value has been entered, save with the “Ok” key or cancel change with “Cancel” key.

6.3. Keys

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

An example of a submenu is this verification menu which opens when the “Manual Override Discharge Valve” key is pressed:



6.4. Password

Some operations need a “Password” and when pressed they opens up a “Password submenu”

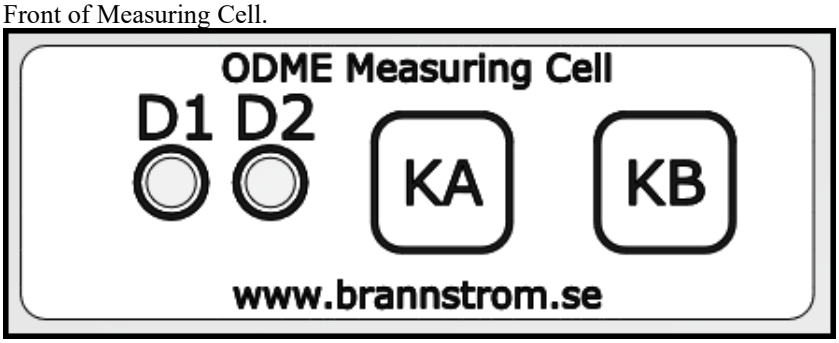
First enter the Password and then select “Admin” for administrator level or “User” for lower level.

The most commonly used passwords are the ones needed to enter sub menus from the “Main Menu”

- “Setup” – Password “3” and “Admin”
- “Computer” – Password “1” and “User”
- “System check” – Password “2” and “Admin”

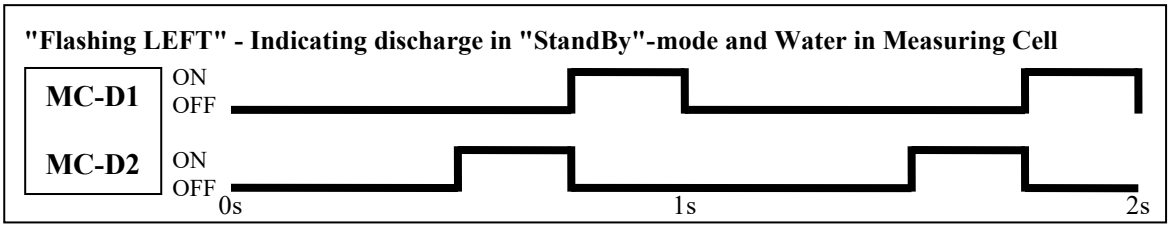
6.5. Measuring Cell – Indications and Keys

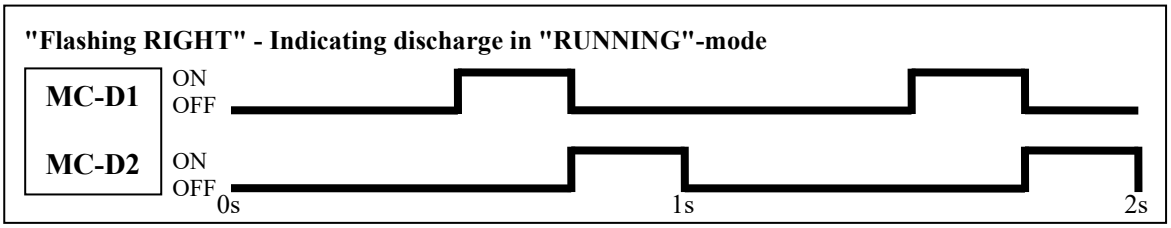
Front of Measuring Cell.

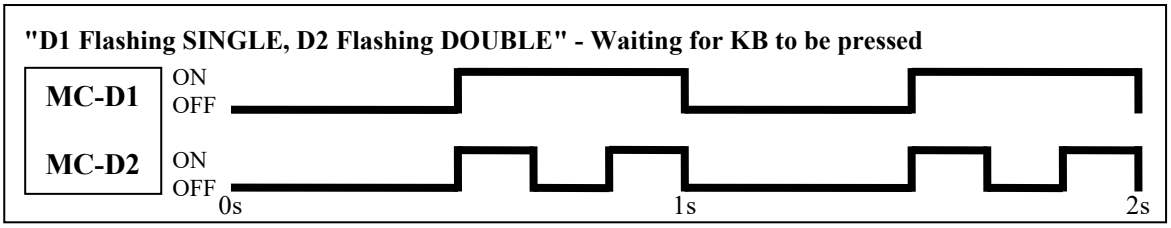


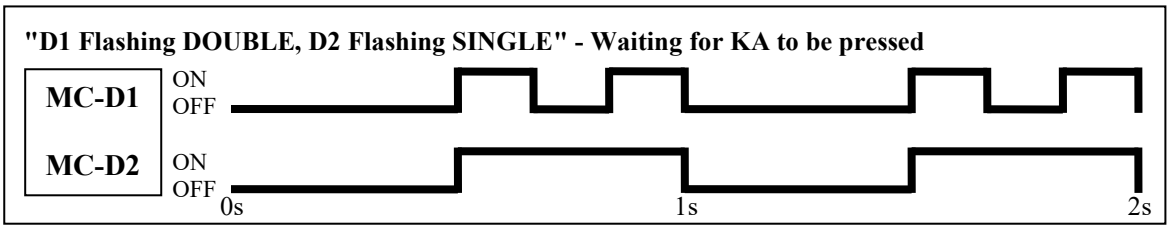
The front of the “Measuring Cell” has two yellow light emitting diodes, “D1” and “D2”.
It also has 2 touch keys, “KA” and “KB”.
The yellow light emitting diodes, D1 and D2, normally indicates if ODME is in “StandBy”-mode, “RUNNING”-mode or “RUNNING STARTUP”-mode. In ”RUNNING STARTUP”-mode or during “CALIBRATION” they can also indicate that the ODME is waiting for a key input. This key input can be given on the touch panel of the “Computer Unit” or on keys “KA” or “KB” on the “Measuring Cell” front.

D1 and D2 Flashing SINGLE – Indicating discharge in “StandBy” -mode and no Water in Measuring Cell.





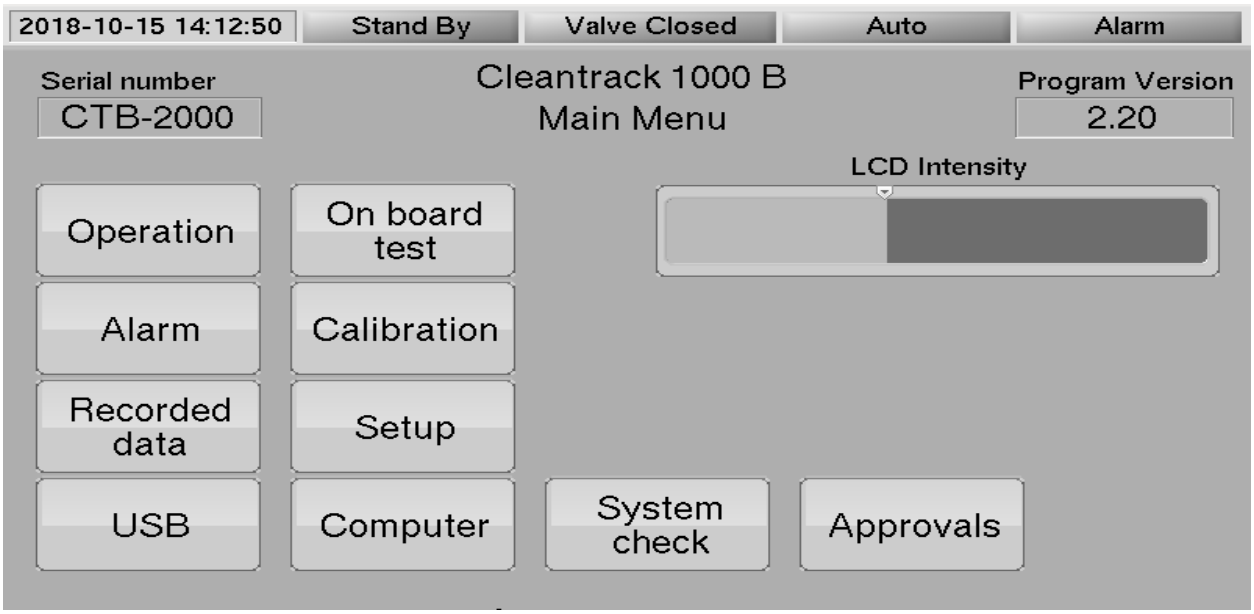




7. Menu layout

7.1. Main Menu

See chapter **6. Menu operations** page **42** for top of page information and key usage.
This menu can be reached by selecting the key “Main Menu” on the bottom right of every submenu or by selecting “Continue” on the “Start page”.



“Operation”	Go to “Operation” page.	**Chapter 7.2. Operation,** page **47**
“Alarm”	Go to “Alarm table”.	**Chapter 7.3. Alarm Table,** page **54**
“Recorded data”	Go to “Recorded data table”.	**Chapter 7.4. Recorded data,** page **55**
“USB”	Go to “USB” page.	**Chapter 7.5. USB,** page **57**
“On board test”	Go to “On board test” page.	**Chapter 7.6. On-board Test,** page **60**
“Calibration”	Go to “Calibration” page.	**Chapter 7.7. Measuring Cell Check/Calibration** page **64**
“Setup”	Go to “Setup” page.	**Chapter 7.8. Setup of parameters,** page **68** Password: “3” and “Admin”.
“Computer”	Go to “Computer” page.	**Chapter 7.9. Computer,** page **74** Password: “1” and “User”.
“System check”	Go to “System check” page.	**Chapter 7.10. System Check,** page **76** Password: “2” and “Admin”.
“Approvals”	Go to “Approvals” page.	**Chapter 7.11. Approvals** page **82**

7.1.1. Start page

If the touch screen is inactive for more than about 30 minutes the “Start page” will be shown.
Select “Continue” to go to the “Main Menu”.

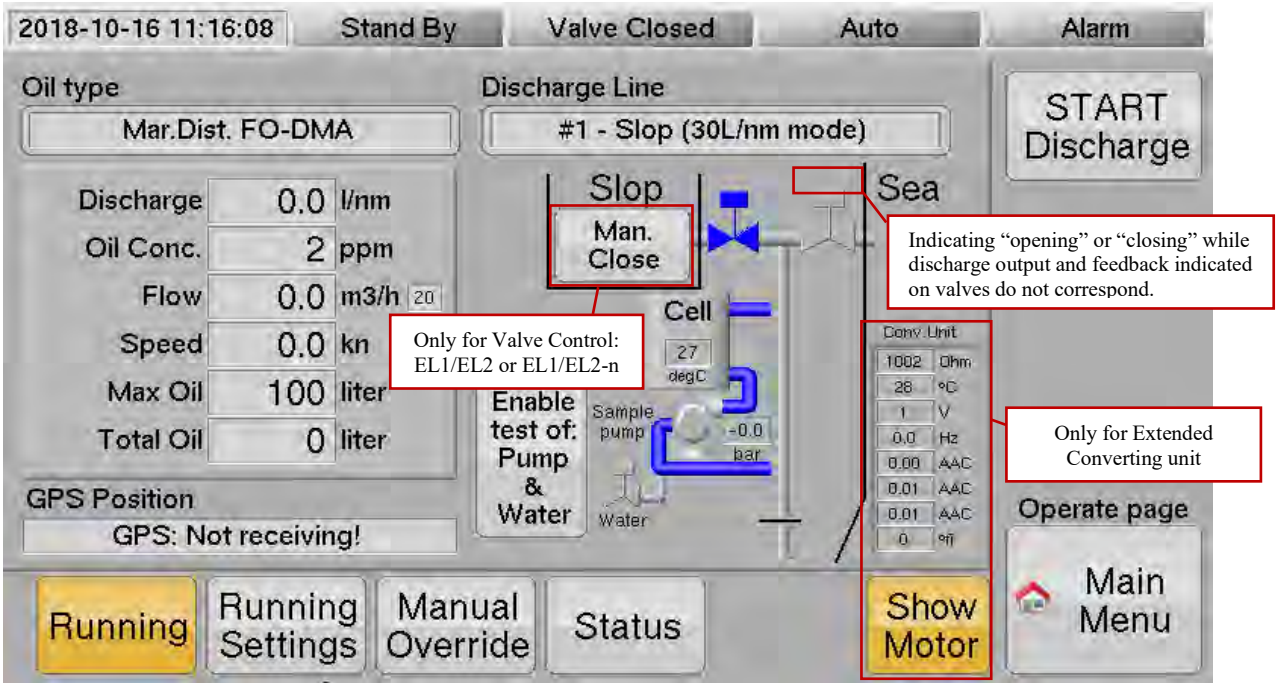
7.2. Operation

7.2.1. Running

All important information during “RUNNING” mode of the system is displayed.
Use “Running Settings” for all settings before a discharge.

The piping arrangement turns blue or grey depending on input / output signal status.

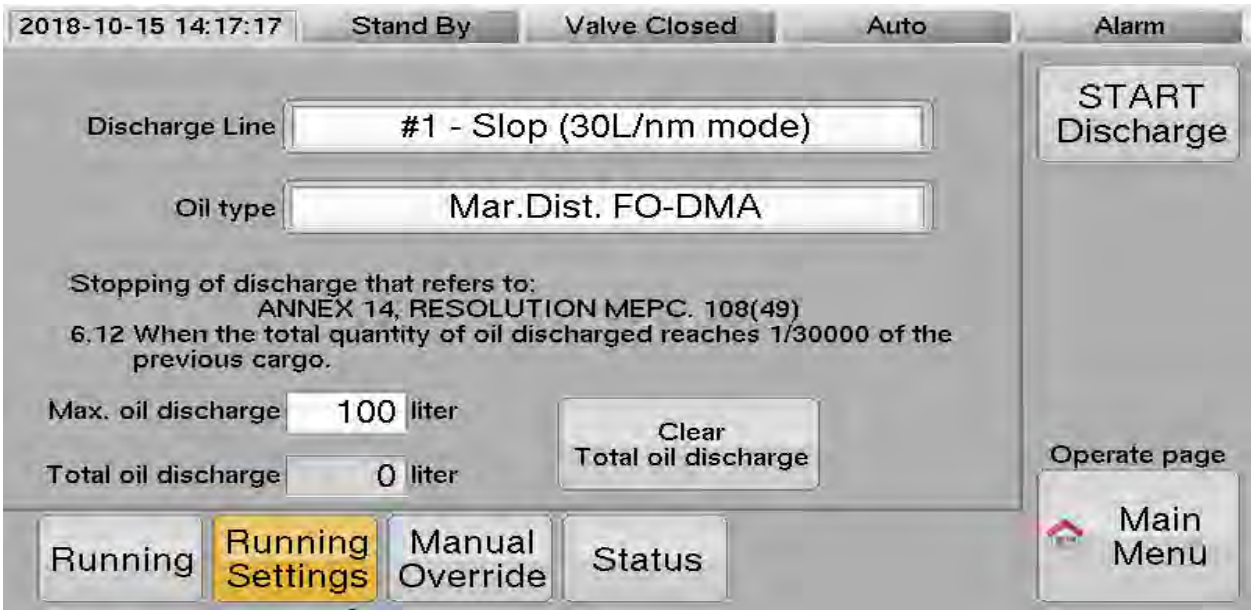
- Overboard valve is grey, indicating closed, and slop tank valve is blue, indicating open.
- The water sensor in the measuring cell is not active and this is displayed with grey sample lines. The sample lines turn blue when the water sensor is activated.
- The “Sample pump” turn blue when its control output is on.
- The “Water”-valve turn blue when its control output is on.
- The Overboard line turns blue when the measured discharge flow is within the flow limits.
- Indications counting down seconds can be displayed, indicating that the unit is waiting for an event. These indications are for information only and can be ignored, alarms are generated for failures.



“Oil type” Indicates the selected “Oil type”. Select in the “Running Settings”-menu.
“Discharge Line” Indicates the selected “Discharge Line” Select in the “Running Settings”-menu.
“START Discharge” Starts the unit for discharging of the water.
Refer to Chapter **5. Start/Stop procedure** page **39** before starting discharge.
When the unit goes into “RUNNING” mode, the key which previously was called “START Discharge” will now display the text “STOP Discharge”.
A submenu is displayed asking for START verification, or if any input signal or other selection prohibits the START, the “Status” menu indicating the reason will be shown.
“Alarm Reset” A RED “Alarm Reset”- key pops up above the “Main Menu” key. It there are any active alarms which have not been acknowledged, the “Alarm” indication on top right is flashing. Same function as the “Reset” key in the “Alarm table”.
“Enable test of: Pump & Water” Enables manual running of the Sample Pump and opening of the Water Valve.
This selection needs to be verified on a popup window.
The two keys below will be shown after the “Enable test ...” key has been pressed.
Refer to Chapter **5. Start/Stop procedure** page **39** before activation of pump or water.
“Pump 60 sec” Manually run the sample pump for 60 seconds, useful for testing.
Pressure check and Water check is enabled and may prohibit start of the pump. Further described in chapter **7.2.4. Status** page **53** below.
“Water 60 sec” Manually flush with fresh water for 60 seconds (if automatic flushing has been installed), useful for testing.
“Man. Close” Option for “Valve control” settings “EL1/EL2” and “EL1/EL2-n”. Activate relay output for closing of slop tank valve. Refer to chapter **7.8.1. Line of discharge** page **68**.
“Conv. Unit” Option for an “Extended” converting unit. A table showing sample pump motor data.
“Show Motor” Option for an “Extended” converting unit. Showing the “Conv. Unit” table above.

7.2.2. Running Settings

Selection and settings to be made before start discharging after a voyage.



"Discharge line" Select line for discharging. A popup menu will be displayed for selection.
"Oil type" Select oil type. A submenu will be displayed for selection.
"Max. oil discharge" Set to 1/30 000 of the total quantity of the particular cargo of which formed a part.
"Clear Total oil discharge" Reset the accumulated value when all tank washing residues have been discharged and a new cargo will be loaded.

"Total oil discharge" Accumulated total oil. The discharge is disabled (valve output deactivated) when the value exceeds the "Max. oil discharge" value.
The value is accumulated when the unit is in "RUNNING" mode and:

1. Discharge is enabled (valve output activated), or;
2. Valve feedback is active, or;
3. "Manual Override Overboard Valve" is enabled.

7.2.2.1. "Discharge line"

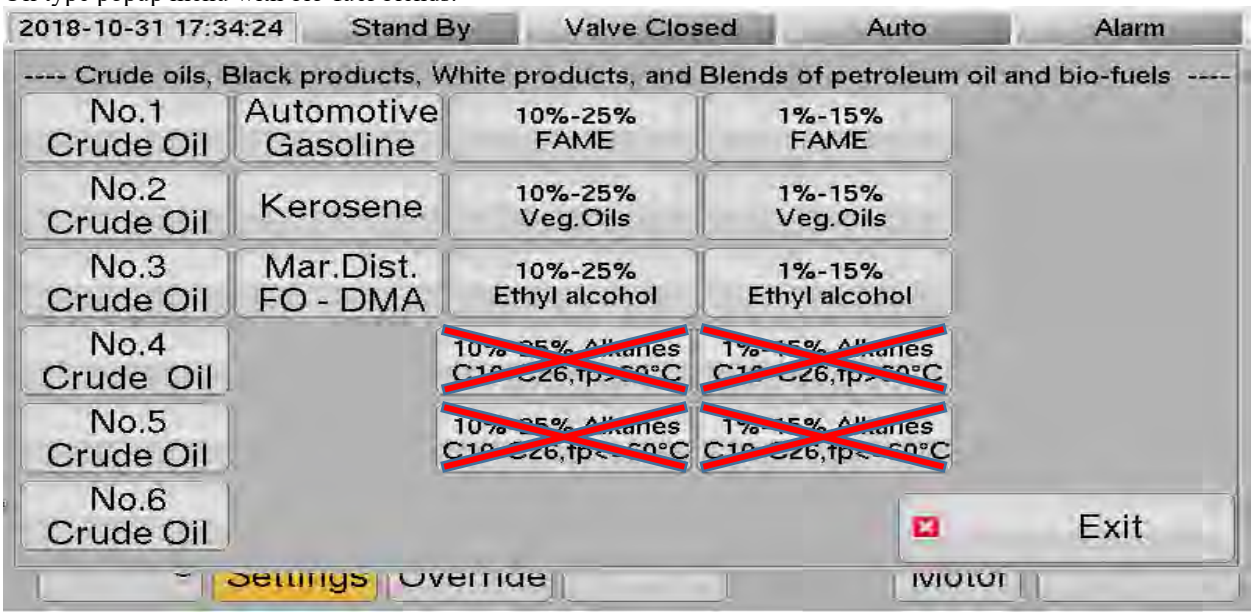
Discharge line popup menu.
(This popup menu will differ depending on selections made in Chapter **7.8.1. Line of discharge** page **68**)

"#1", "#2", "#3" or "#4" Select line for discharging.

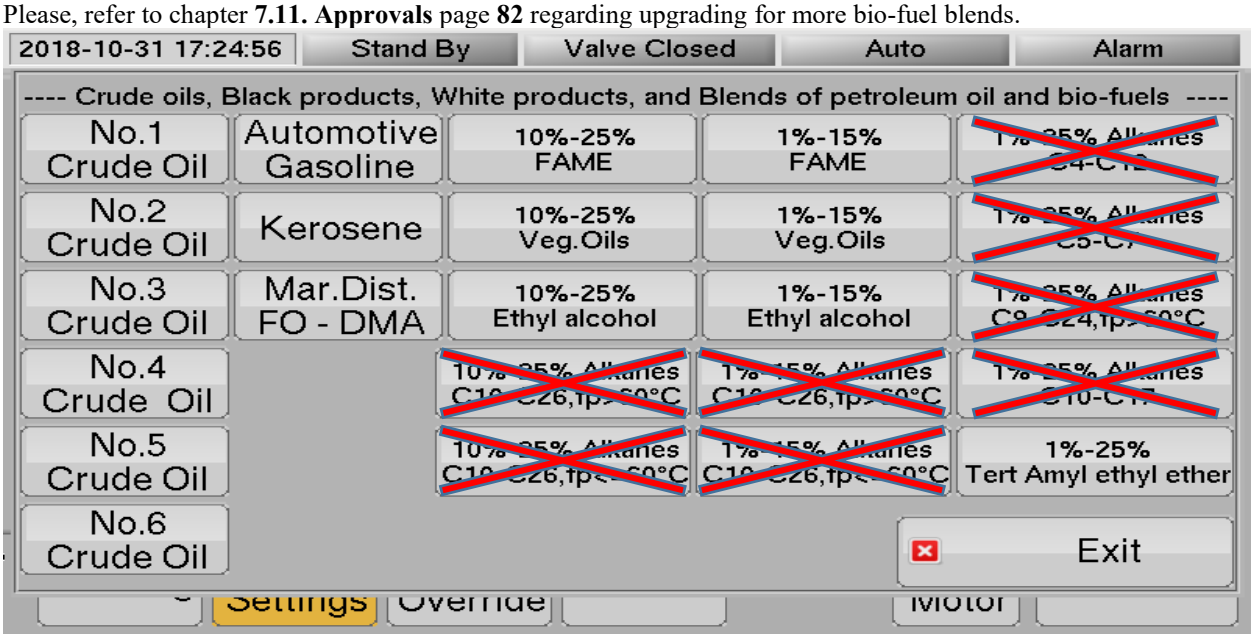
7.2.2.2. "Oil type"

Test substances mentioned in section 1.2.6 and 1.2.7 of MEPC.108(49) are considered to be sufficient representative also for the Energy-rich fuels as recently specified in Annex 11 of MEPC.2/Circ.24, so therefore MEPC.1/Circ.879 does not require any additional type approval test for the Energy-rich fuels. The crossed over substances below are considered to be Energy-rich fuels.

Oil type popup menu with bio-fuel blends.



Oil type popup menu with bio-fuel blend types in accordance with MEPC.1/Circ.761 and MEPC.240(65).
Please, refer to chapter **7.11. Approvals** page **82** regarding upgrading for more bio-fuel blends.



Oil types "No.1 Crude Oil" – "No.6 Crude Oil" are according to "No 1-6 crude oils" in MEPC.108(49).
Oil types "Automotive Gasoline", "Kerosene" and "Mar.Dist FO – DMA" are according to "White petroleum products" in MEPC.108(49).
The bio-fuel blended types are in accordance with MEPC.1/Circ.761 and MEPC.240(65) and Annex 11 of MEPC.2/Circ.23.

No 1-6 crude oil and white petroleum products MEPC.108(49) as amended

Oil Type	Density	Viscosity	Pour Point	General description
No.1 Crude Oil	Low	Medium	Very low	Mixed base
No.2 Crude Oil	Medium	Medium	Low	Mixed base
No.3 Crude Oil	High	Medium	Low	Naphthenic
No.4 Crude Oil	Very high	Very high	Low	Asphaltic
No.5 Crude Oil	Medium	High	Very high	Paraffinic
No.6 Crude Oil	Marine residual fuel oil – RMG 35. RMG 35 Parameters as per ISO 8217:2010/Corr 1:2011 (tables 1 and 2.)			
Automotive Gasoline	Automotive Gasoline			
Kerosene	Kerosene			
Mar.Dist. FO – DMA	Marine distillate fuel oil – DMA – ISO 8217:2010/Corr 1:2011 (tables1 and 2)			

Bio-fuel blends MEPC.1/Circ.761 and MEPC.240(65) and Annex 11 of MEPC.2/Circ.23 as revised

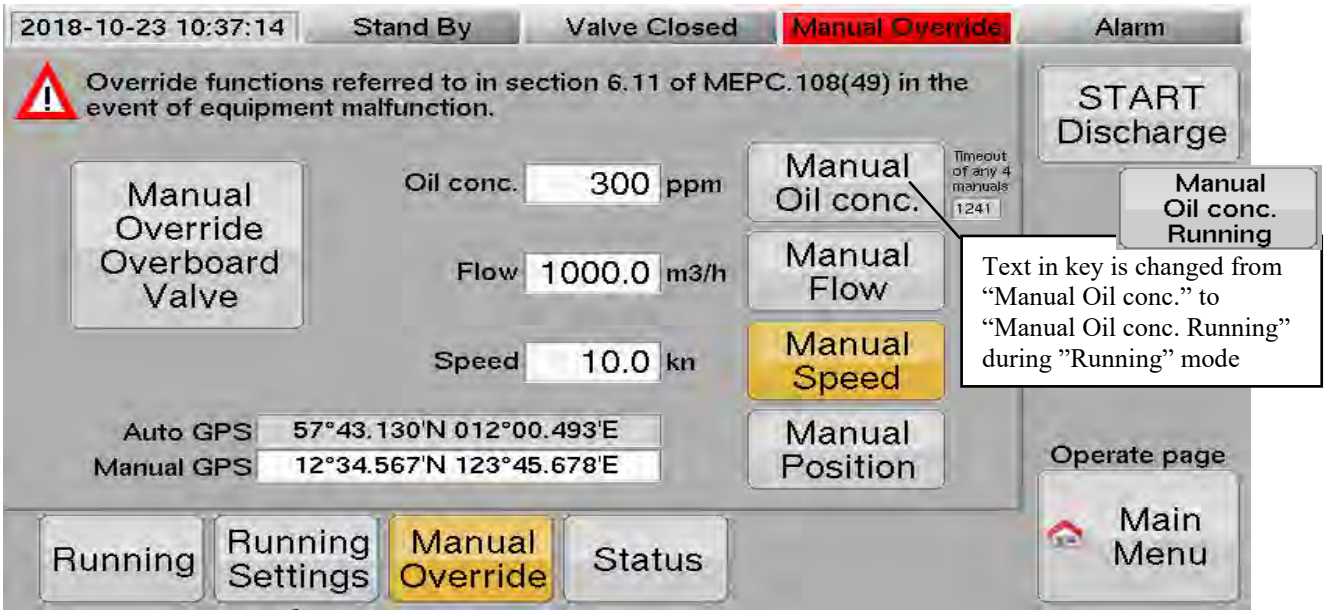
Blended Type	Description
1%-15% FAME	Bio-fuel blends of Diesel/gas oil and FAME (>85% but <99% Diesel gas oil by volume)
10%-25% FAME	Bio-fuel blends of Diesel/gas oil and FAME (>75% but <90% Diesel/gas oil by volume)
1%-15% Veg.Oils	Bio-fuel blends of Diesel/gas oil and Vegetable oils (>85% but <99% Diesel/gas oil by volume)
10%-25% Veg.Oils	Bio-fuel blends of Diesel/gas oil and Vegetable oils (>75% but <90% Diesel/gas oil by volume)
1%-15% Ethyl alcohol	Bio-fuel blends of Gasoline and Ethyl alcohol (>85% but <99% Gasoline by volume)
10%-25% Ethyl alcohol	Bio-fuel blends of Gasoline and Ethyl alcohol (>75% but <90% Gasoline by volume)
1%-15% Alk es C10-C26,fp>60	Bio-fuel blends of Diesel/gas oil and Alkanes (C10-C2 linear and branched with a flashpoint >60°C (>85% but <99% Diesel/ by volume)
10%-25% Alkanes C10-C26,fp>60°C	Bio-fuel blends of Diesel/gas oil and Alkane -C26), linear and branched with a flashpoint >60°C (>75% but <90 esel/gas oil by volume)
1%-15% Alkanes C10-C26,fp<=60°C	fuel blends of Diesel/gas oil a kanes (C10-C26), linear and branched wi lashpoint ≤60°C (>85% <99% Diesel/gas oil by volume)
10%-25% Alkanes C10-C26,fp<=60°C	Bio-fuel ds of Diesel oil and Alkanes (C10-C26), linear and branched with a flashp (>75% but <90% Diesel/gas oil by volume)
1%-25% Alkanes C4-C12	Bio-fuel blend tha and Alkanes (C4-C12), linear, branched and cyclic (> ut <99% phtha by volume)
1%-25% Alkanes C5-C7	Bio blends of Naphtha a lkanes (C5-C7), linear and branched % but <99% Naphtha by vo
1%-25% Alkanes C9-C24,fp>60°C	Bio-fuel blends of Diesel/gas oil and A (C9-C24), linear, branched and cyclic with a flashpoint >60°C (>75% but Diesel/gas oil by volume)
1%-25% Alkane C10-C17	Bio-fuel blends of Kerosene and Alkanes (C10-C inear and branched (>75% but <99% Kerosene by volume)
1%-25% Tert-Amyl ethyl ether	Bio-fuel blends of Naphtha and Tert-Amyl ethyl ether (>75% but <99% Naphtha by volume)

The table below together with the 2 tables above should be used as a guidance for selection of oil type setting for oils of various kinds.

Oil origin or type	Oil type setting
Sahara Blend	No.1 Crude Oil
Arabian Light crude	No.2 Crude Oil
Nigerian Medium crude	No.3 Crude Oil
Bachaquero 17 crude	No.4 Crude Oil
Minas crude	No.5 Crude Oil
Bunker C	No.6 Crude Oil
Automotive Gasoline	Automotive Gasoline
Kerosene	Kerosene
Diesel Oil	Mar.Dist FO – DMA
Ekofisk	No.2 Crude Oil
DUC	No.2 Crude Oil
Statfjord	No.5 Crude Oil
Brent	No.5 Crude Oil
Light Arabian Gulf crude’s	No.2 Crude Oil
Light North Africa and West Africa crude’s	No.2 Crude Oil
Light USSR crude’s	No.2 Crude Oil
Marine diesel and light fuel oil	Mar.Dist FO – DMA
Heavy Arabian Gulf crude’s	No.3 Crude Oil
High paraffin content crude’s	No.5 Crude Oil
Mixed slop	No.3 Crude Oil
Asphalt crude’s	No.4 Crude Oil
Lubrication oil	No.4 Crude Oil
Heavy fuel oil	No.6 Crude Oil
Kerosene and JP1 jet fuel	Kerosene
Gasoline and JP4 type jet fuel	Automotive Gasoline

7.2.3. Manual Override

This page allows you to insert and use manual values in case of equipment malfunction.
The "Manual Override" indication will turn red if any manual is selected.
Note that manual selections are recorded in "Recorded data", ***and PSC will demand an acceptable reason for it***.
"Manual Oil conc", "Manual Flow", "Manual Speed" and "Manual Position" will automatically return to automatic mode 30 minutes after last activation or after return from "RUNNING" mode to "StandBy" mode.



"Manual Override Overboard Valve" Forcing the Overboard Valve to open.
This selection needs to be verified on a popup window.
For setting of relay output function see chapter:
7.8.8. System Configuration, Standard page **72**.

"Oil conc." Press value indication to insert manual value.

"Manual Oil conc." **(Text in key during "StandBy" mode)**
"Override Oil concentration with the value inserted in **"Oil conc."**
This selection needs to be verified on a popup window.
Communication and readings from the Measuring cell and the Pressure transmitter are ignored. The sample pump is not started.
A "Warning" with activated Alarm relay and Buzzer is raised every 10-20 minutes to alert a user that this manual is active.

"Manual Oil conc. Running" (Text in key during "Running" mode)
"Override Oil concentration with the value inserted in **"Oil conc."**
This selection needs to be verified on a popup window.
Communication and readings from the Measuring cell and the Pressure transmitter are checked as if this selection was not activated.
This selection was made during running mode and will automatically be deselected when the running mode ends.

"Flow" Press value indication to insert manual value.

"Manual Flow" Override discharge Flow with the value inserted in **"Flow"**
This selection needs to be verified on a popup window.
Flow alarms are no longer generated with this selection active.
If both "Manual Oil conc." and "Manual Flow" are activated and neither "ZD1" nor "ZD2" are used for Overboard valve feedback, no communication with the Converting unit is needed and the Computer unit works as a "stand-alone" unit.

"Speed" Press value indication to insert manual value.

"Manual Speed" Override ship's speed with the value inserted in **"Speed"**
This selection needs to be verified on a popup window.

"Auto GPS" Indicating actual position or an error message.

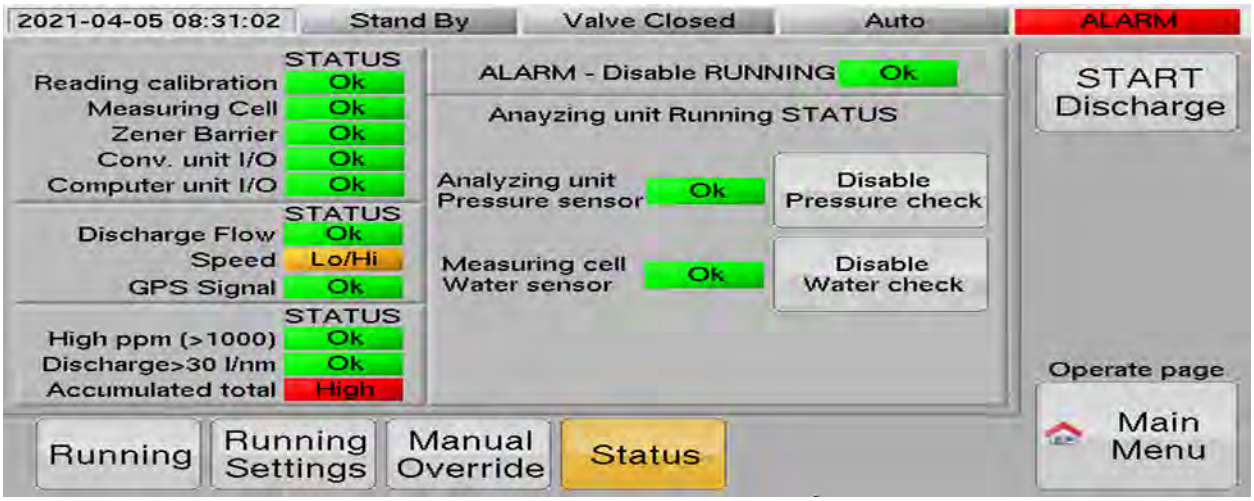
"Manual GPS" Press indicator to manually insert coordinates for the shop's position.

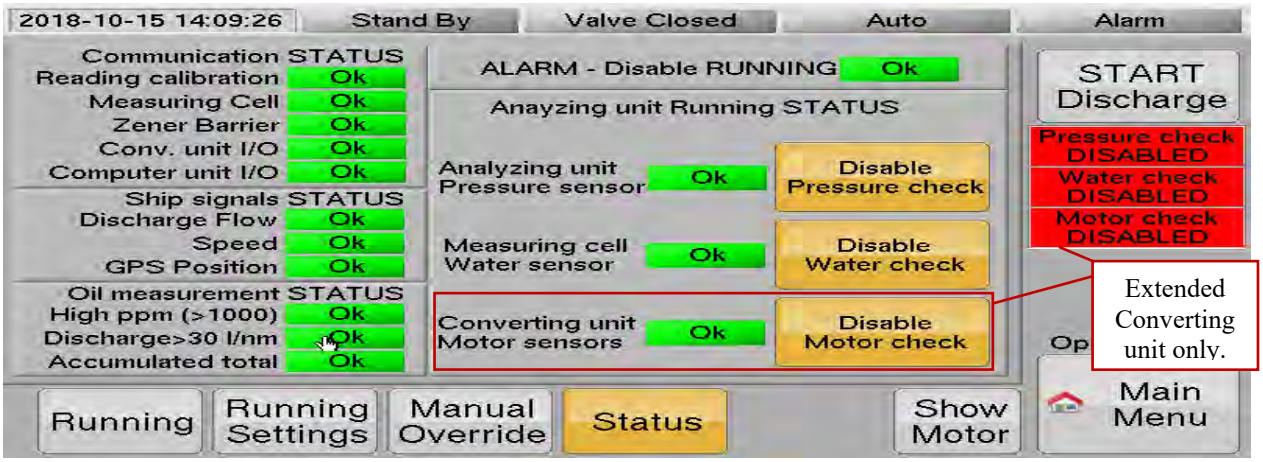
"Manual Position" Override ship's position with the **"Manual GPS"** value.
This selection needs to be verified on a popup window.

"Timeout of any 4 manuals" Display of the 1800 seconds (30 minutes) countdown timer that which automatically resets all of the 4 manual selections "Manual Oil conc", "Manual Flow", "Manual Speed" and "Manual Position" to automatic mode again.

7.2.4. Status

A system status indication is displayed on this page.
This status indication gives an immediate information if discharge can be started.
Indicate a low or high signal from the flow meter and speed log with the text “Lo/Hi” in amber instead of the text “Fail” in red, software 2.2061 and later.





“<u>STATUS</u>” (1st) Any RED indication stops “RUNNING” mode and blocks starts.
“<u>STATUS</u>” (2nd) Any RED or AMBER indication stops discharging and blocks starts.
“<u>STATUS</u>” (3rd) Any RED indication stops discharging.
“ALARM – Disable RUNNING” RED indication stops “RUNNING” mode and blocks start. View “Alarm table” for further information about alarm status.
“<u>Analyzing unit Running STATUS</u>” Any RED indication stops “RUNNING” mode and blocks starts.
“Analyzing unit Pressure sensor” A Pressure transmitter connected to the output of the sample pump is used to measure and protect the ODME from pump blockages or starvation.
“Disable Pressure check” Activate, YELLOW indication, to disable pressure transmitter protection above. A RED flashing indication will be shown to the right.
Only to be used in case of pressure transmitter malfunction
This selection needs to be verified on a popup window.
“Measuring cell Water sensor” A Water sensor in the Measuring Cell is used to protect the sample pump from starvation.
“Disable Water check” Activate, YELLOW indication, to disable water checking. A RED flashing indication will be shown to the right.
Only to be used in case of water check malfunction.
This selection needs to be verified on a popup window.
“Converting unit Motor sensors” Sample pump Motor sensors (when applicable) in a Converting unit fitted with motor performance monitoring, used to protect the indicated sample pump from malfunctions and also to further protect the pump from blockages and starvation.
“Disable Motor check” Activate, YELLOW indication, to disable Converting unit motor sensors. A RED flashing indication will be shown to the right.
Only to be used in case of motor sensor malfunction.
This selection needs to be verified on a popup window.

7.3. Alarm Table

"Alarm Reset" Resetting alarms. Status columns indicates "ACTIVE" for alarm not yet resets and "RESET" for remaining alarms already reset.

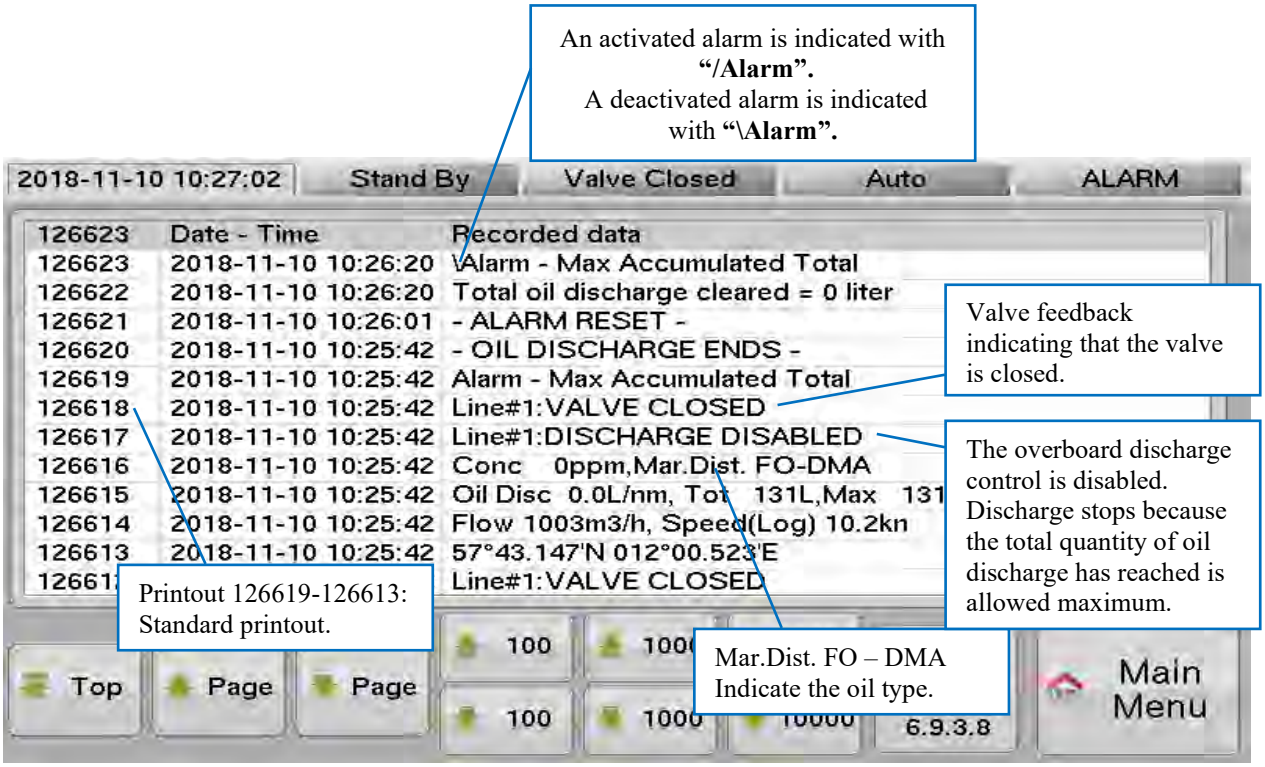
"Operate" Go to "Operate page".

"MENU" Go to "Main Menu".

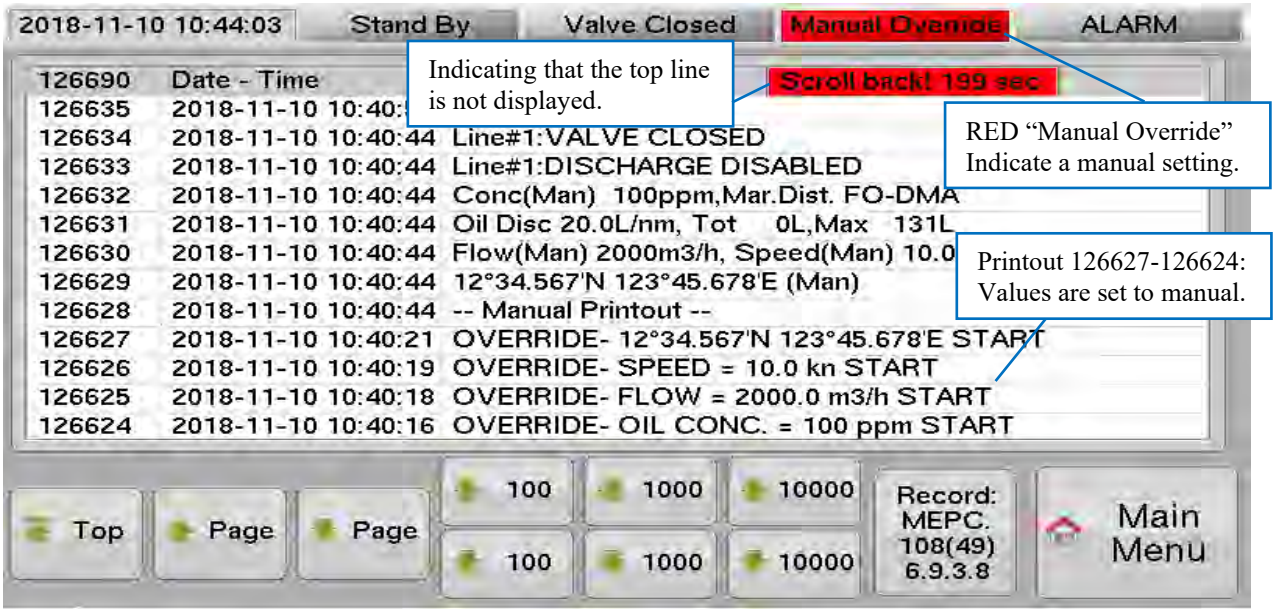
7.4. Recorded data

The recording device is formatted electronically as mentioned in MEPC.108(49) chapter 6.9.1.
Recorded date is stored in a non-volatile memory and can hold approximately 3,000,000 printouts which is more than sufficient to meet the requirements.
Optionally a paper printer can also be installed in the computer unit.
The recorded data should be retained for at least three years.

The recorded data can be copied to a USB-memory stick. See chapter **7.5. USB,** page **57.**



The "Recorded Data" table shows printouts as specified in MEPC.108(49), chapter 6.9.



The RED "Scroll back! ### sec" is shown if latest printout is not shown on top line. After 300 seconds (5 minutes) of inactivity, indications will go back to displaying the top line.
The indication (Man) after "Conc", "Flow", "Speed" and GPS coordinates indicates that all values are in manual.
The two screenshots above have different (Man) settings.
The indication (Man) after "Conc" also indicate that the Oil Concentration was set to manual before starting for discharge, thus the sample pump will not be started.
The indication (MaR) after "Conc" indicate that the Oil Concentration was set to manual after starting for discharge, (in "RUNNING" mode). Then the sample pump is started and normal pressure checks are made.

7.4.1. Recorded data examples

Below are some examples of recorded data.
Lines of recorded data contains, from the left: a printout line number, date, time and event.
The date “2018-11-15” means: year 2018, month 11 = November, day 15.
The time “17:33:25” means: hour 17, minute 33, second 25.
The event is indicated by the 40 rightmost characters on a line.

At power on some data and settings are recorded as shown below:

```
126710 2018-11-10 11:09:35 Power On, Power Off: 2018-11-10 11:07:17
126711 2018-11-10 11:09:35 Program Version: 2.201p3
126712 2018-11-10 11:09:35 Sample Pump: Nikuni 32MED22
126713 2018-11-10 11:09:35 PumpMotorDisconnect: NoManualSwitch
126714 2018-11-10 11:09:35 ConvertingUnitType: PumpFeedback
126715 2018-11-10 11:09:35 Flushing: Controlled Water Valve
126716 2018-11-10 11:09:35 Override: Override and OBV Valve Outputs
126717 2018-11-10 11:09:35 Line#1: Cargo,EL1,ZF1,S1
```

Both “Power On” and “Power Off” time are records as well as “Program Version”, “Sample Pump” type and other settings.

“Automatically recorded data” that should be recorded at intervals specified in MEPC.108(49) chapter 6.9.3 can also be printed manually by selecting the **“Record MEPC.108(49) 6.9.3.8”** key on previous page.

```
126718 2018-11-10 11:10:04 – OIL DISCHARGE STARTS -
126719 2018-11-10 11:10:04 Line#1: Cargo,EL1,ZF1,S1
126720 2018-11-10 11:10:20 – Manual Printout --
126721 2018-11-10 11:10:20 57°43.147’N 012°00.523’E
126722 2018-11-10 11:10:20 Flow 1003m3/h, Speed(Log) 10.2kn
126723 2018-11-10 11:10:20 Oil Disc  0.0L/nm, Tot     0L,Max   131L
126724 2018-11-10 11:10:20 Conc    0ppm,Mar.Dist. FO-DMA
126725 2018-11-10 11:10:20 Line#1:DISCHARGE DISABLED
126726 2018-11-10 11:10:20 Line#1:VALVE CLOSED
```

Line 126718 “Start Discharge” key has been pressed and system goes into “RUNNING” mode.
Line 126719 indicate setting of selected discharge line, overboard control, flow input and line selection outputs.
Line 126720 indicate that the records after are printed on a manual command.
Line 126721 show the ships position from the ships GPS.
Line 126722 show the flow in the overboard line measured by the flow meter and the ships speed from the speed log.
Line 126723 show the calculated oil discharge, the total amount of discharged oil and the maximum allowed amount.
Line 126724 show the measured oil concentration and the selected oil type.
Line 126725 show the selected overboard line and the overboard discharge control status.
Line 126726 show the selected overboard line and the indication of the overboard valve feedback. The valve is closed.

“Automatically recorded data”:

```
126741 2018-11-10 11:11:10 – MANUAL OVERRIDE VALVE STARTS -
126742 2018-11-10 11:11:11 /Alarm – Manual Override Valve
126743 2018-11-10 11:11:11 12°34.567’N 123°45.678’E (Man)
126744 2018-11-10 11:11:11 Flow(Man) 1000m3/h, Speed(Man) 10.0kn
126745 2018-11-10 11:11:11 Oil Disc 10.0L/nm, Tot     1L,Max   131L
126746 2018-11-10 11:11:11 Conc(MaR)  100ppm,Mar.Dist. FO-DMA
126747 2018-11-10 11:11:11 Line#1:DISCHARGE ENABLED
126748 2018-11-10 11:11:11 Line#1:VALVE OPEN
126749 2018-11-10 11:11:11 Alarm – Manual Override Valve
126750 2018-11-10 11:11:19 – ALARM RESET -
126751 2018-11-10 11:11:31 – MANUAL OVERRIDE VALVE ENDS -
126752 2018-11-10 11:11:31 \Alarm – Manual Override Valve
```

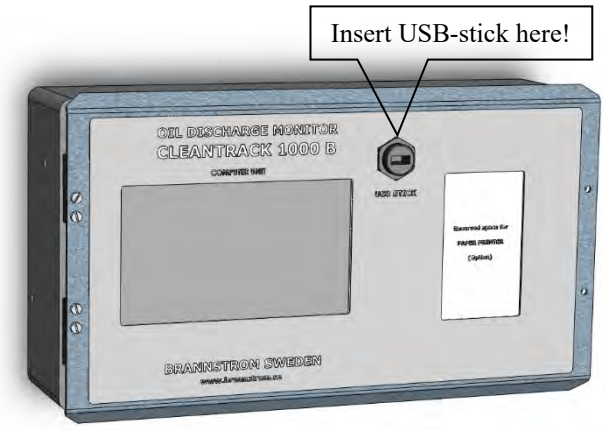
Line 126741 show that the overboard valve control is set to manual.
Line 126742 show with the initial “/Alarm” the time that the alarm overboard valve in manual is activated.
Line 126743 and 126744 show that position, flow and speed are inserted manually by succeeding “(Man)” indications.
Line 126745 show that the oil concentration was inserted manually by a succeeding “(MaR)”.
It also shows that its mode was selected after the discharge was started. If manual mode is selected before discharge is started the indication after “Conc” is “(Man)” and in this case the sample pump is not started and communication with the measuring cell is ignored.
Line 126749 show that the overboard valve is in manual. All active alarms are printed on a standard printout.
Line 126750 show that the “Alarm Reset” key has been activated.
Line 126751 show that overboard valve control is set back to automatic.
Line 126752 show with the initial “\Alarm” the time that the alarm overboard valve in manual is deactivated.

7.5. USB

The recording device is formatted electronically as mentioned in MEPC.108(49) chapter 6.9.1.
Recorded data is stored in a non-volatile memory and can hold approximately 3,000,000 printouts.

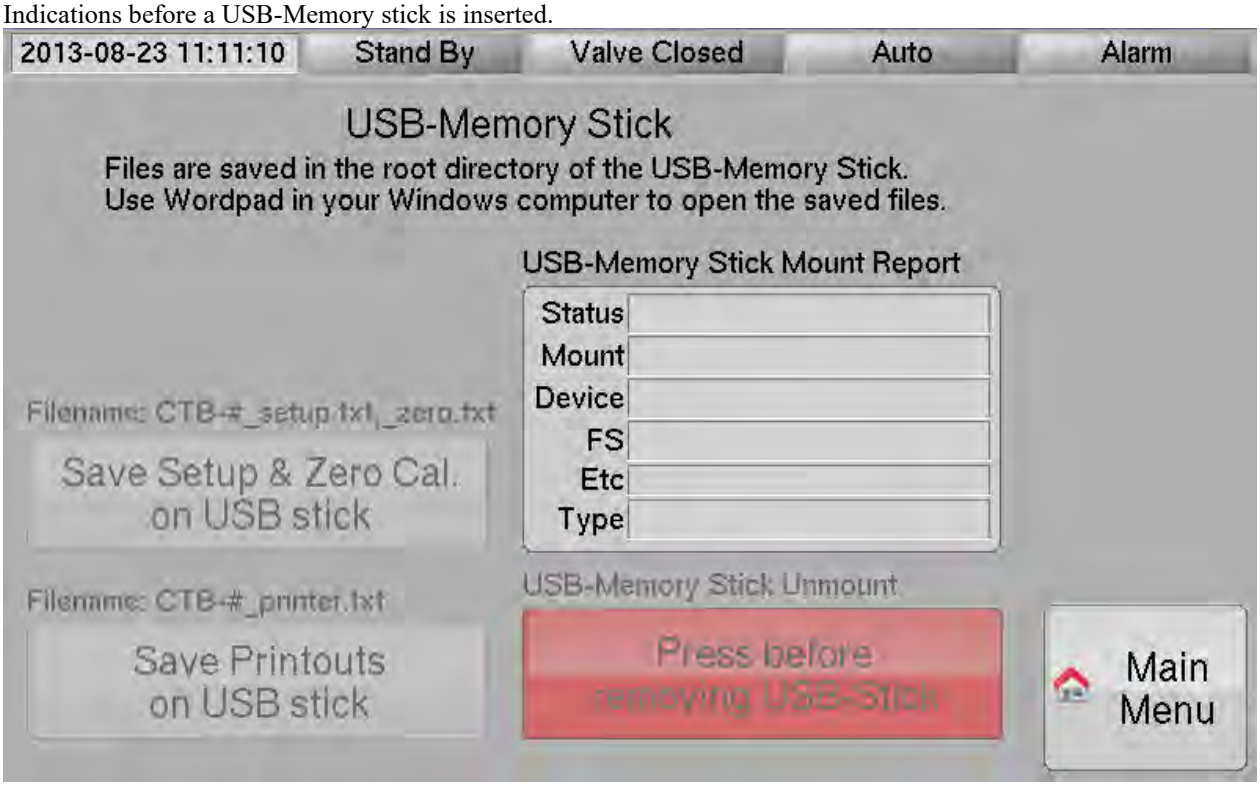
Recorded data can be copied to a USB-memory stick. Use a USB-stick with a Windows FAT32 file system. (Most memory sticks are preformatted with FAT32)

For information regarding Recorded data see chapter **7.4.1. Recorded data examples** page **56**.

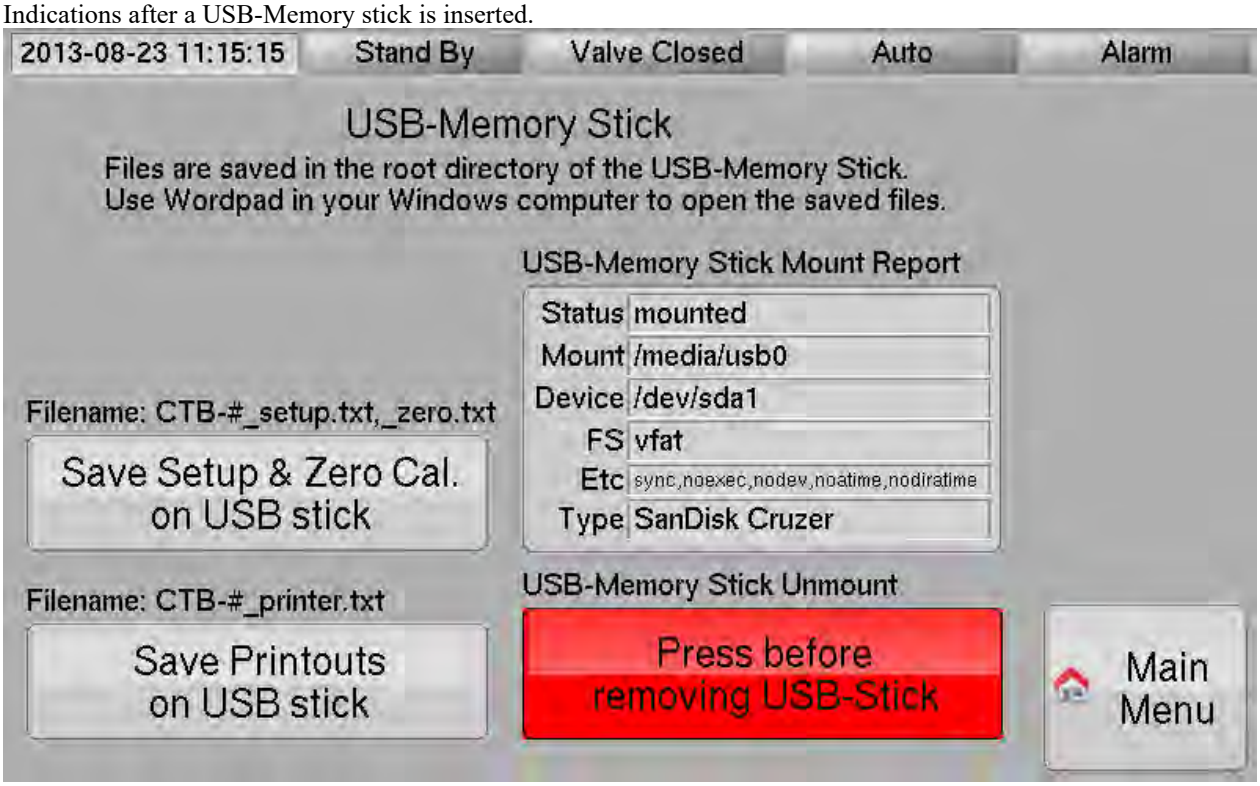


7.5.1. USB-Memory stick

Indications before a USB-Memory stick is inserted.



Indications after a USB-Memory stick is inserted.



"USB-Memory Stick report" Indicates if a USB-Memory stick is attached or not on its "Status" line.
When a USB-Memory stick is found the other 3 keys becomes highlighted.

"Save Printouts on USB stick" Copy the printer file to the USB-Memory stick.
A new menu opens up with selections of how many printer lines to copy.
The copy of the printer file will be stored in the root directory of the USB-Memory stick. The file name is "CTB-#_printer.txt"

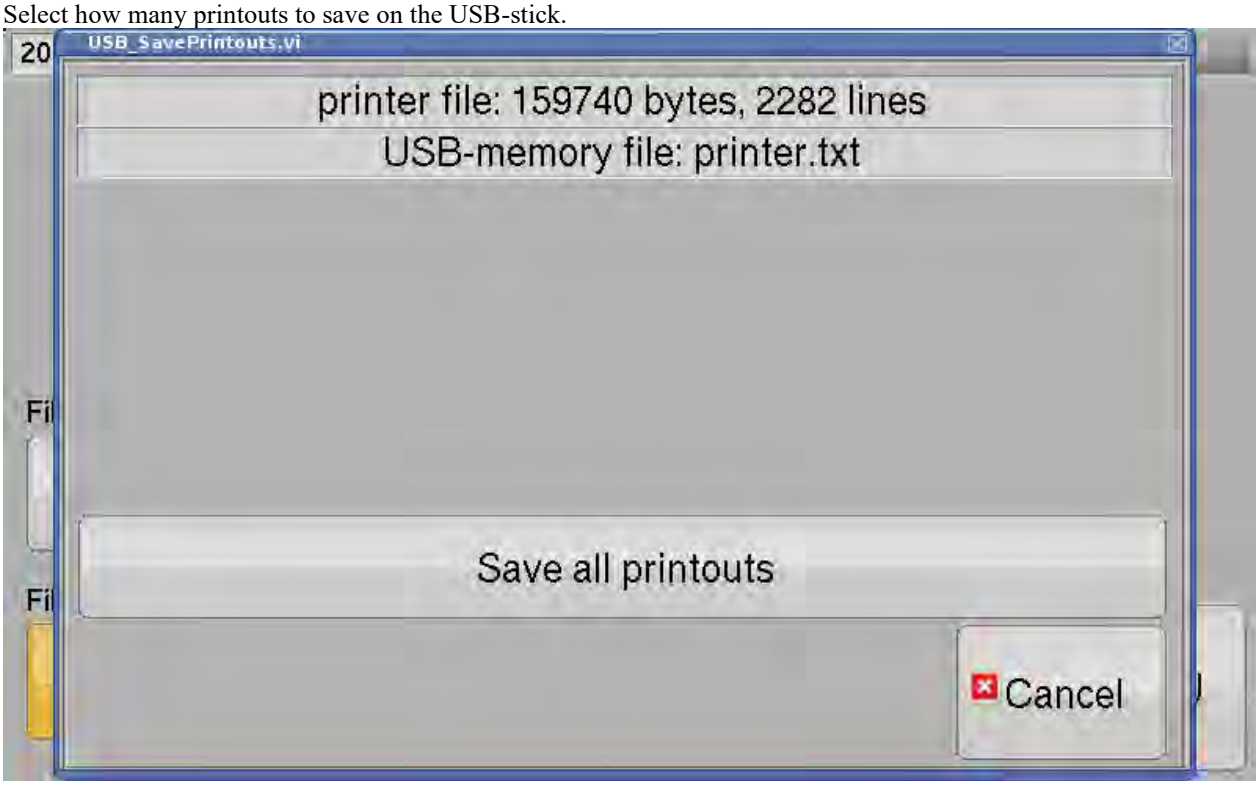
"Save Setup & Zero Cal. on USB stick"
Copy the Setup file and the zero calibration files to the USB-Memory stick.
The Setup file contains all settings made from the touch screen.
The file name is "CTB-#_setup.txt"
The Zero calibration file contains the result from the latest successful calibration.
The file name is "CTB-#_zero.txt"

"Press before removing USB-Stick"
IMPORTANT! Press this key before removing the USB-Memory stick.
The "Status" line will show when the stick is unmounted and can be removed.
If the USB-stick is removed before this key is pressed, power must be switched off and on again before the Computer Unit can recognize a USB-stick again.

7.5.2. Save Printouts on USB stick

If the printer file “CTB-####_printer.txt” already exist on the USB-stick an overwrite verification popup is displayed.

Select how many printouts to save on the USB-stick.

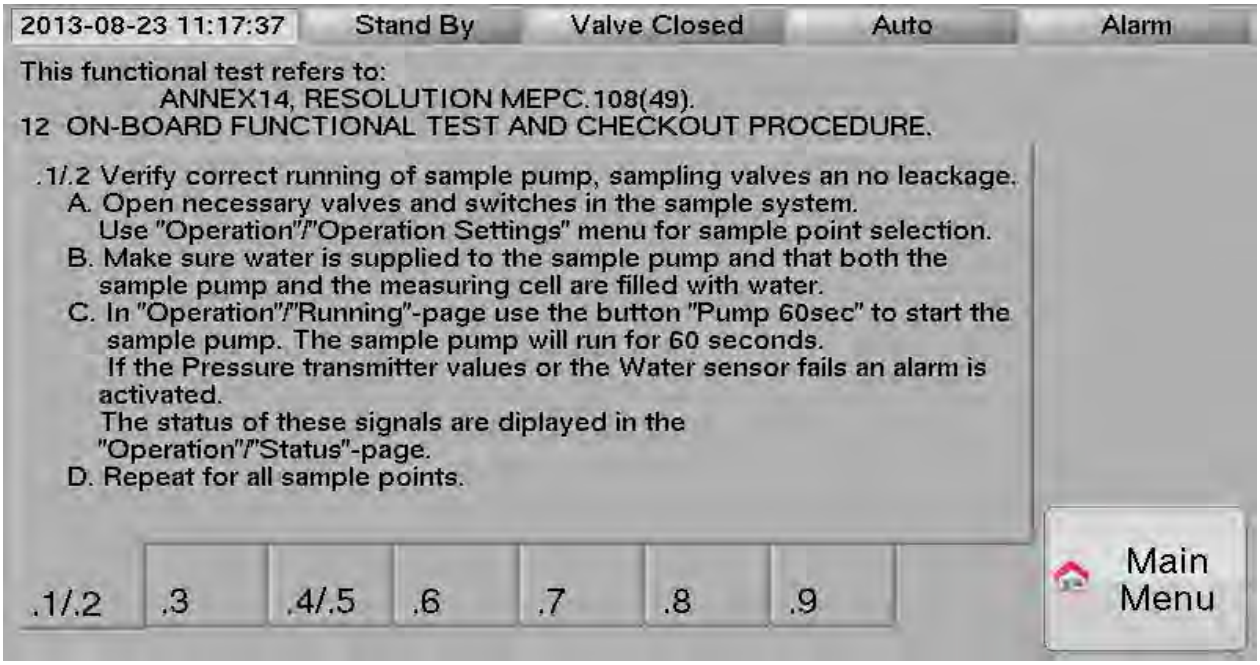


7.6. On-board Test

This chapter refers to ANNEX 14, RESOLUTION MEPC.108(49) chapter 12.

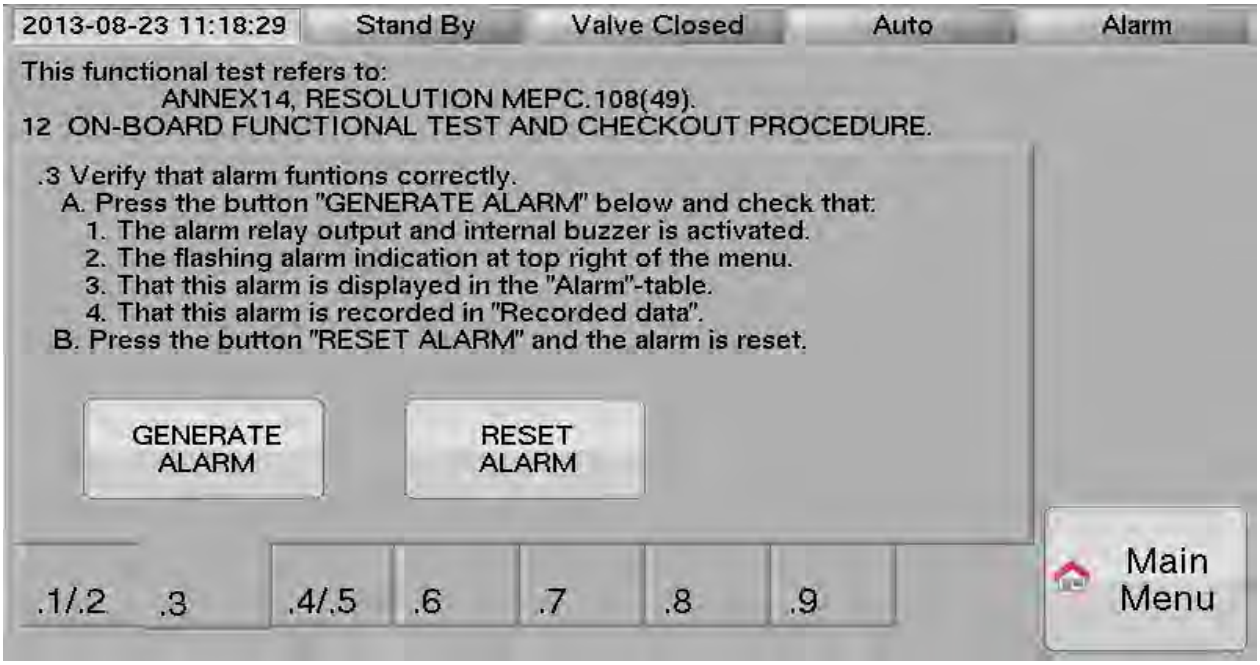
12 ON-BOARD FUNCTIONAL TEST AND CHECKOUT PROCEDURE

The functional test referred to in paragraph 9.1.8 should include at least all the following tests when the monitoring system is operating on water:



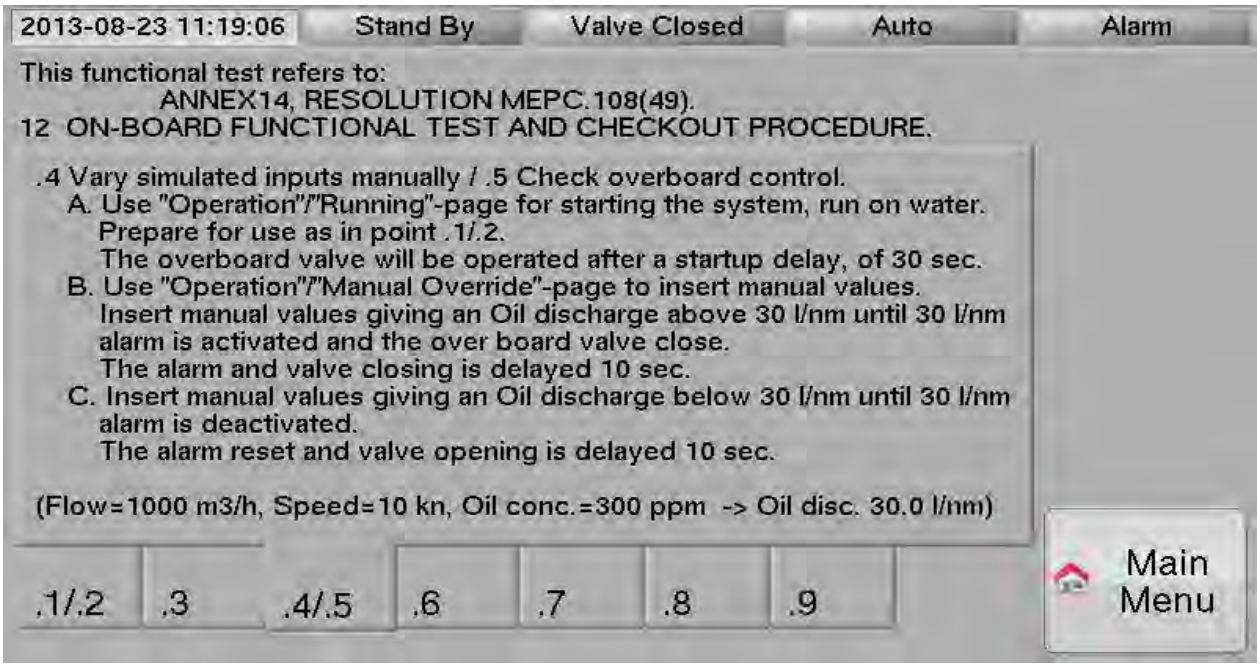
.1 verify correct running of pumps, absence of leakage in the sample pumping and piping system, correct functioning of remote-controlled sampling valves, etc.

.2 verify by checking flow rates or pressure drops, as appropriate, that the system operates under correct flow conditions. This test should be repeated separately for each sampling point;



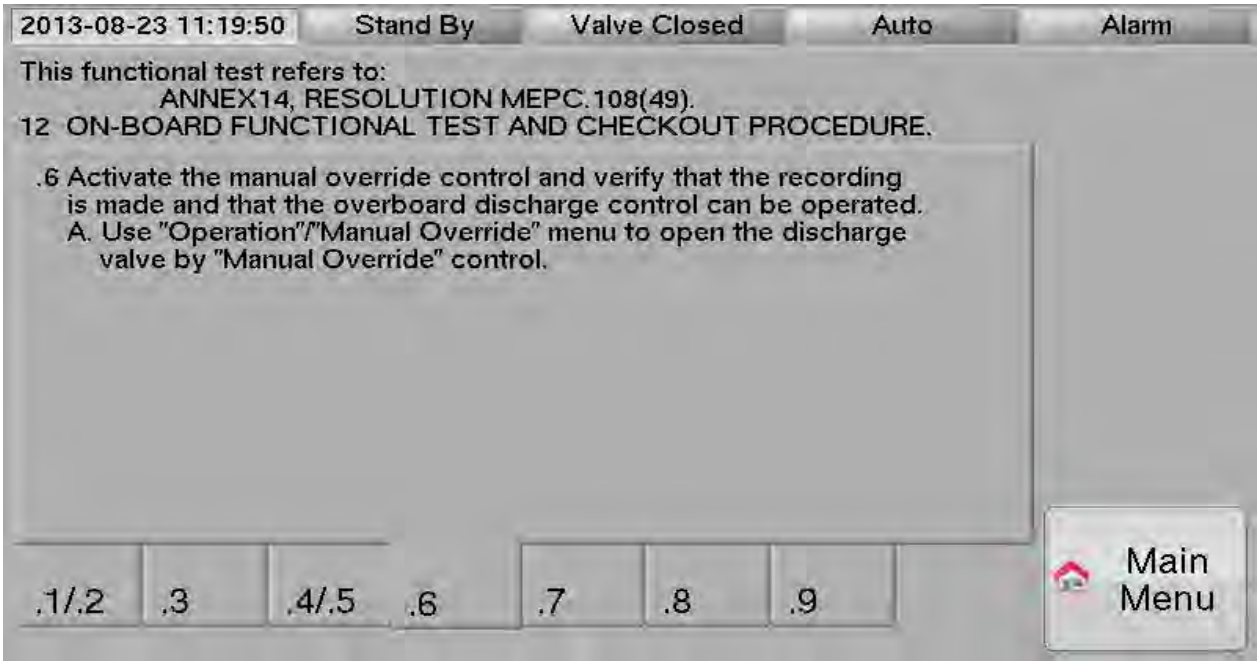
.3 verify that alarms function correctly when a malfunction occurs external to the monitoring system, such as no sample flow, no flow meter signal, power failure, etc.;

An external malfunction can be checked by disconnecting power to the converting unit. Then communication alarms will be raised.

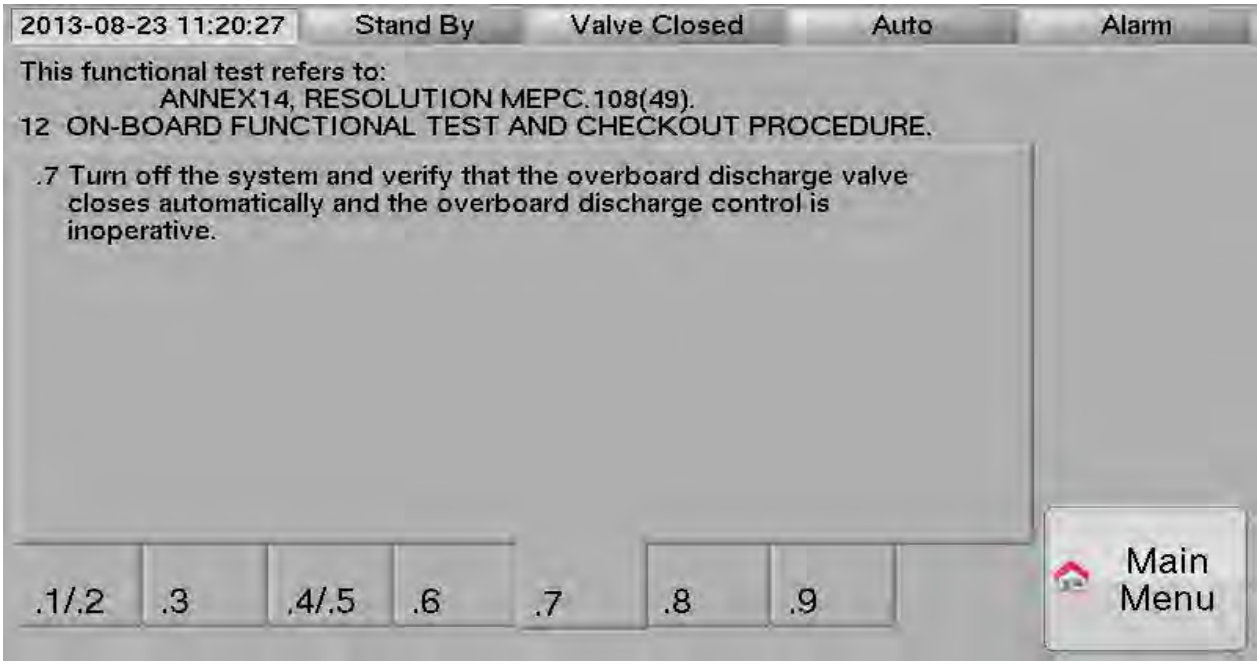


.4 vary the simulated input signals manually while the monitoring system is operating on water and check the recordings for correct values and timing. Vary the simulated manual input signals until alarm conditions are obtained, and verify proper recordings. Ascertain that the overboard discharge control is activating and verify that the action is being recorded;

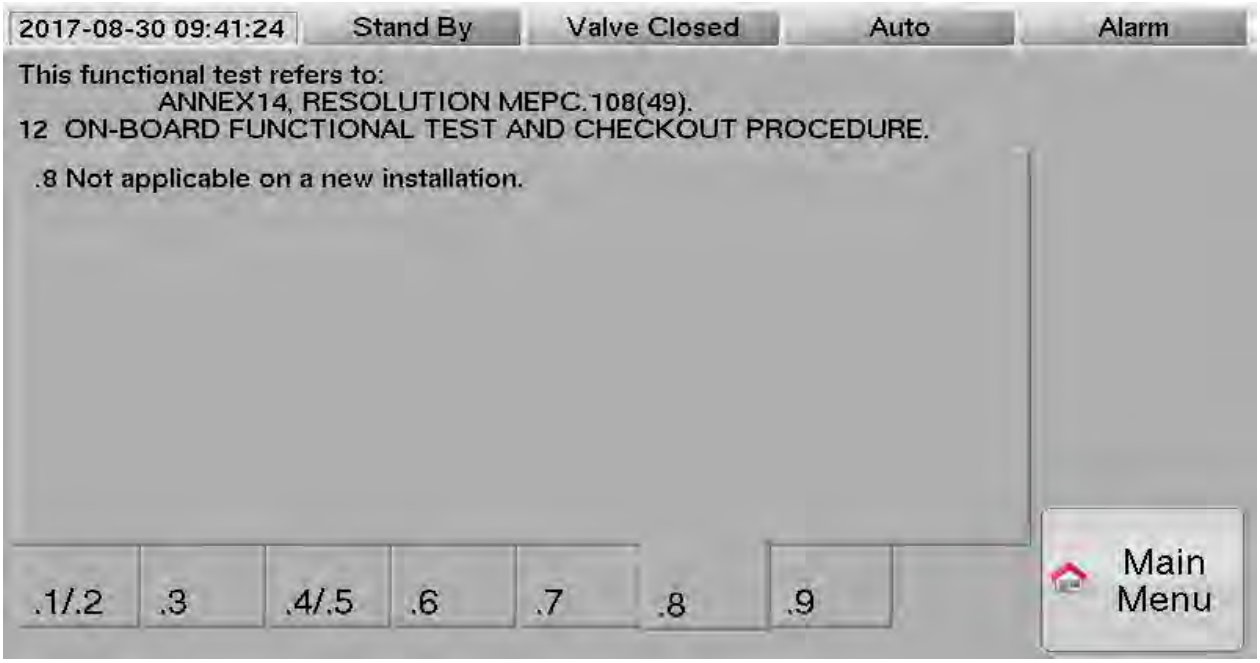
.5 verify that normal operating condition can be reset when the value of the instantaneous rate of discharge is reduced below 30 liters per nautical mile;



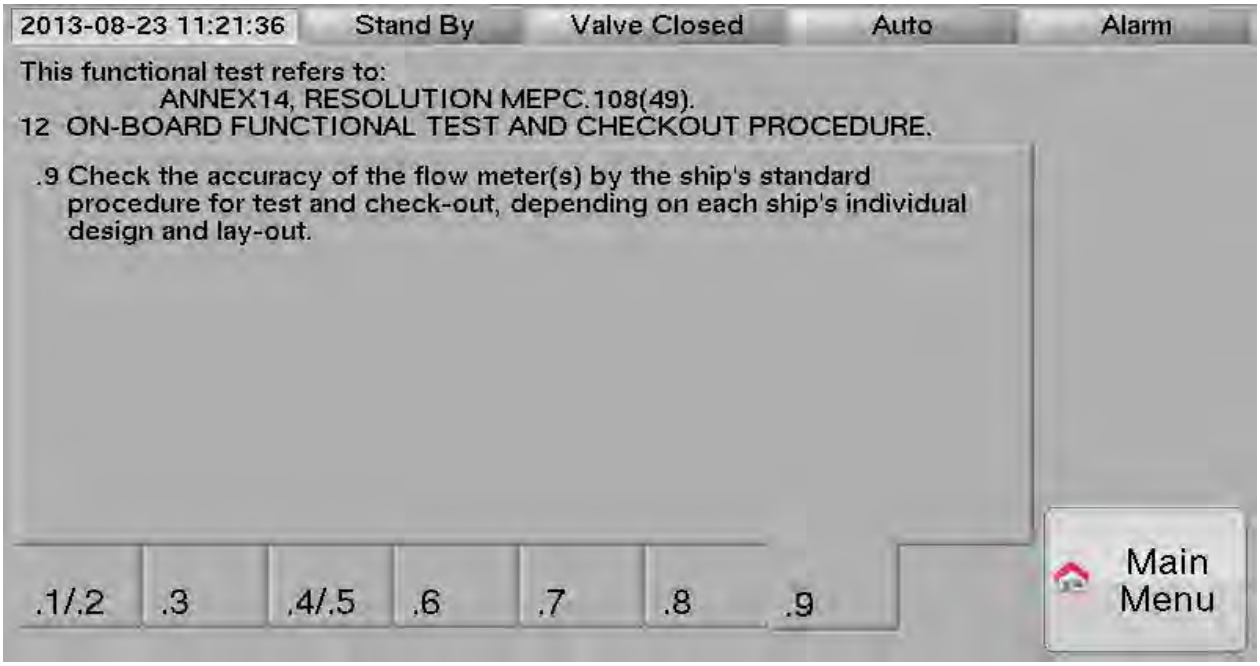
.6 activate the manual override control and verify that a recording is made and that the overboard discharge control can be operated;



.7 turn off the system and verify that the overboard discharge valve closes automatically or the relevant pumps are stopped and the overboard discharge control is inoperative;



.8 Only in connection to renewal of ship's IOPP Certificate, if a new measuring cell has not been installed, the following should be performed. Start up the system and check the zero and gain settings for the oil content meter in accordance with the manufacturer's operations and technical manual.

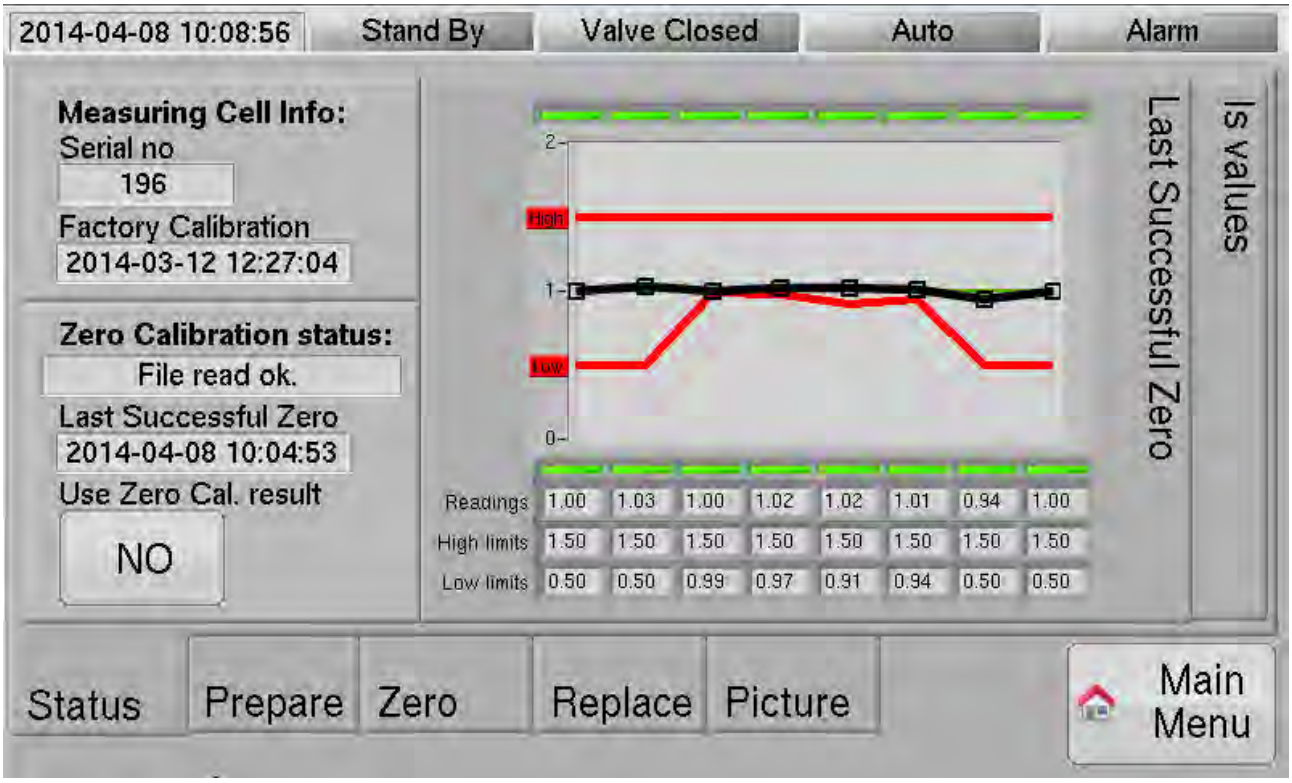


.9 check the accuracy of the flow meter(s), for example by pumping water in a loop where the flow rate may be calculated from the level change in a tank. The check should be made at a flow rate of about 50% of the rated flow of the flow meter.

7.7. Measuring Cell Check/Calibration

7.7.1. Zero Calibration Status

Indicates the Zero Calibration status of the connected Measuring Cell.



The graph indicates eight different values measured in the Measuring Cell. Values from the left are:
#1 internal reference, #2-6 photo diodes, #7 water detector, #8 temperature.
The upper red line is the high limit and the lower red line indicates the low limits for accepting as fresh water (0 ppm).
Values outside of accepted areas are indicated by a red light and inside by a green light.
Measured values (Readings) and limits are also displayed numeric below the graph.

"Measuring Cell info:"

"Serial no"	Serial number of the connected Measuring Cell.
"Factory Calibration"	Factory calibration time of the connected Measuring Cell.
"Zero Calibration status:"	Calibration status.
"Last Successful Zero"	Display the time of the last successful Zero Calibration of the connected Measuring Cell. Unsuccessful trials are not indicated here.
"Use Zero Cal. Result"	Selection if the Zero Calibration Result is used in the concentration calculations.

Graphs

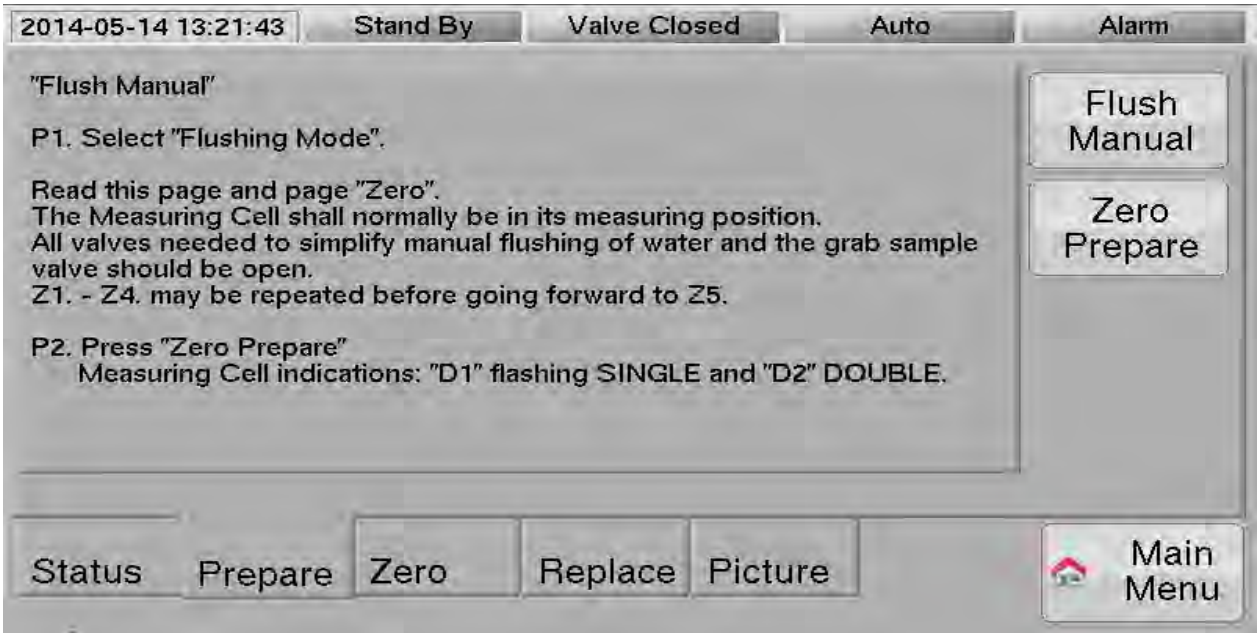
"Last Successful Zero"	Displays the values from the last successful zero.
"Is values"	Displays the measured values.

7.7.2. Zero Calibration Prepare

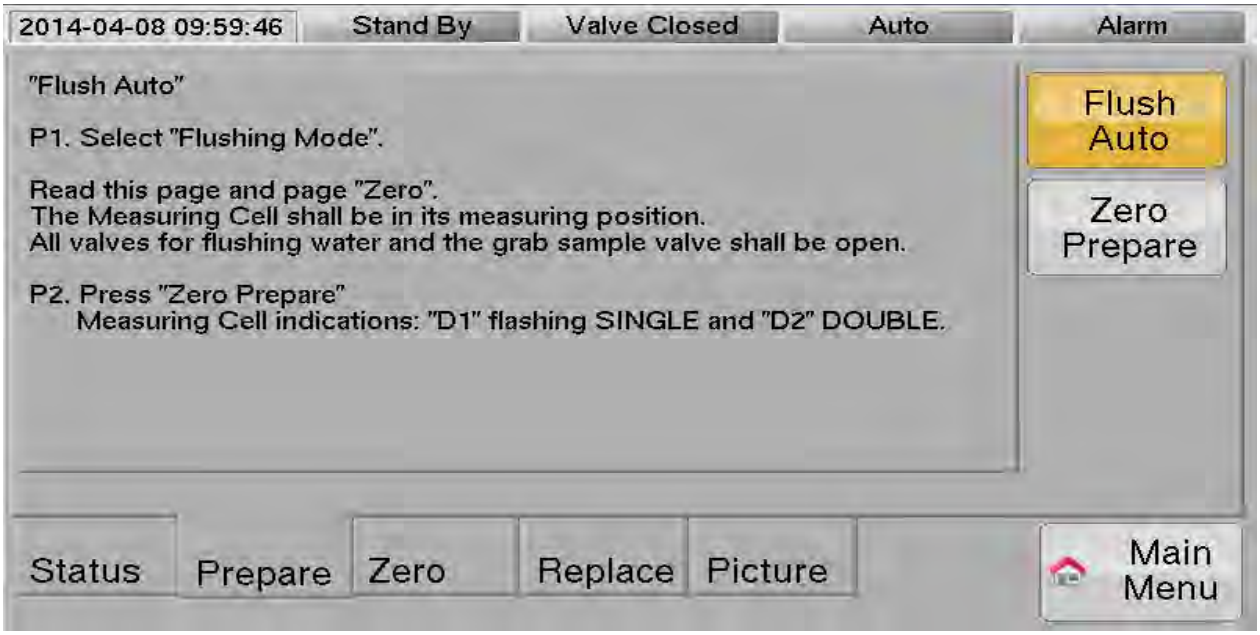
Zero Calibration can be performed in 2 different ways. If the installation has a “Controlled Water Valve” this fresh water can be used for calibration. If not, water has to be manually poured into the Measuring Cell.

When “Zero Prepare” is pressed the tabs “Status”,”Prepare”,...,”Picture” are no longer visible.

Flush Manual:



Flush Auto:



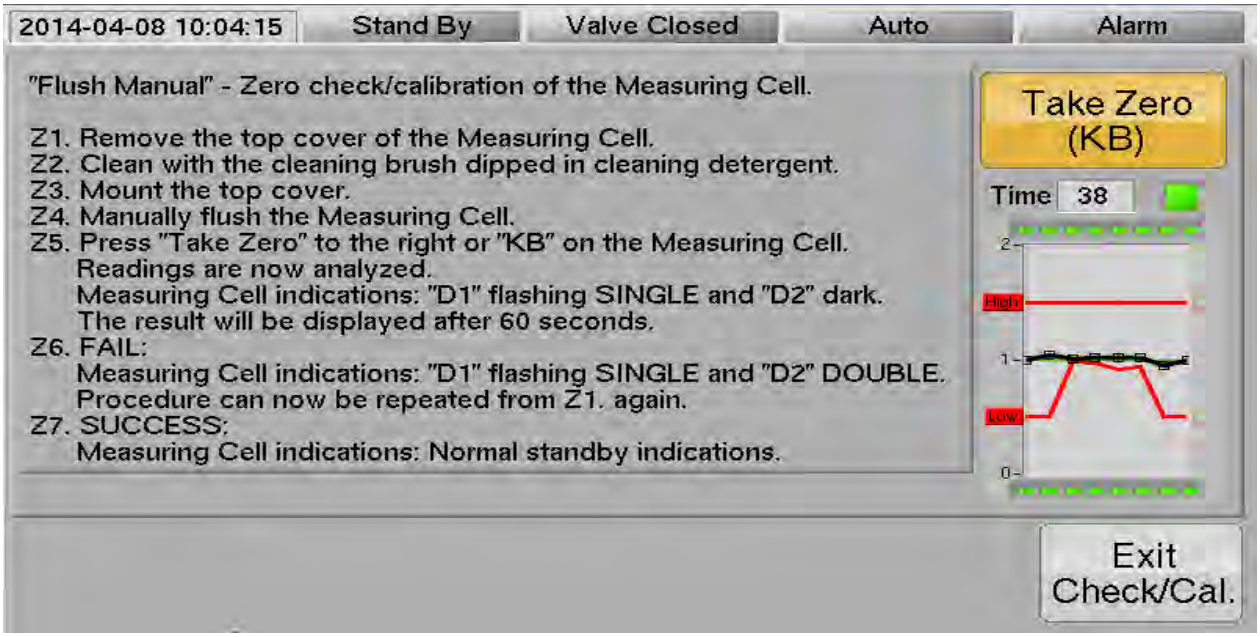
“Flush Manual/Auto” Press this key to toggle between manual flushing and automatic flushing by the “Controlled Water Valve”. If “No Controlled Water Valve” is selected in the Setup/Config-page this key is not visible.

“Zero Prepare” Press this key to start preparations for Zero Check/Calibration.

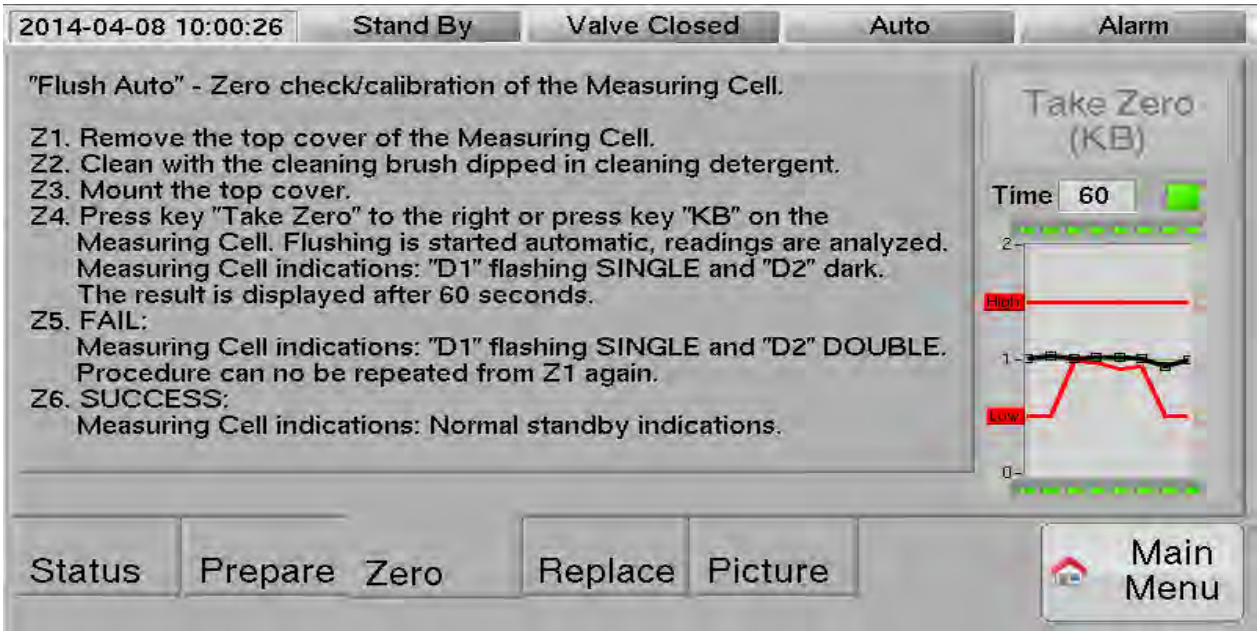
7.7.3. Zero Calibration Take Zero

When “Zero Prepare” is pressed the tabs “Status”,”Prepare”,...,”Picture” are no longer visible.

Flush Manual:



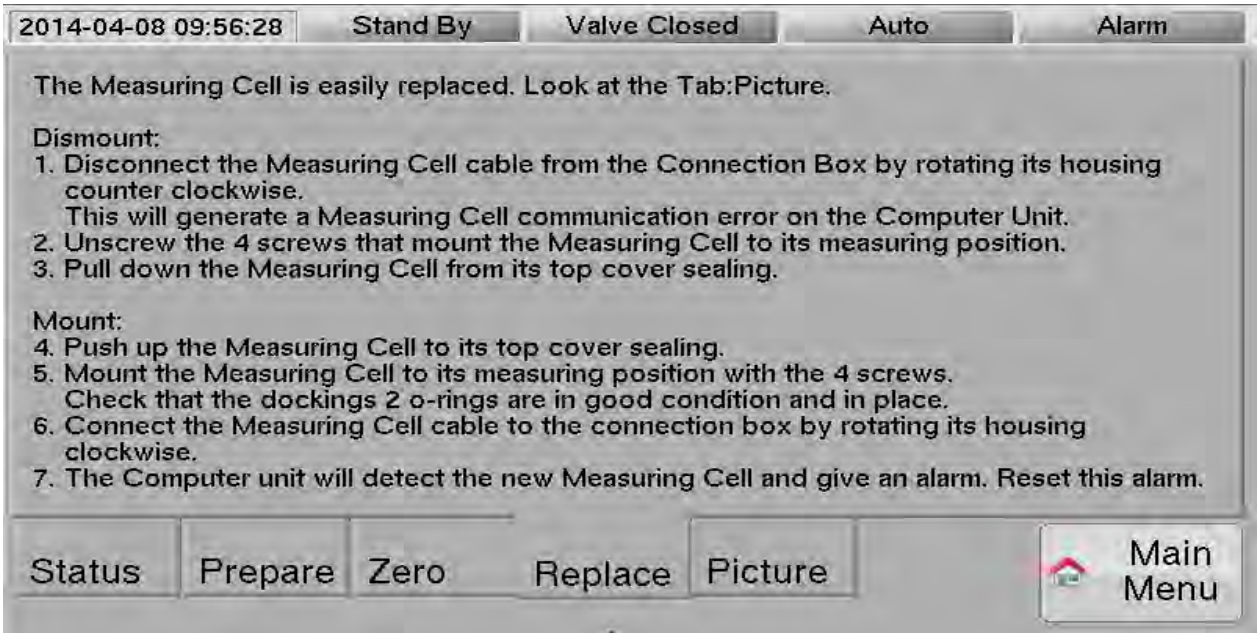
Flush Auto:



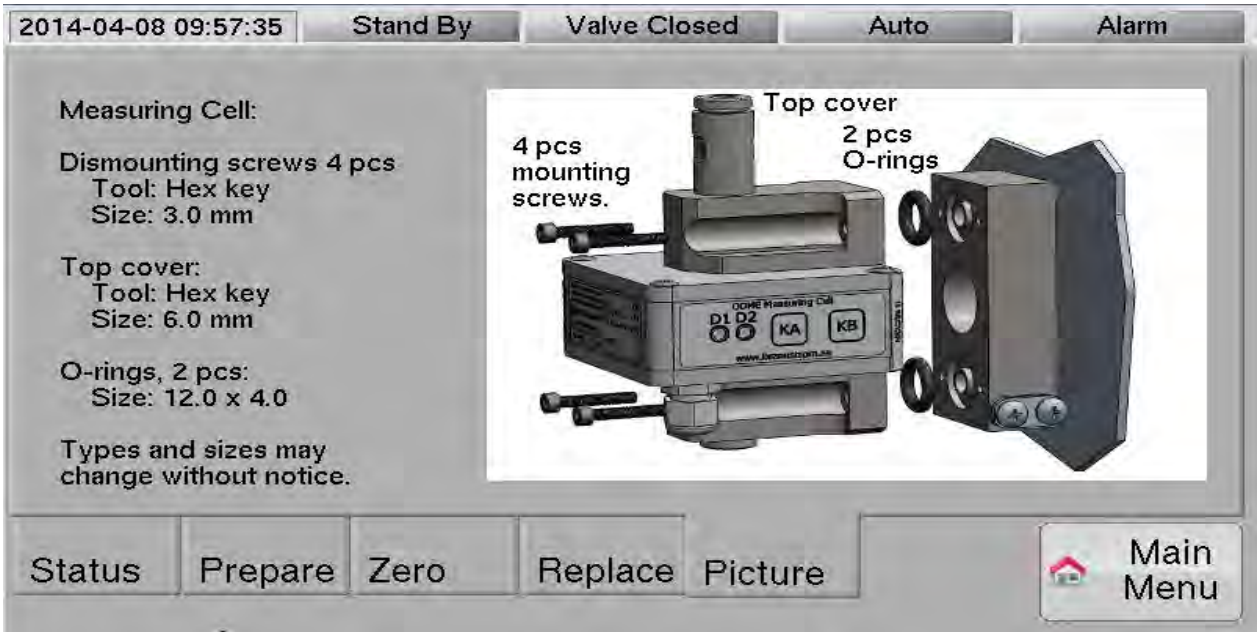
“Take Zero (KB)”	Press this key to start Zero Check/Calibration. Reading are analyzed for 60 seconds.
“Time”	Counting down seconds while readings are analyzed.
“Square indication”	Indicates the result of the Check/Calibration, red = fail / green = ok.
“Graph indication”	See explanation 2 pages up when where Status is explained.

7.7.4. Replace Measuring Cell

The instructions on the 2 pages below describes how the Measuring Cell is replaced and the tools needed.



Before replacing the measuring cell, study the chapter **4.10. Measuring Cell Instructions and Replacement** page **31**.

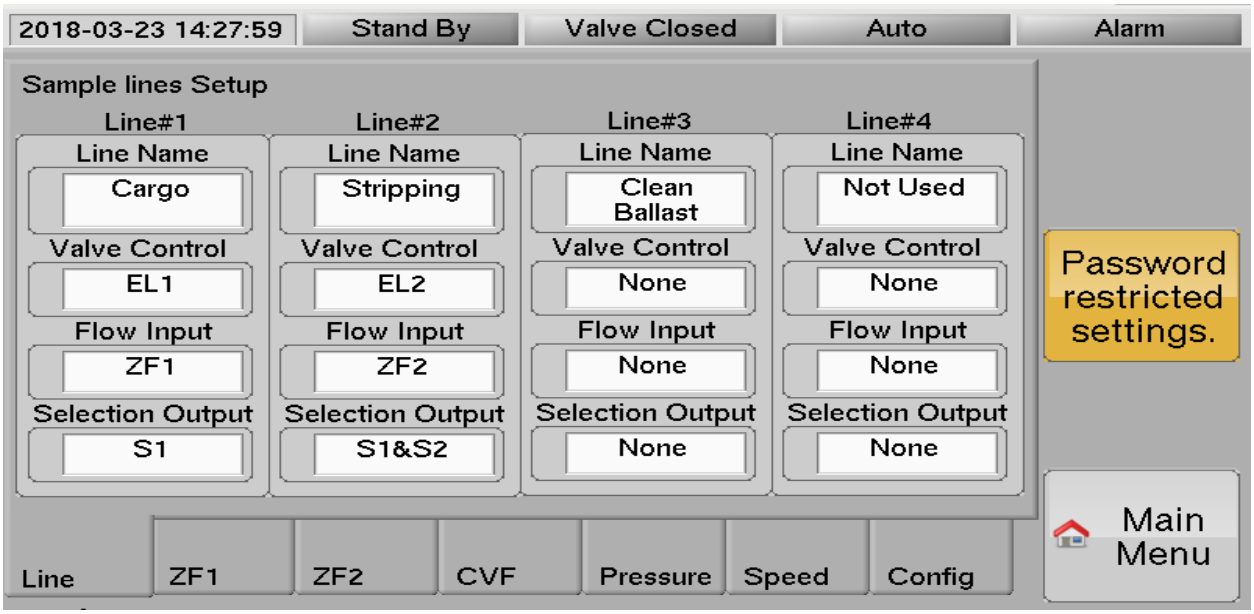


7.8. Setup of parameters

In each system setting the system details are selected by pressing indicators with white background or keys.
To enter the “Setup”-page you should first use: Password: “3” and “Admin”.
Greyed out indications and keys cannot be changed without giving the password for “Restricted Settings”.
Password: “8515 and “Admin”. Caution must be taken before changing setup settings.
Changes are recorded at the time of change and on normal printouts.

7.8.1. Line of discharge

The system handles a maximum of 4 discharge lines but maximum of 2 overboard valves



“Line Name” Name of each overboard line. Drop down list below:
- **“Not Used”** Line is not used.
- **“ “** 30 L/nm alarm mode, line has no name.
- **“Cargo”** 30 L/nm alarm mode, line name is “Cargo”.
- **“Stripping”** 30 L/nm alarm mode, line name is “Stripping”.
- **“Slop”** 30 L/nm alarm mode, line name is “Slop”.
- **“Dirty Ballast”** 30 L/nm alarm mode, line name is “Dirty Ballast”.
- **“Clean Ballast”** 15 ppm alarm mode, line name is “Clean Ballast”.

“Valve Control” Hardware relay output and input.
- **“None”** No valve control.
- **“EL1”** Relay output on terminals 3 and 4 in Computer Unit.
  Feedback input on terminals 26 and 27 in Computer Unit.
  Closed contact indicating open overboard valve.
- **“EL2”** Relay output on terminals 5 and 6 in Computer Unit.
  Feedback input on terminals 28 and 29 in Computer Unit.
  Closed contact indicating open overboard valve.
- **“EL1-ZD1”** Relay output on terminals 3 and 4 in Computer Unit.
  Feedback input on terminals ZD1 in Converting Unit.
  Closed contact indicating open overboard valve.
- **“EL2-ZD2”** Relay output on terminals 5 and 6 in Computer Unit.
  Feedback input on terminals ZD2 in Converting Unit.
  Closed contact indicating open overboard valve.
- **“EL1-INV”** Relay output on terminals 3 and 4 in Computer Unit.
  Feedback input on terminals 26 and 27 in Computer Unit.
  Open contact indicating closed overboard valve.
  Closed contact indicating closed overboard valve.
- **“EL2-INV”** Relay output on terminals 5 and 6 in Computer Unit.
  Feedback input on terminals 28 and 29 in Computer Unit.
  Open contact indicating closed overboard valve.
  Closed contact indicating closed overboard valve.
- **“EL1/EL2”** Open a key in “Operate”-menu to manually control the slop tank valve output.
  Relay output on terminals 3 and 4 in computer unit controls the overboard valve.

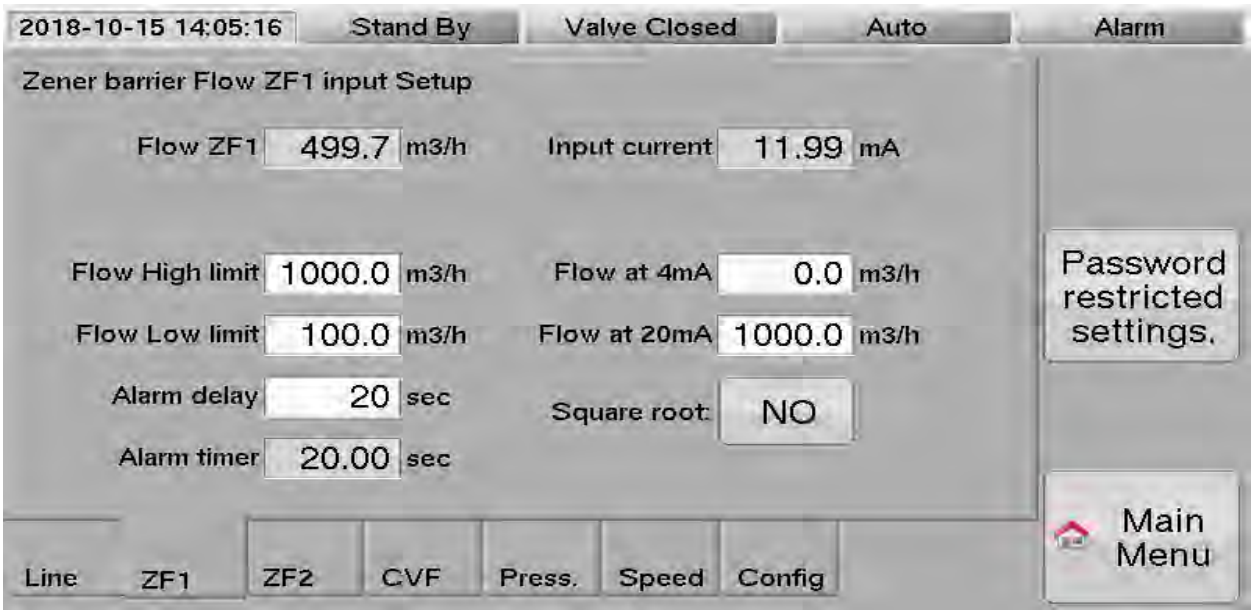
Relay output on terminals 5 and 6 in computer unit controls the slop tank valve.
Feedback input on terminals 26 and 27 in computer unit for the overboard valve.
Feedback input on terminals 28 and 29 in computer unit for the slop tank valve.
Closed contact indicating open overboard valve / slop tank valve.
Drawings for this setting are, on request, and not included in this manual

"EL1/EL2-n" Open a key in "Operate"-menu to manually control the slop tank valve output.
Relay output on terminals 3 and 4 in computer unit controls the overboard valve.
Relay output on terminals 5 and 6 in computer unit controls the slop tank valve.
Feedback input on terminals 26 and 27 in computer unit for the overboard valve.
Closed contact indicating open overboard valve, no feedback indication for the slop tank valve.
Drawings for this setting are on request, and not included in this manual

"Flow Input" Actual flow meter.
- **"None"** No flow meter for this line.
- **"ZF1"** ZF1 input on Zener Barrier PCB is used.
- **"ZF2"** ZF2 input on Zener Barrier PCB is used.
- **"CVF"** CVF input on Converting Unit PCB is used.
- **"ZF1->ZF2"** ZF1 input on Zener Barrier PCB is used but calculations are setup in ZF2-page.

"Selection Output" Hardware relay output to activate when line is selected
- **"None"** No hardware relay output for this line.
- **"S1"** Relay output on terminals 5 and 6 on Converting Unit PCB.
- **"S2"** Relay output on terminals 7 and 8 on Converting Unit PCB.
- **"S1&S2"** Both relay outputs above are activated.

7.8.2. ZF1 (Zener barrier flow input 1)



"Flow ZF1" Is value, calculated flow.
"Flow High limit" High flow limit.
"Flow Low limit" Low flow limit.
"Alarm delay" Alarm delay.
"Alarm timer" Alarm time to count down the alarm delay.
"Input current" Measured current on ZF1 input.
"Flow at 4mA" Corresponding flow for current input of 4 mA.
"Flow at 20mA" Corresponding flow for current input of 20 mA.
"Square root" NO if current is linear to flow, YES if current is linear to pressure.

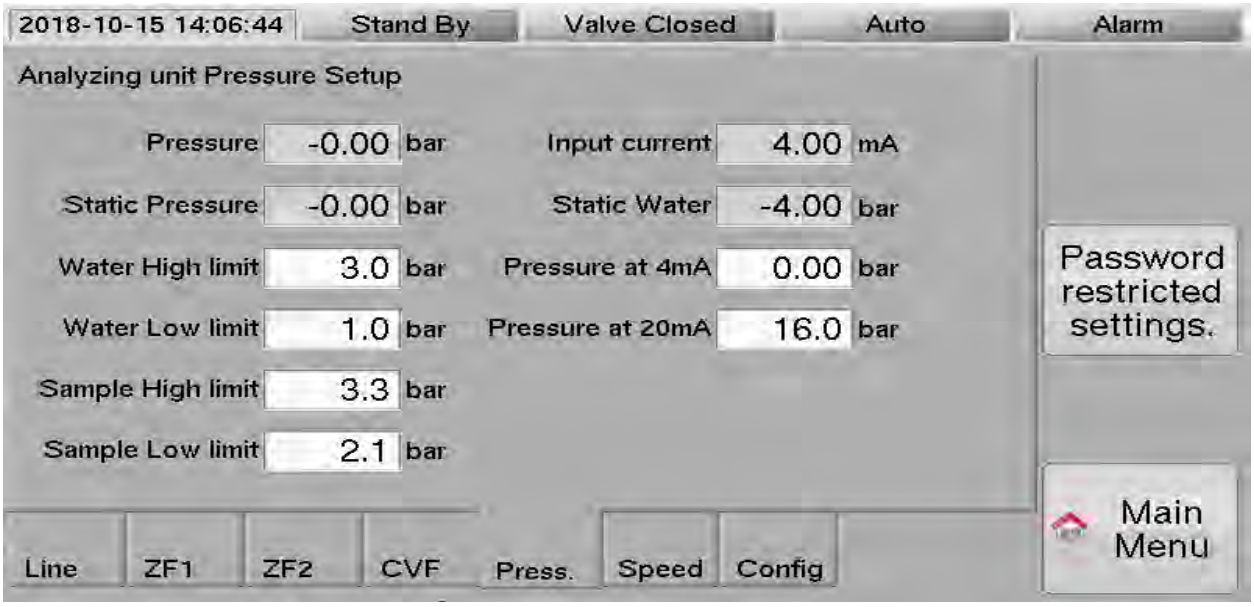
7.8.3. ZF2

Same as ZF1 above.

7.8.4. CVF

Same as ZF1 above.

7.8.5. Pressure



Refer to chapter **4.8. Pressure alarm settings** page **25** for suggestions of limit settings.
The function of the pressure alarms is explained below, see chapter **7.8.5.1. Static Pressure/Water function** page **70**.

"Pressure"	Is value, calculated pressure.
"Static Pressure"	Measured counter pressure from overboard line.
"Water High limit"	High pressure limit from fresh water.
"Water Low limit"	Low pressure limit from fresh water.
"Sample High limit"	High pressure limit from sample pump.
"Sample Low limit"	Low pressure limit from sample pump.
"Input current"	Measured current on Pressure input.
"Pressure at 4mA"	Corresponding pressure for current input of 4 mA.
"Pressure at 20mA"	Corresponding pressure for current input of 20 mA.

7.8.5.1. Static Pressure/Water function

The pressure alarms compare the actual pressure with the pressure measured from the overboard line before the sample pump was started or the fresh water valve was opened.

Assume that the unit is started without flushing and the start is normal without any alarms.
The process for checking the sample pressure limits then becomes:

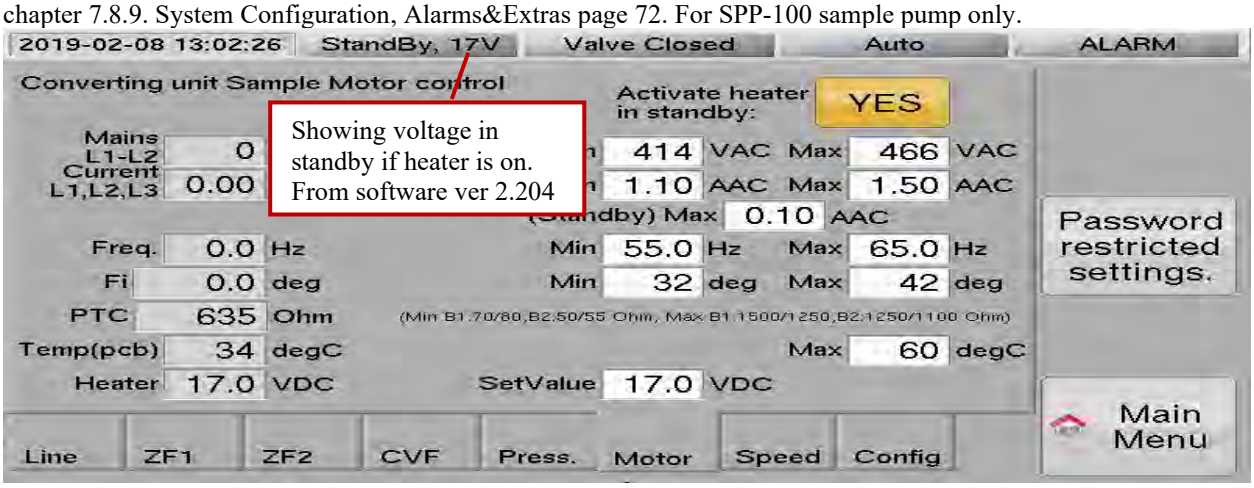
1. Measure the "Pressure" in the analyzing unit. This will be the same pressure as in the overboard line because the inlet and outlet pipes to the overboard line are open.
2. The "Static Pressure" is set to the measured "Pressure". The "Static Pressure" will not change while the sample pump is running.
3. Start the sample pump.
4. The level of pressure increase is then calculated as "pressure increase" = "Pressure" – "Static Pressure".
5. The "pressure increase" is then compared with the "Sample High limit" and "Sample Low limit".
6. If "pressure increase">"Sample High limit" for 10 seconds the "Alarm – High Work Pressure" is activated and if "pressure increase"<"Sample Low limit" for 10 seconds the "Alarm – Low Work Pressure" is activated.
7. Any of these 2 alarms will stop the unit, switch off the sample pump and close the overboard valve.

Assume that the unit is started with water flushing and the start is normal without any alarms.
The process for checking the fresh water pressure limit then becomes:

1. Measure the "Pressure" in the analyzing unit. This will be the same pressure as in the overboard line because the inlet and outlet pipe to the overboard line are open.
2. The "Static Water" is set to the measured "Pressure". The "Static Water" will not change while the water valve is open.
3. Open the water valve.
4. The level of pressure increase is then calculated as "pressure increase" = "Pressure" – "Static Water".
5. The "pressure increase" is then compared with the "Water High limit" and "Water Low limit".
6. If "pressure increase">"Water High limit" for 10 seconds the "Alarm – High Water Pressure" is activated and if "pressure increase"<"Water Low limit" for 10 seconds the "Alarm – Low Water Pressure" is activated.
7. Any of these 2 alarms will stop the unit and close the water valve.

7.8.6. Motor (Optional Extended Converting unit I/O PCB)

This tab is shown only if the property “ConvertingUnitType” is set to “Extended” in the “Config” tab below, see chapter 7.8.9. System Configuration, Alarms&Extras page 72. For SPP-100 sample pump only.



“Activate heater in “StandBy” Output DC voltage between phases L1-L2 while the sample pump is not running. The motor is heated to avoid condensation in the motor.

“Heater” Measured DC voltage between phases L1-L2 to heat the motor while it is not running.

“SetValue” Wanted DC voltage between phases L1-L2 to heat the motor while it is not running.

“Mains L1-L2” Measured AC voltage between phases L1-L2.

“Min”,”Max” Min. and max. limits of Mains, stops discharge with an alarm delay of 10 seconds.

“Current L1,L2,L3” Measured AC current on phases L1, L2 and L3.

“Min”,”Max” Min. and max. limits of Current, stops discharge with an alarm delay of 10 seconds.

“(Standby) Max” An alarm is generated if this max current is exceeded by any phase during “StandBy” mode.

“Freq.” Measured mains voltage frequency.

“Min”,”Max” Min. and max. limits of freq., stops discharge with an alarm delay of 10 seconds.

“Fi” Measured angle in degrees between voltage and current. Cos(fi)=0.78 => fi=39 degrees.

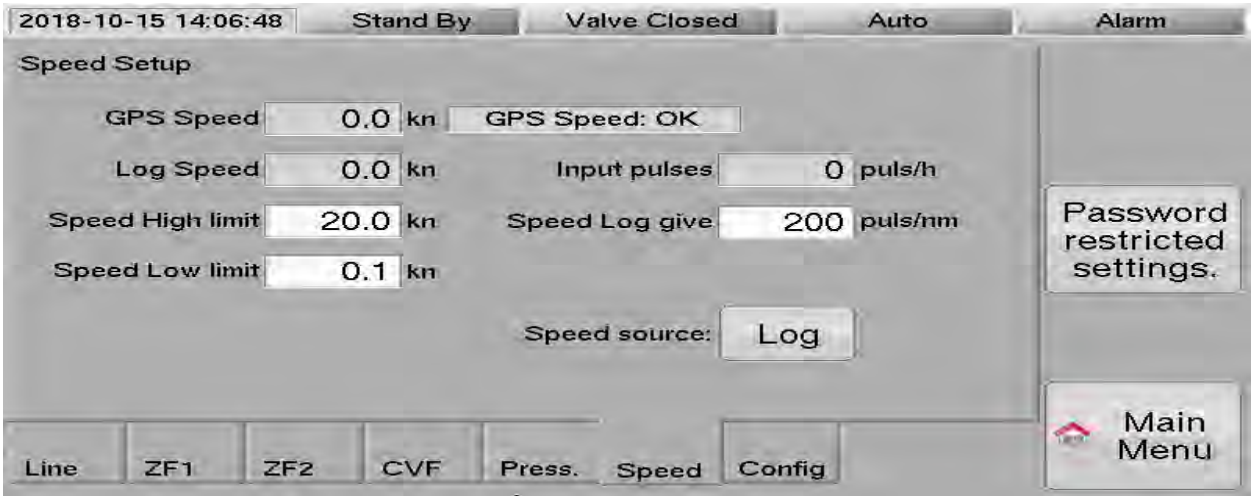
“Min”,”Max” Min. and max. limits of fi., stops discharge with an alarm delay of 10 seconds.

“PTC” Measured resistance of PTC resistors in motor windings. Immediately stop of both sample pump motor and heater.

“Temp(pcb)” Measured temperature by sensor located on the converting unit pcb.

“Max” Max. limit of pcb temperature, stops discharge with an alarm delay of 10 seconds.

7.8.7. Speed



“GPS Speed” Speed indicated by the GPS.

“Log Speed” Speed measured from the speed log.

“Speed High limit” High speed limit.

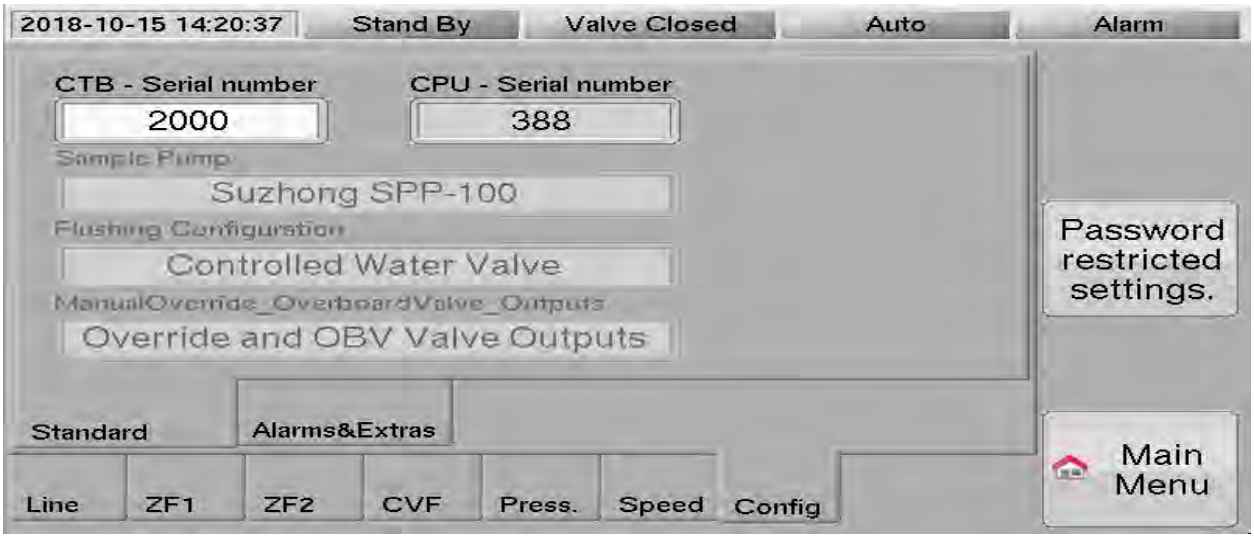
“Speed Low limit” Low speed limit.

“Input pulses” Measured pulse frequency from the speed log.

“Speed Log give” Speed log pulses per nautical mile.

“Speed source” Selected speed source. “Log” speed pulse log, “GPS” speed from GPS.

7.8.8. System Configuration, Standard



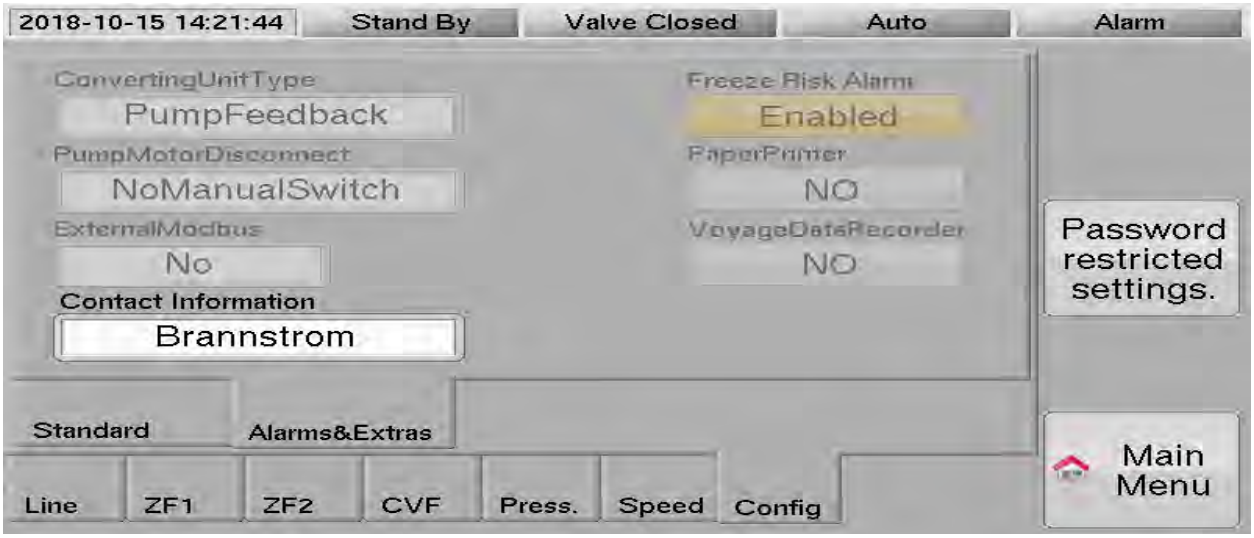
"CTB – Serial number" Serial number of the unit.
"CPU – Serial number" Serial number of the Computer Unit PCB.
"Sample Pump" Set to the installed sample pump.
"SpeckPumpSerialNo" If "SamplePump" selection is "Speck Air" its serial number can be inserted to the right of the "SamplePump" selection.
"Flushing Configuration" Set to the installed water flushing arrangement.

- **"No Controlled Water Valve"** No fresh water valve is controlled by the unit.
- **"Controlled Water Valve"** A fresh water valve is controlled by the unit.
- **"Indicated Water Valve"** An indicated fresh water valve is connected to the unit. Connect to ZD4. Closed contact for closed valve.

"ManualOverride_OverboardValve_Output"
Selection of which relay output should be activated when the key: "Manual Override Overboard Valve" is activated. Relays are in Computer Unit.
See chapter **7.10.6. Power (Computer unit Power supply)** page **78**.

- **"Manual Override Output"** Activating "Manual Override Relay", terminals 7, 8 and 9. Normally used to remove an external interlock.
- **"Overboard Valve Output"** Activating relay output of selected overboard line.
- **"Override and OBV Valve Outputs"** Activating both functions above.

7.8.9. System Configuration, Alarms&Extras



"ConvertingUnitType" Setting of converting unit type.
An alarm for sample pump contactor feedback in wrong position will be raised again at every touch screen timeout (about 30 minutes).
This alarm is always checked for units with serial number CTB 2892 and later that have software version 2.2xx installed.

“PumpFeedback” When upgrading the software to version 2.20x it is recommended to upgrade converting units made for an electrical sample pump according to drawing, **CTB110627.1el, internal cable diagram for electrical sample pump motor** page **142**.
The computer unit monitors the feedback of the sample pump start/stop contactor position and raise an alarm if the feedback is unexpected.
An open contactor (pump not running) is indicated with a closed feedback.
Converting unit I/O pcb: ”CVNT_C”.

“NoPumpFeedback” Setting for units without sample pump feedback and for units with air driven sample pump.
For units with an electrical sample pump it is recommended to install the pump feedback.
Converting unit I/O pcb: ”CVNT_C”.

“Extended” (Option) Setting for specially equipped converting units only, with means for monitoring pump motor performance and heating the motor during “StandBy” mode.
The Extended Converting unit can only be combined with the SPP-100 sample pump.
Extended units have the sample pump contactor feedback wired.
See drawing: **CTB110627.1elext** page **143**.
Converting unit I/O pcb: ”CVCT_B”.

“Extended-NoLim” (Option) Same as **“Extended”** above except for 2 disabled alarms:
“62 Alarm – Sample pump Motor Phase Error”
“63 Alarm – Sample pump Motor Limits”.
See chapter **8.9. Extended Converting unit Motor alarms (Optional)** page **89**.

“Freeze Risk Alarm” A freeze risk alarm is raised if the temperature in the Measuring cell is below 4°C and the water sensor is active. The alarm is raised only once and will not be activated again unless the Measuring cell temperature first has increased above 8°C.

“PumpMotorDisconnect” Support of an optional manual on/off switch between the Converting unit and the sample pump motor. The computer unit can monitor the switch position through a help contact.

“ManualWithFeedback” The computer unit monitors the switch position and raises an alarm if the switch remains in the unexpected position.
Switch in OFF position should have a closed help contact for feedback.

“NoManualSwitch” No manual on/off switch is installed.

“PaperPrinter” Select whether a paper printer is installed of not.
If “NO” no printouts are made and no printer alarms are generated.
If “YES” the same printouts that are made to “Recorded data” are made on the printer. Printer errors will stop overboard discharging.

“ExternalModbus” (Option) A modbus RTU master that can over an RS485 line send data to other equipment.
This needs a specially equipped CUIO board. Connect on terminals 44-46.
Use of this optional CUIO-board is not included in this manual.
Setting should normally be **“No”**.

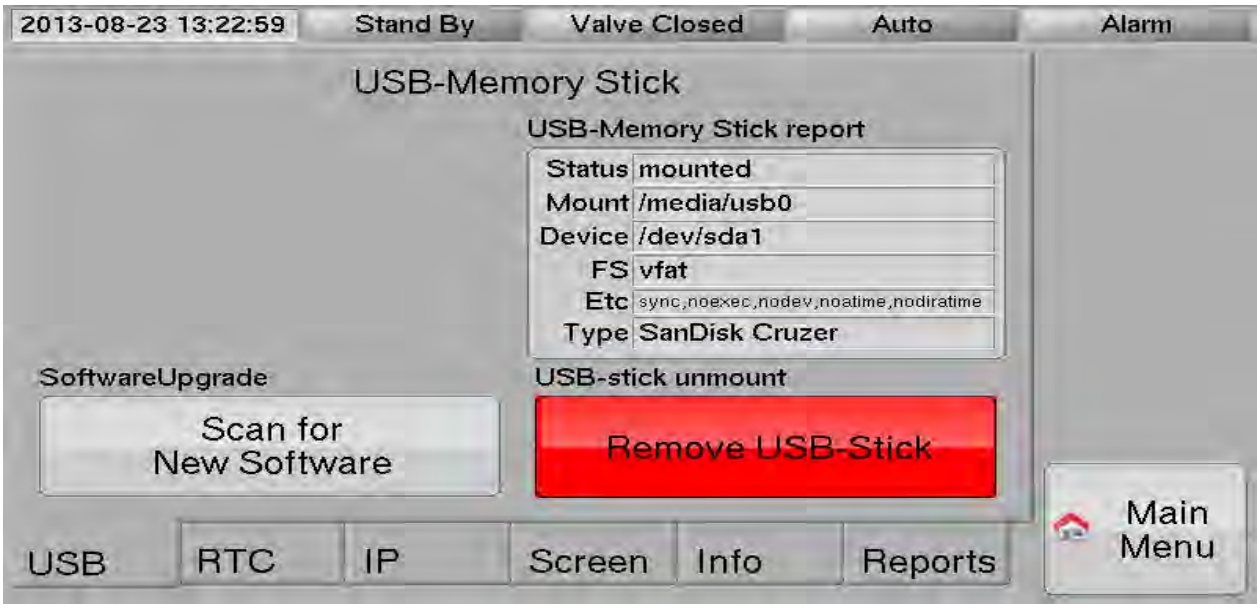
“VoyageDataRecorder” (Option) An RS422 message sent for every line added to “Recoded data”.
This needs a CUIO board of version “L” or later, connect on terminals 41-43.
Setting should normally be **“No”**.
Note! A paper printer cannot be used together with this option.
Message composition is:
“$PCTB”,”Recorded data line”,”*”,2 bytes checksum, Carriage Return, Line Feed.
Baudrate=4800, Parity=None, Data bits=8.

“Contact Information” Contact information can be displayed in the “Start menu” and in the “Alarm table”.

7.9. Computer

7.9.1. USB-Memory stick

To enter the “Computer”-page you should first use: Password: “1” and “User”.
Indications with an inserted USB-Memory stick.



“USB-Memory Stick report” Indicates if a USB-Memory stick is attached or not on its “Status” line. When a USB-Memory stick is fount the other 3 keys becomes highlighted.

“Scan for New Software” Used to install new software on the unit. When pressed the root directory of the USB-Memory stick is scanned for new software. A new menu will open up with the result of the scan and installation selection.
A serial number specific password is needed for the software upgrade is provided by an authorized agent.

“Remove USB-Stick” IMPORTANT! Press this key before removing the USB-Memory stick. The “Status” line will show when the stick is unmounted and can be removed.

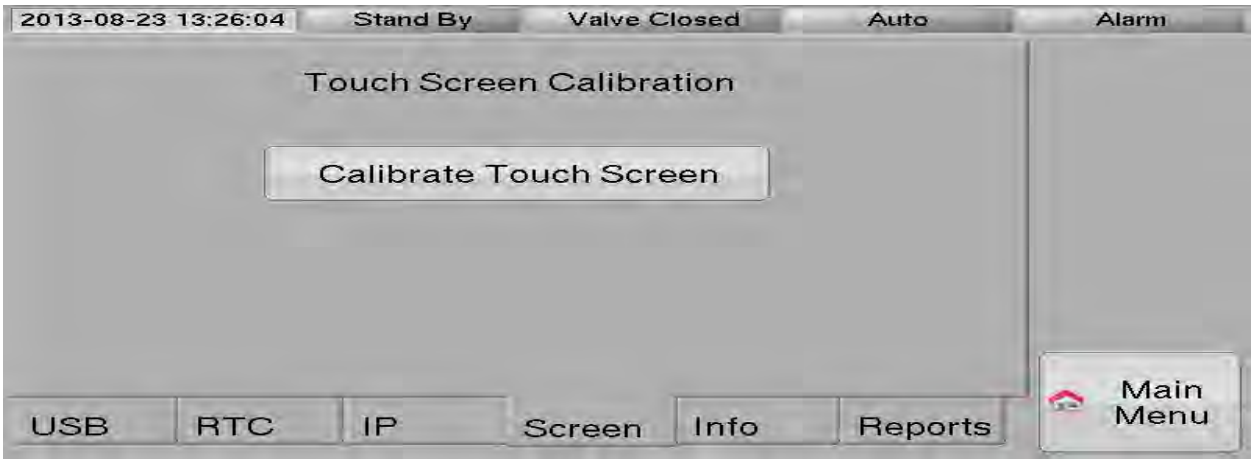
7.9.2. Real Time Clock

Setting of the Real Time Clock. Clock shall be set to GMT-time.
The clock can be set manually or to the time read from the GPS.

7.9.3. IP-address

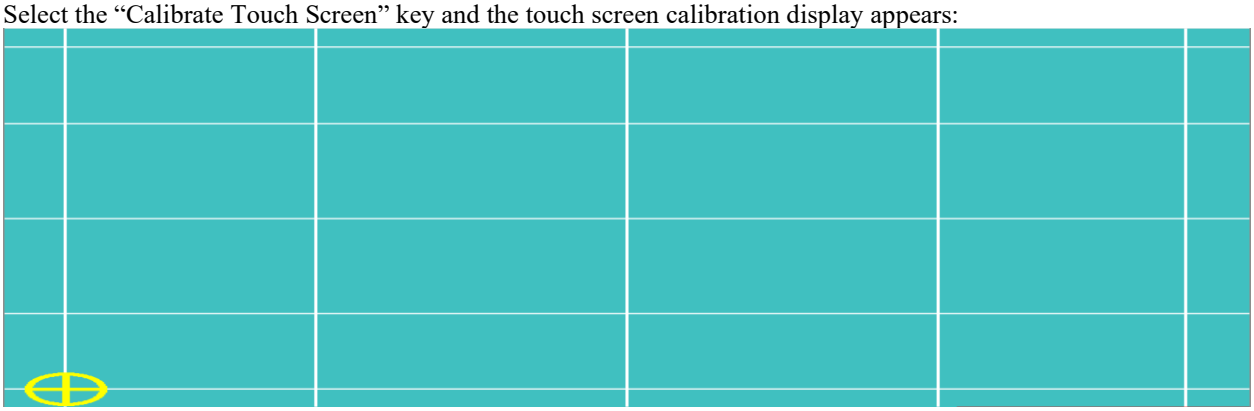
If the unit is connected to the local area network on the vessel it normally by a wired ethernet connection.
One this page a static IP-address or IP-address received through DHCP can be selected.

7.9.4. Touch Screen Calibration



If the touch screen is not in a working condition or behaving strange, a calibration might solve the problem.
If it is impossible to maneuver to the touch screen calibration page by using the touch screen itself it is possible to connect a USB mouse to the USB port at the front of the computer unit.

Select the “Calibrate Touch Screen” key and the touch screen calibration display appears:



Press your fingertip (do NOT use the USB-mouse) against the yellow circle.
When the touch screen has accepted your input, the circle moves to the next calibration point.
Press your fingertip against the yellow circle again and so on.

To exit without calibrating the screen, wait until the red bar at the bottom of the screen has disappeared and the calibration screen will close.

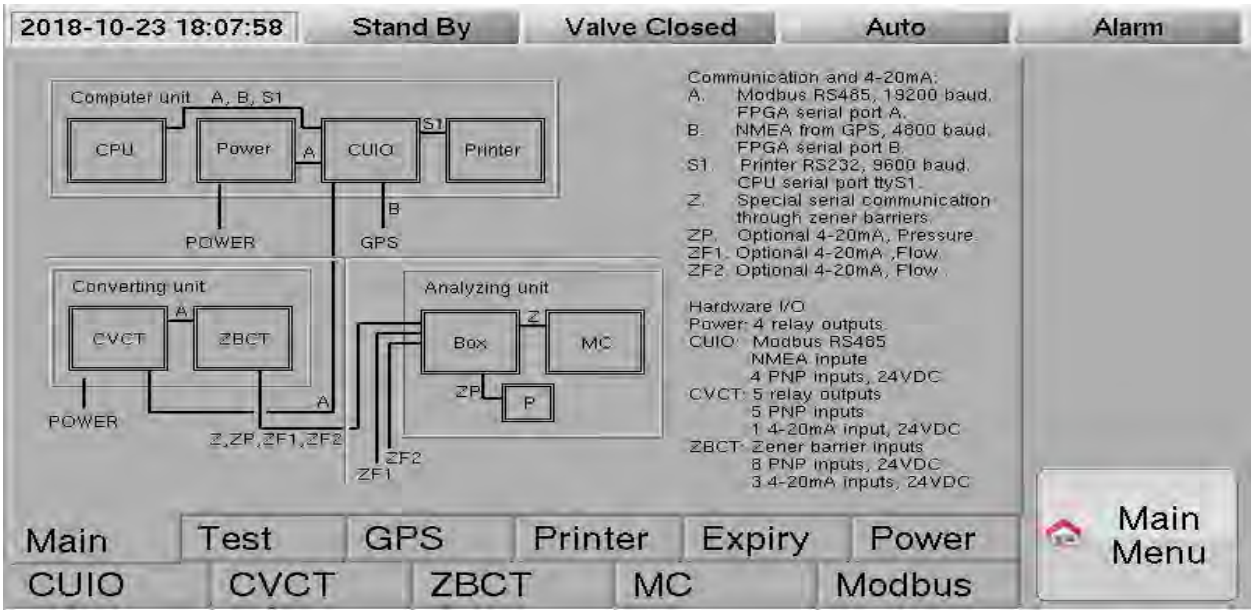
If the calibration is successful, the new calibration should be in effect directly after exit from the calibration screen.
In some cases, the unit must be restarted. Do this by disconnecting power and connecting it back on again.

7.10. System Check

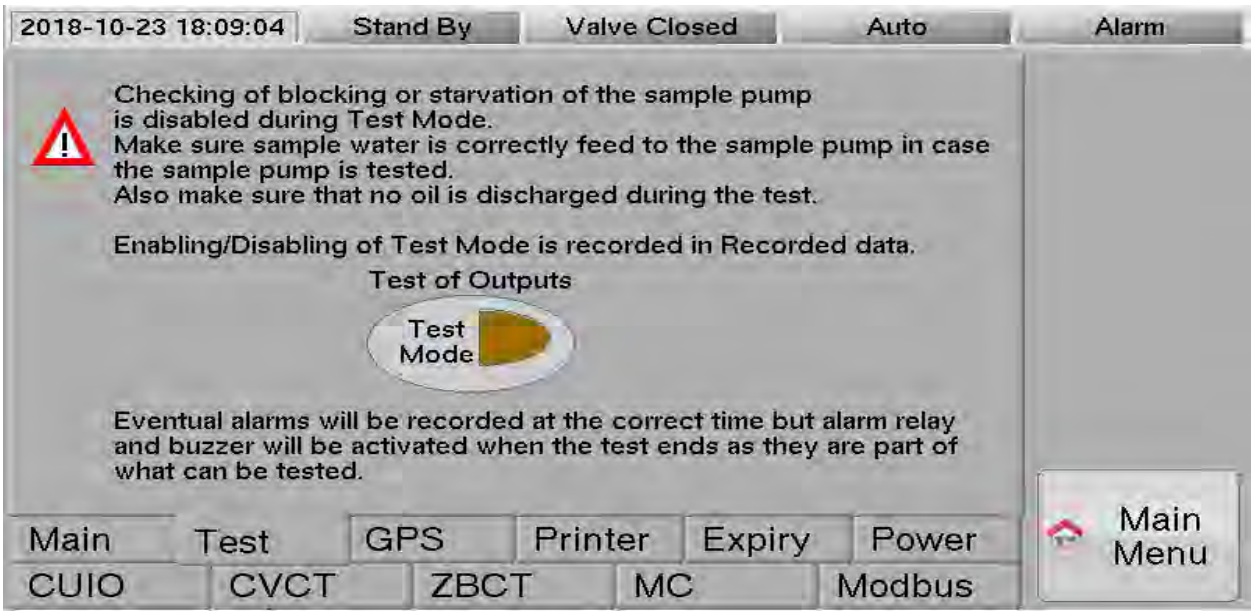
To enter the “System check”-page you should first use: Password: “2” and “Admin”.
Status of communication with printed circuit boards in computer, converting unit and analyzing unit.
NMEA (GPS) transmitter data.
Testing of relay output and digital inputs.
Testing of printer port.
Activation and deactivation of Expiry.

7.10.1. Main

Overview of printed circuit boards in the system.



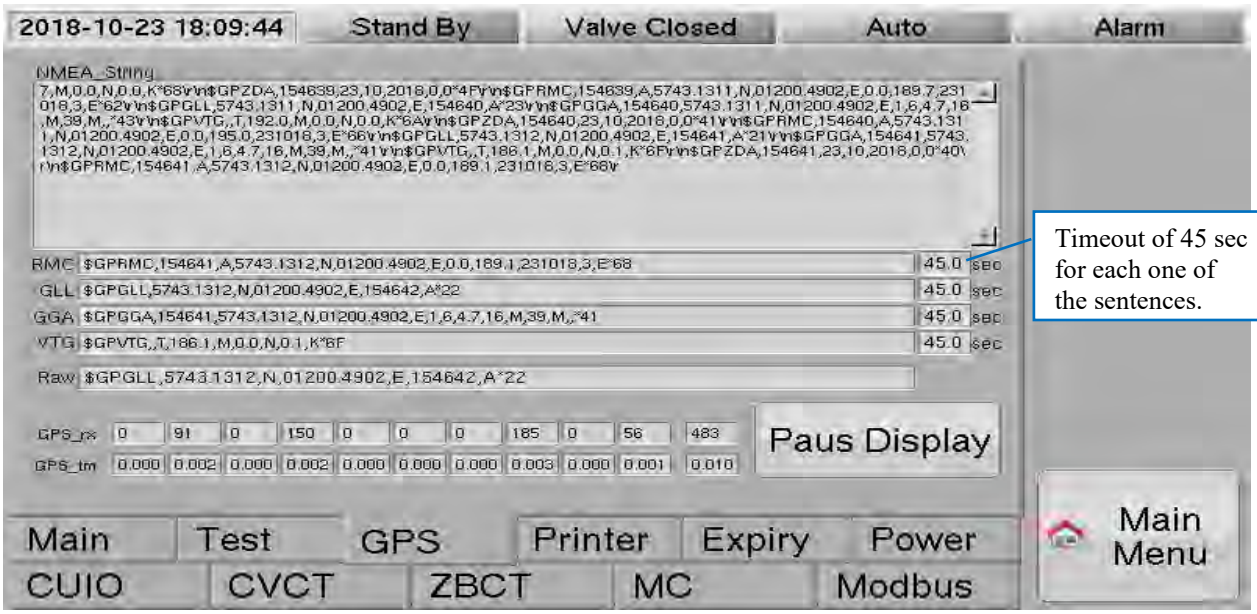
7.10.2. Test



“Test Mode” Press to activate. When activated, relay outputs of other printed circuit boards in the system can be manually activated.
Take caution when starting the sample pump, pressure alarms are disabled.
Password: “8378” and “Admin”.

7.10.3. GPS (NMEA 0183 receiver)

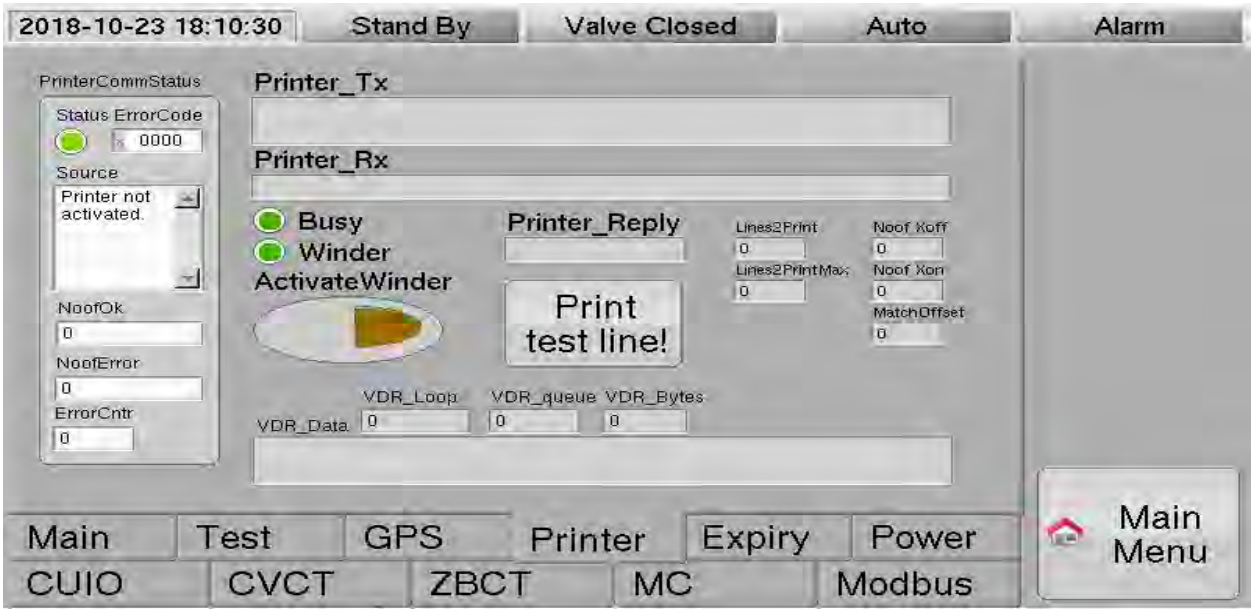
Display of the transmitted NMEA sentences from the GPS. Any of the sentence's RMC, GLL or GGA must be received to get the ship's GPS position. If the ship speed is taken from the GPS, the RMC or VTG sentences must be received.



"NMEA_String"	Showing a buffer containing about the last 600 received characters.
"RMC"	Showing the last RMC sentence, the RMC sentence contains GPS position, ships speed, date and time.
"GLL"	Showing the last GLL sentence, the GLL sentence contains GPS position.
"GGA"	Showing the last GGA sentence, the GGA sentence contains GPS position.
"VTG"	Showing the last VTG sentence, the VTG sentence contains ships speed.
"Pause Display"	Press to stop updating the "NMEA_String" and the different sentences. To make it easier to manually read out data.

7.10.4. Paper Printer (Optional)

The paper printer module mounted to the right inside the computer unit. The unit includes a thermal paper printer and a paper rewinder mounted on a frame that fits to the right inside the computer unit.
Item d2 on drawing: **CTB10001p sheet 3, Computer Unit with open door** page **99**.



"PrinterCommStatus"	Communication status with the paper printer module.
"ActivateWinder"	Activate the paper rewinder.
"Print test line"	Makes a test printout to the paper printer.

7.10.5. Expiry (Trial period)

A trial period of a number of days, normally 30 or 60, can be activated.
When the trial period has expired the system can no longer be started to discharge the slop.
The status of an enabled trial period is also displayed at the bottom of the “Main Menu”.
The number of days, hours, minutes and seconds until expiry is shown.

Expiry codes can only be generated by the maker. All units have a unique code.

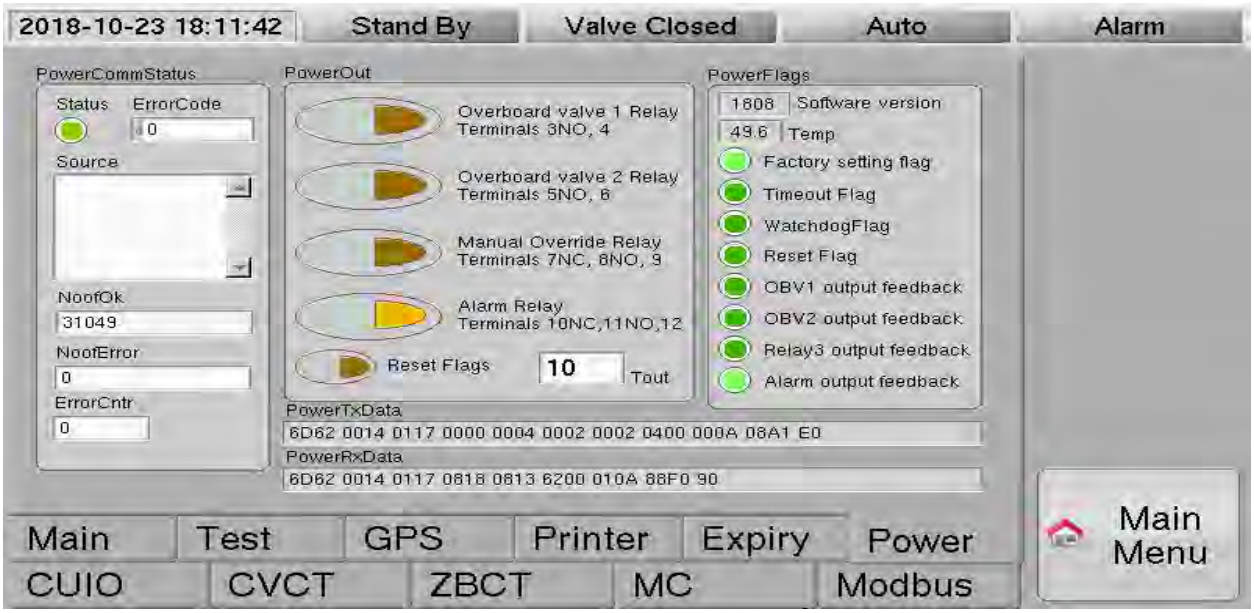
“Set Expiry” Normally activated by maker or by agent. A special code is needed to enable the trial period.

“Set Extra Expiry” A code for extending the trial period. Normally inserted by the end customer. The code for Extra Expiry can only be used once.

“Remove Expiry” A code for removing the trial period.

7.10.6. Power (Computer unit Power supply)

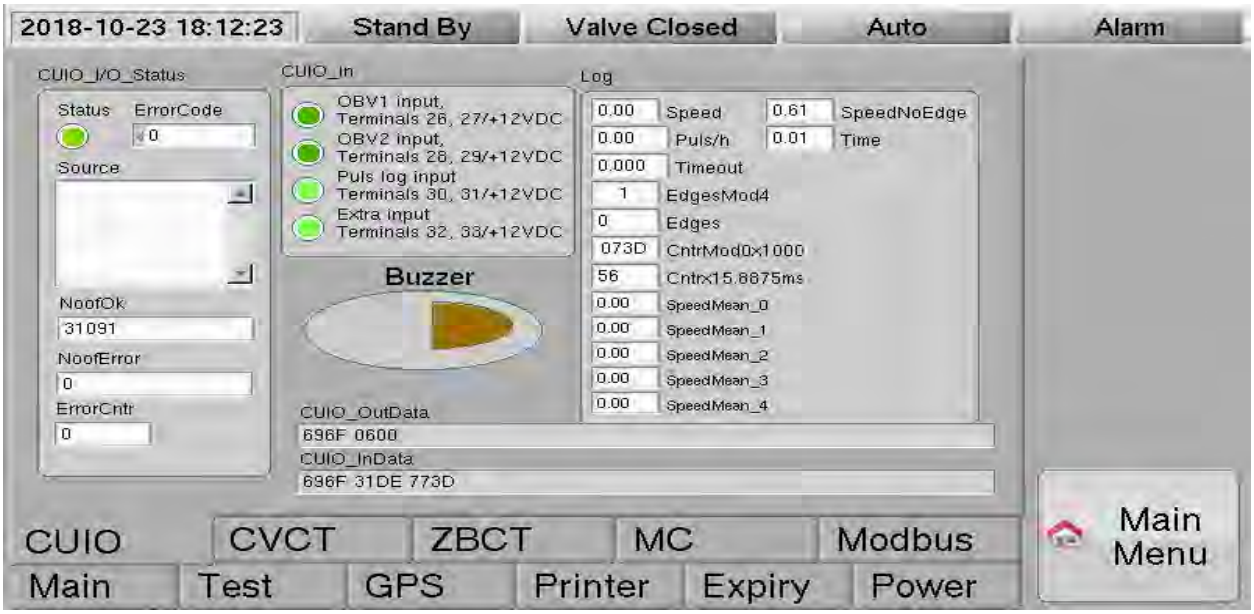
The power unit in the computer unit.
Item **d1** drawing **CTB10001p sheet 3, Computer Unit with open door** page **99**.



“PowerCommStatus” Communication status with the power supply.
“PowerOut” Relay outputs of the power supply
“PowerFlags” Software version, temperature and flags status of the power supply.
“PowerTxData” Transmit data to the power supply.
“PowerRxData” Received data from the power supply.

7.10.7. CUIO (Computer unit I/O PCB)

The Input/Output printed circuit board (PCB) in the computer unit (CUIO).
Item **d5** drawing **CTB10001p sheet 3, Computer Unit with open door** page **99**.



"CUIO_I/O_Status" Communication status with the CUIO PCB.
"CUIO_In" Status of digital inputs of the CUIO PCB.
"Log" Input data from the speed log connected to the CUIO PCB.
"Buzzer" Buzzer output on the CUIO PCB.
"CUIO_OutData" Output data to the CUIO PCB.
"CUIO_InData" Input data from the CUIO PCB.

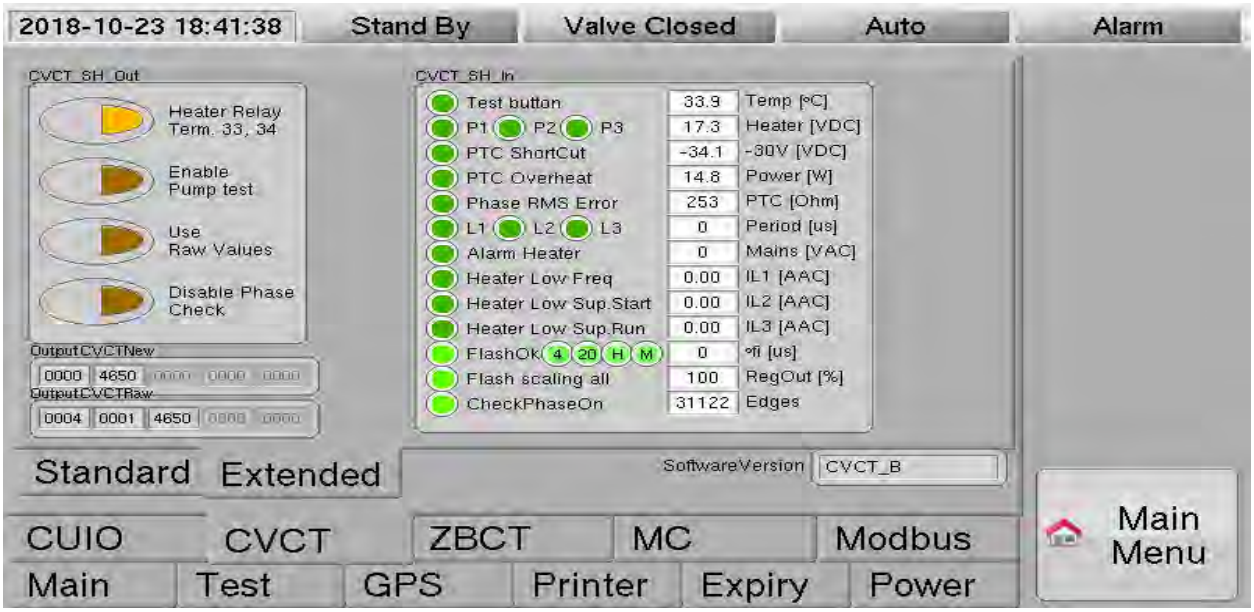
7.10.8. CVCT/Standard (Converting unit I/O PCB)

The Input/Output printed circuit board (PCB) in the converting unit (CVCT).
Item **d5** drawing **CTB10003 sheet 3 of 4, Converting Unit** page **103**.

"CVCT_CommStatus" Communication status with the CVCT PCB.
"CVCT_Out" Relay outputs of the CVCT PCB.
Refer to Chapter **5. Start/Stop procedure** page **39** before activation of pump or water.
"CVCT_In" Software version, digital inputs and current input of the CVCT PCB.
"CVCT_TxData" Transmit data to the CVCT PCB.
"CVCT_RxData" Received data from the CVCT PCB.

7.10.9. CVCT/Extended (Optional Extended Converting unit I/O PCB)

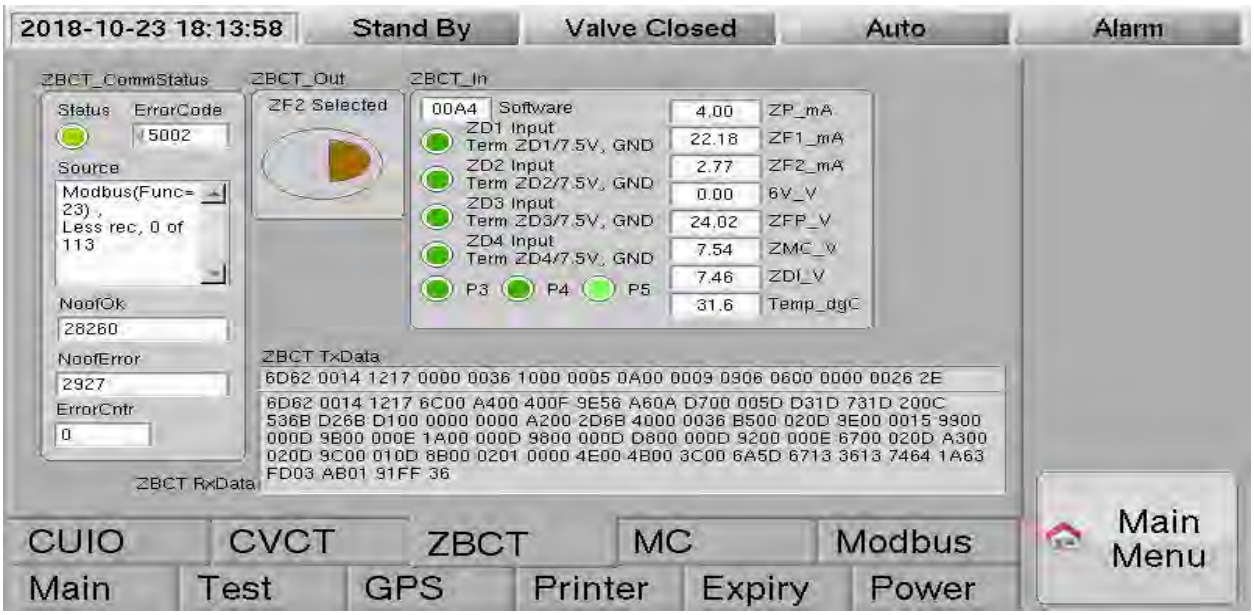
The Extended Input/Output printed circuit board (PCB) in the converting unit (CVCT).



"CVCT_SH_Out" Relay outputs of the Extended CVCT PCB.
"CVCT_SH_In" Input and Output data on the Extended CVCT PCB.

7.10.10. ZBCT (Converting unit Zener Barrier PCB)

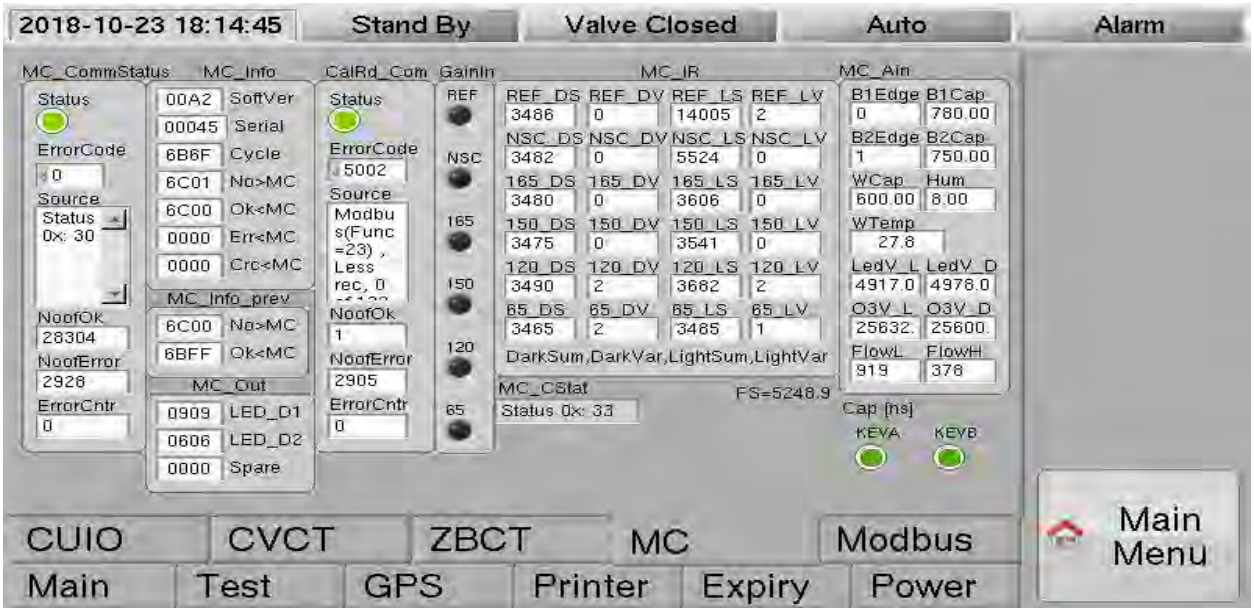
The Zener Barrier printed circuit board (PCB) in the converting unit (ZBCT).
Item **d6** drawing **CTB10003 sheet 3 of 4, Converting Unit** page **103**.



"ZBCT_CommStatus" Communication status with the ZBCT PCB.
"ZBCT_Out" Selection of power to ZF1 or ZF2 current input.
"ZBCT_In" Software version, digital inputs ZD1 – ZD4, analogue input of channels ZP, ZF1 and ZF2. Voltage levels and temperature on the ZBCT PCB.
"ZBCT_TxData" Transmit data to the ZBCT PCB.
"ZBCT_RxData" Received data from the ZBCT PCB.

7.10.11. MC (Measuring Cell)

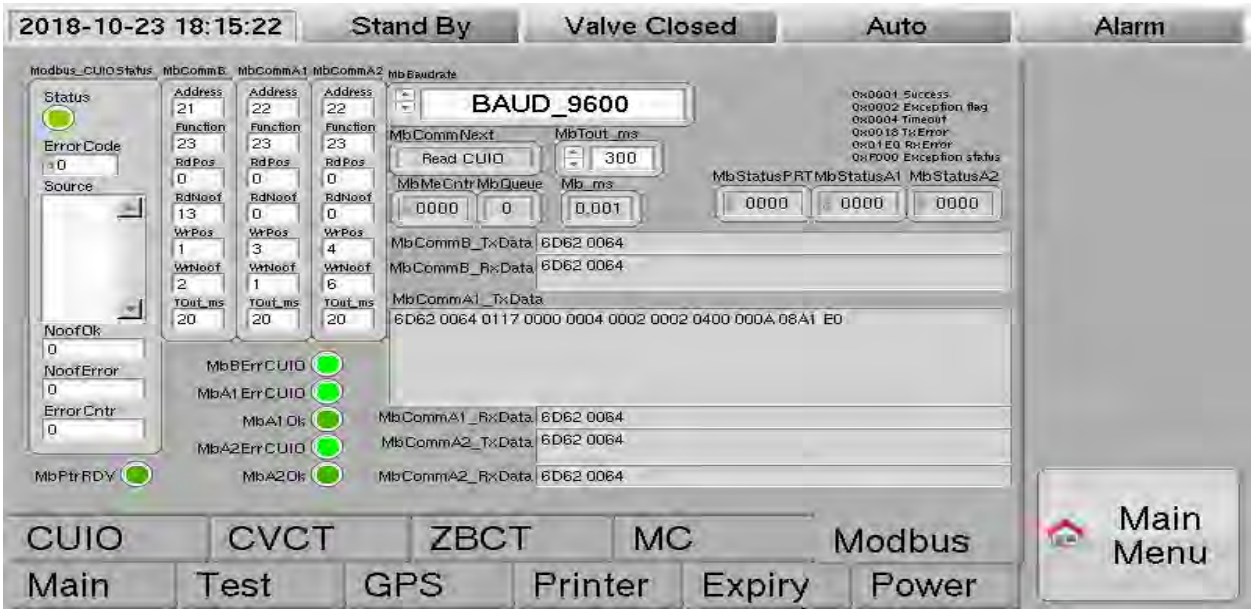
Readings from the measuring cell. The cell is connected to the Zener Barrier PCB.



"MC_CommStatus" Communication status with the MC.
"MC_Info" Indicates software version, serial number and more communication status.
"CalRd_Com" Communication status of reading calibration from with the MC.
"GainIn" Internal use.
"MC_IR" Internal use.
"MC_Ain" Internal use.

7.10.12. External Modbus RTU (Optional CUIO)

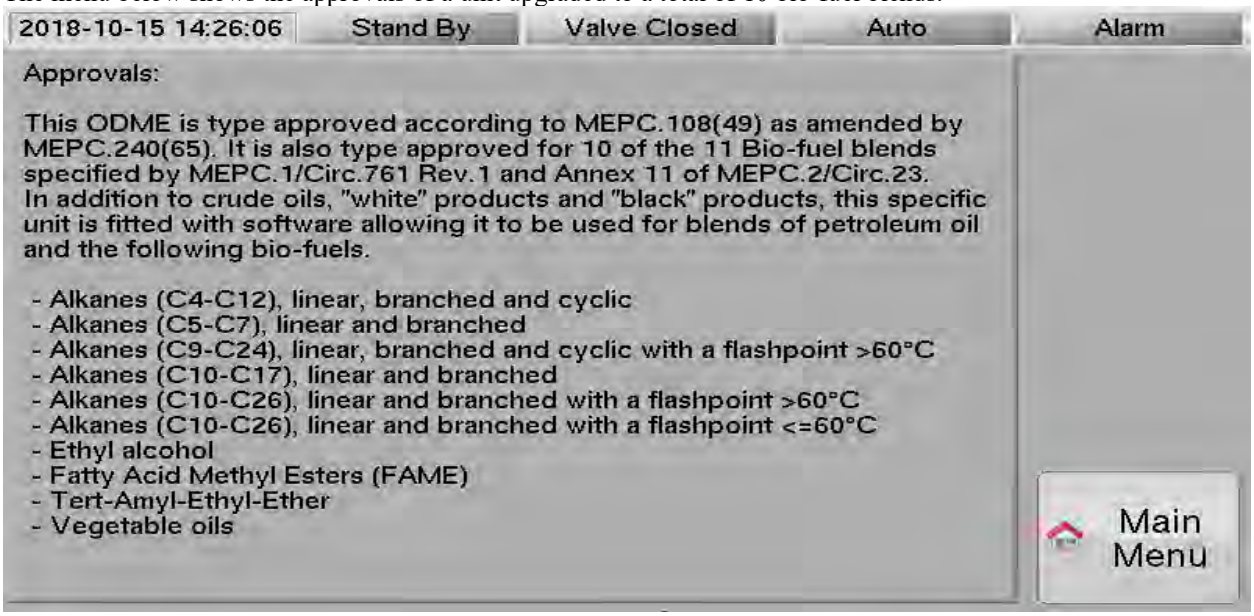
Modbus RTU communication over an RS485 channel on the CUIO PCB in the Computer unit. Intended for communication with the Cargo Control system. This option is not further described in this manual.



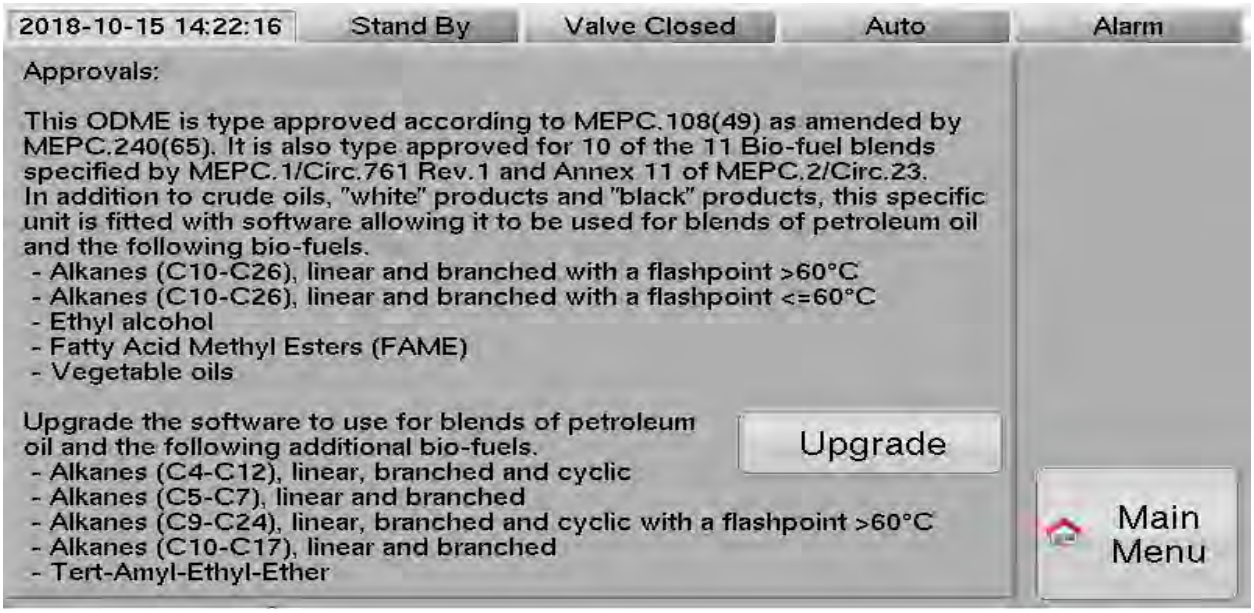
7.11. Approvals

Indicating approvals of the Cleantrack1000B.

The menu below shows the approvals of a unit upgraded to a total of 10 bio-fuel blends.



The menu below shows the approvals of a unit approved for the 5 bio-fuels blends according to MEPC.1/Circ.761.



“Upgrade” If adaption for additional bio-fuels is needed, another serial number specific activation password can be purchased from an authorized agent. Select the “Upgrade” key and insert the activation password in the popup menu.

8. Fault-finding

The computer program contains functioning resulting in a number of alarms for internal malfunctions and abnormal operational conditions. This section gives a summary of the functioning and, where appropriate, how the alarms are used in fault-finding. The information given is useful for experienced computer and electronic engineers as well as for the operator in fault-finding of the entire system.

This section contains essentially descriptive and explanatory information. Guidance to trouble shooting based on the computer alarm indications is given below.

8.1. Malfunction of Computer/Converting unit

In case of malfunction of either the Computer unit or the Converting unit, disconnect power supply to both units.
Always keep power supply to Converting unit disconnected if its functioning cannot be monitored by the Computer unit, regardless of whether the malfunction is in the Converting unit or in the Computer unit.
Follow the recommendations given on the separate alarms below.
Contact an approved agent for service.

8.2. List of displayed alarms

0 System – Setup file Key error
1 System – Setup file Read error
2 System – Setup file Write error
3 System – Acc total file Key error
4 System – Acc total file Read error
5 System – Acc total file Write error
7 System – Setup error #101 Valve Control
10 System – Ref Error Measuring Cell
12 System – Reading Cal Data
13 System – Comm. error Computer Power PCB
14 System – Comm. error Converting I/O PCB
15 System – Comm. error Zener Barrier PCB
16 System – Comm. error Measuring Cell
17 System – Computer I/O error
18 System – Replaced Measuring Cell?
19 System – Invalid MC values.
20 Alarm – NMEA (GPS) receiver timeout.
21 Alarm – Low Flow
22 Alarm – High Flow
23 Alarm – Low Speed
24 Alarm – High Speed
25 Warning – Valve Open no feedback
26 Alarm – Valve Close no feedback
27 Alarm – Slop Valve Open no feedback
28 Alarm – Slop Valve Close no feedback
29 Alarm – GPS Speed timeout
30 Alarm – High Conc. > 1000 ppm
31 Alarm – Discharge > 30 l/nm
32 Alarm – Max Accumulated Total Oil
36 Alarm – Oil conc. > 15 ppm
37 Alarm – Manual Override Valve
38 Warning – Oil Concentration in Manual
39 ON-BOARD FUNCTIONAL TEST ALARM
40 Alarm – High Work Pressure
41 Alarm – Low Work Pressure
42 Alarm – No water in Measuring Cell
43 Alarm – High Water Pressure
44 Alarm – Low Water Pressure
45 Alarm – Overcurrent
46 Alarm – High Pump Temperature
47 Alarm – Indicating Flushing Water
50 Alarm – Printer Busy

51 Alarm – Printer Busy (Xoff)
52 Alarm – Printer Feedback Error
53 Alarm – Printer Cover Open
54 Alarm – Printer Paper End/Cover Open
55 Alarm – Printer Head Temp Error
56 Alarm – Printer Voltage Error
57 Alarm – Printer Feedback Missing
58 Alarm – Printer Buffer Overflow
60 Alarm – Sample Pump Motor PTC Overheat
61 Alarm – Sample Pump Motor PTC Shortcut
62 Alarm – Sample Pump Motor Phase Error
63 Alarm – Sample Pump Motor Limits
64 Alarm – Sample Pump Motor Heater
66 Alarm – Sample Pump Running feedback
67 Alarm – Sample Pump no Running feedback
68 Alarm – Work Pressure after Pump Stop
69 Alarm – Freezing risk Measuring cell
70 Warning – VALVE OPENED, Line#1
71 Warning – VALVE OPENED, Line#2
72 Warning – VALVE OPENED, Line#3
73 Warning – VALVE OPENED, Line#4
74 Alarm – Pump Switch is ON
75 Alarm – Pump Switch is OFF

8.3. System file errors

The unit cannot run with one of these alarms remaining.
All these errors are considered as serious malfunctions and if the alarm conditions cannot be fixed, please, follow the instructions given in chapter **8.1. Malfunction of Computer/Converting unit** page **83**.

"0 System – Setup file Key error"
Error in the content of the programmed setup data.
At least one setting need to be changed before this alarm can be reset.
Check all settings or consult a service engineer for corrective actions.

"1 System – Setup file Read error"
File system error while reading the setup data.
Consult a service engineer for corrective actions.
(Computer CPU printed circuit board need to be replaced.)

"2 System – Setup file Write error"
File system error while writing the setup data.
Consult a service engineer for corrective actions.
(Computer CPU printed circuit board need to be replaced.)

"3 System – Acc total file Key error"
Error in the content of the saved accumulated oil content data.
Reset total oil discharged. See chapter **7.2.2. Running Settings**, page **48**.
Reset the alarm.

"4 System – Acc total file Read error"
File system error while reading the content of the accumulated oil content data.
Consult a service engineer for corrective actions.
(Computer CPU printed circuit board need to be replaced.)

"5 System – Acc total file Write error"
File system error while writing the content of the accumulated oil content data.
Consult a service engineer for corrective actions.
(Computer CPU printed circuit board need to be replaced.)

"7 System – Setup error #101 Valve Control"
File system error indicating a compatibility error in "Valve Control" of "Line" data in the "Setup" menu.
Settings "EL1/EL2" and "EL1/EL2-n" can only coexist together with "None".
Reprogram this setting or consult a service engineer for corrective actions.

8.4. System communications errors

The Computer PCB (master) is communicating with the Computer Power supply, the Converting unit I/O and the Zener barrier PCB that also transmits data to and from the Measuring Cell.
The communication is Modbus RTU over an RS485 line at the speed of 19200 baud.
The Zener barrier PCB and the Measuring Cell has a special 2-wire connection. The Measuring cell is powered through the same 2-wires as where the half duplex communication is going on

See chapter **3.2. Scope of Supply and System Supplies** page **10** and chapter **8.11. Indications on PCB's**, page **91** for locating PCB's (Printed Circuit Boards) in text below.
For light emitting diode indications, see chapter **8.11. Indications on PCB's** page **91.**

When a communication error occurs the communication wiring, power supply wiring and fuses must be checked.
The unit cannot run with one of these alarms remaining.
Press the "Alarm Reset"-key in the "Alarm Table" to reset the alarm and try to fix the fault.
See chapter **7.3. Alarm Table**, page **54.**

"10 System – Ref Error Measuring Cell"

An internal error on the IR-measurement readings in the Measuring Cell.
Normally the Measuring Cell needs to be replaced.
Note that the communication to the ZBCT must work before this communication failure can be solved.

"12 System – Reading Cal Data"

The Computer CPU failed to read the Measuring Cell calibration data.
Check the connection between the Zener barrier PCB (ZBCT) and the Measuring cell. This is a special 2 wire connection. The measuring cell is powered on the same 2 wire as where the communication is done.
Note that the communication to the ZBCT must work before this communication failure can be solved.
For light emitting diode indications, see chapter **8.11.4. Zener barrier PCB indications** page **92**

"13 System – Comm. error Computer Power PCB"

Computer CPU failed to communicate with the Computer power supply.
This is a Modbus RTU communication over an RS485 line at the speed of 19200 baud.
Check the flat cable connections in the Computer unit cabinet. There are 2 flat cables, the 34 pole flat cable with grey contacts that connects the Computer CPU PCB with the Computer I/O CPU (CUIO) and the 14 pole flat cable with red contacts the connects the Computer Power supply with the Computer I/O CPU.

"14 System – Comm. error Converting I/O PCB"

Communication error between the Computer CPU and the Converting unit I/O PCB.
This is a Modbus RTU communication over an RS485 line at the speed of 19200 baud.
Check the connection between the Computer unit and the Converting unit.
Check also setting of property "ConvertingUnitType",
see chapter **7.8.9. System Configuration, Alarms&Extras** page **72**.
For light emitting diode indications, see chapter **8.11.2. Converting unit I/O PCB indications** page **91.**
Keep the power supply to the Converting unit disconnected until the error can be fixed.

"15 System – Comm. error Zener Barrier PCB"

Communication error between the Computer CPU and the Converting unit I/O PCB.
This is a Modbus RTU communication over an RS485 line at the speed of 19200 baud.
Check the connection between the Computer unit and the Converting unit.
Check the flat cable between the Converting unit I/O PCB and the Zener barrier PCB inside the Converting unit.
For light emitting diode indications, see chapter **8.11.4. Zener barrier PCB indications** page **92**

"16 System – Comm. error Measuring Cell"

Communication error between the Computer CPU and the Measuring cell.
Check the connection between the Zener barrier PCB and the Measuring cell.
Check communication to the Zener barrier PCB to work before fail searching this error.
Normally at least one light emitting diode on the Measuring Cell is lit.

"17 System – Computer I/O error"

Communication error between the Computer CPU and the Computer I/O PCB.
Check the flat cable connections inside the Computer unit.

"18 System – Replaced Measuring Cell?"

If the Measuring Cell is replaced while power is connected to the Computer Unit, it will give this alarm.

Reset the alarm to acknowledge.

"19 System – Invalid MC values"

Readings from the Measuring Cell are not valid.
Reset the alarm to acknowledge.
The alarm is expected to disappear after a reset. If not, the Measuring Cell needs to be replaced.

8.5. External sensor alarms

Refer to drawing CTB110204.1el/pn for electrical connections.

"20 Alarm – NMEA (GPS) receiver timeout"

This alarm is generated if the NMEA signal drops out.
Expected communication speed is 4800 baud.
The unit listens for four different NMEA sentences:

1. RMC, containing GPS position, ships speed, time and date.
2. GLL, containing GPS position
3. GGA, containing GPS position
4. VTG, containing ships speed

If neither RMC, GLL nor GGA containing position is received this alarm will be generated.
To be able to get the ships speed information from the GPS the RMC or VTG must be received.
Check the connection of the NMEA transponder to the Computer unit.
See chapter **7.10.3. GPS (NMEA 0183 receiver)** page **77.**

"21 Alarm – Low Flow"
"22 Alarm – High Flow"

This alarm indicates a flow that is above the "High Flow" limit or below the "Low Flow" limit.
Check the connection of the 2-wire flow connection on terminals ZF1 or ZF2 on the Zener barrier PCB in the Converting unit. Flow meter is normally connected to ZF1.
Flow meter selection and scaling is made in the "Setup"-menu.
See chapter **7.8.1. Line of discharge** page **68** for actual selection and the following pages for scaling.
The transmitter is a 2-wire, 4-20 mA with 24 VDC supply.
The voltage should be between 16 VDC and 25 VDC.
It is only the selected flow input that has the 24 VDC power enabled.
Note that these alarms are disabled if flow is in manual mode.

"23 Alarm – Low Speed"
"24 Alarm – High Speed"

This alarm indicates a ships speed that is above the "High Speed" limit or below the "Low Speed" limit.
Check that the Speed source selection is correct, Pulse log or GPS.
If source is GPS, check that the NMEA communication from the GPS works.
If source is Pulse log, check the connection and the programming of pulses / hour.
See chapter **7.8.7. Speed** page **71**

"25 Warning – Valve Open no feedback"
"26 Alarm – Valve Close no feedback"

This is a Warning (Open)/Alarm (Close), indicating that the overboard valve position feedback signal has not acknowledged the output signal within the timeout. The timeout is selectable up to 60 seconds in the "Setup"/"Line"-menu.
The overboard valve may be in the wrong position due to some part of the overboard valve control or the power supply for the valve control system has failed.
Or the valve is in the correct position by the feedback signal fails.
The overboard valve is controlled by the overboard valve relay output in the computer unit.
Check the fuse(s) for the overboard valve and both the output and the feedback connections.
The ships specific interface between the ODME computer unit and the valve is normally electro/pneumatic or electro/hydraulic and normally designed/delivered by the shipyard or installation contractor.
Refer to drawing CTB110204.1el/pn.

"27 Alarm – Slop Valve Open no feedback"
"28 Alarm – Slop Valve Close no feedback"

The slop tank valve position feedback signal has not acknowledged the output signal within its timeout. The timeout is programmable in the "Setup"/"Line" menu. This alarm can only be generated for the "Valve Control" setting"EL1/EL2". The slop tank valve may be in the wrong position due to some part of the slop tank valve control or the power supply for the valve control system has failed. The slop tank valve is controlled

by the “EL2” relay output in the computer unit. Check the fuse(s) for the relay output the feedback connections.

“29 Alarm – GPS Speed timeout”
Source for the ships speed sis selected to “GPS” but neither the sentence “RMC” or “VTG” is received correctly. Refer to alarm 20 above for faultfinding.

8.6. Measurement alarms

The unit closes the overboard valve and does not discharge with any of the alarms 30-36 below active.
Press the “Alarm Reset”-key in the “Alarm Table” to reset the alarm. See chapter **7.3. Alarm Table**, page **54.**

“30 Alarm – High Conc > 1000 ppm”
Measured oil concentration is above the measuring range of 1000 ppm.

“31 Alarm – Discharge > 30 l/nm”
Measured oil discharge is above 30 l/nm.

“32 Alarm – Max Accumulated Total Oil”
Discharged oil has reached the programmed maximum total oil discharge.
For setting of total oil, see chapter **7.2.2. Running Settings**, page **48.**

“36 Alarm – Oil conc. > 15 ppm”
The unit is in oil concentration mode (15 ppm mode).
Measured oil concentration is above 15 ppm.

“37 Alarm – Manual Override Valve”
This alarm is generated when the “Manual Override Overboard Valve” key is activated.

“38 Warning – Oil Concentration in Manual”
This alarm is generated at an interval of 10 to 20 minutes if the unit is in “RUNNING” mode (Discharge Started) and Oil Concentration is in “Manual”.

“39 ON-BOARD FUNCTIONAL TEST ALARM”
This alarm is generated when the “GENERATE ALARM” key is activated in the “On board test” .3 page.

- Check the sample pump, the measuring cell, the measuring cell outlet orifice and the inlet and outlet pipe for contamination.

8.7. Measurement sample alarms

“40 Alarm – High Work Pressure”
High sample water pressure in the analyzing unit for 10 seconds.
It indicates a problem on the sample outlet side after the pressure transmitter in the analyzing unit.
Check that valves on the outlet side are open and that the measuring cell and its outlet orifice are clean.
“RUNNING” mode is stopped.
This alarm is also displayed with a popup window indicating all pressures.
See chapter **7.8.5. Pressure**, page **70** and **7.8.8. System Configuration, Standard,** page **72.**

“41 Alarm – Low Work Pressure”
Low sample water pressure in the analyzing unit for 10 seconds.
It indicates a problem on the inlet side of the analyzing unit or with the sample pump.
Check that valves on the inlet side are open, the inlet filter is clean and that the sample pump and the inlet pipe are filled with water.
For an air motor sample pump: Inspect and clean the Exhaust protection,
see drawing **CTB10010 sheet 4 of 5, Analyzing unit with air motor sample pump** page **118**.
“RUNNING” mode is stopped.
This alarm is also displayed with a popup window indicating all pressures.
See chapter **7.8.5. Pressure**, page **70** and **7.8.8. System Configuration, Standard,** page **72.**

“42 Alarm – No water in Measuring Cell”
The water sensor in the measuring cell has been deactivated for 10 seconds.
Indicates a problem with the fresh water or sample water. Relevant valves must be checked.

"RUNNING" mode is stopped.
This alarm is also displayed with a popup window.

"43 Alarm – High Water Pressure"
High water pressure in the analyzing unit for 10 seconds.
Indicates a problem on the outlet side of the analyzing unit.
"RUNNING" mode is stopped.
See chapter **7.8.5. Pressure**, page **70** and **7.8.8. System Configuration, Standard,** page **72.**

"44 Alarm – Low Water Pressure"
Low water pressure in the analyzing unit for 10 seconds.
Indicates a problem on the fresh water supply to the analyzing unit.
"RUNNING" mode is stopped.
See chapter **7.8.5. Pressure**, page **70** and **7.8.8. System Configuration, Standard,** page **72.**

"45 Alarm – Overcurrent"
The over-current protection relay in the Converting Unit is activated.
The cause for an activated relay could be the sample pump pumping against a closed valve or a clogged pipe. The sample pump itself might be clogged.
Also check that the sample pump fan is easily rotated and the status of its impeller.
Reset the over-current protection relay by pressing the key at the front of the relay. The relay is located to the left in the Converting Unit.
Operating conditions that require frequent and repeated resetting of the over-current relay might harm the sample pump.
"RUNNING" mode is stopped.

"46 Alarm – High Pump Temperature"
The high temperature guard connected to terminals 17 and 18 in the Converting Unit is activated.
This indicates a high temperature of the pump shaft seal.
Check shaft seal oil refilling. See chapter **9.7. Sample Pump Shaft seal oil refilling** page **94**.
"RUNNING" mode is stopped.

"47 Alarm – Indicating Flushing Water"
The unit is in "RUNNING" mode and the "ZD4" input is active.
Close the water valve. See chapter **7.8.8. System Configuration,** Standard page **72**.
"RUNNING" mode is stopped.

8.8. Paper Printer alarms

The Computer PCB (master) is communicating with the Paper Printer continuously and will give Printer alarm immediately.

The unit cannot discharge with one of the paper printer alarms remaining.
Press the "Alarm Reset"-key in the "Alarm Table" to reset the alarm and try to fix the fault.
See chapter **7.3. Alarm Table**, page **54.**
However, the printer can be deselected in the Setup menu. See chapter **7.8.8. System Configuration,** Standard page **72**

Printer hardware is RS232 and baudrate is 9600 baud.

"50 Alarm – Printer Busy"
"51 Alarm – Printer Busy (Xoff)"
Printer is busy and do not accept more printouts.
Check cable connections to the printer and that printer paper is correctly installed.

"52 Alarm – Printer Feedback Error"
Wrong format on printer reply. Check cable connections to the printer and its baudrate settings.

"53 Alarm – Printer Cover Open"
"54 Alarm – Printer Paper End/Cover Open"
Printer has no paper or its paper cover is open. Check the printer paper and its cover.

"55 Alarm – Printer Head Temp Error"
If this alarm remains the printer need to be replaced.

"56 Alarm – Printer Voltage Error"

If this alarm remains the printer and/or the CUIO PCB connected to the printer need to be replaced.

"57 Alarm – Printer Feedback Missing"

No reply from Printer. Check cable connections to the printer.

"58 Alarm – Printer Buffer Overflow"

Printer buffer has overflow. Printer busy do not work, check cable connections to the printer.
If this alarm remains the printer and/or the CUIO PCB connected to the printer need to be replaced.

8.9. Extended Converting unit Motor alarms (Optional)

"60 Alarm – Sample pump Motor PTC Overheat"

High resistance > 1500 Ohm measured on the PTC resistors in the sample pump motor windings.
The alarm can be reset when the resistance is < 1250 Ohm.
The Converting I/O PCB stops both the sample pump and the space heater.
"RUNNING" mode is stopped.
Disconnect power supply to the Converting unit until the Sample pump Motor has cooled down and until the error can be fixed.

"61 Alarm – Sample pump Motor PTC Shortcut"

Low resistance < 70 Ohm measured on the PTC resistors in the sample pump motor windings.
The alarm can be reset when the resistance is > 80 Ohm.
The Converting I/O PCB stops both the sample pump and the space heater.
"RUNNING" mode is stopped.

"62 Alarm – Sample pump Motor Phase Error"

Different current consumption on the different phases of the sample pump motor.
The alarm is raised when the lowest current is < 70% of the highest current.
The Converting I/O PCB stops the sample pump.
"RUNNING" mode is stopped.

"63 Alarm – Sample pump Motor Limits"

If the unit is in "RUNNING" mode:

At least one of the sample pump motor currents is outside its high and low limits.
See chapter **7.8.6. Motor** page **71**.
"RUNNING" mode is stopped.

If the unit is in "StandBy" mode:

At least one of the sample pump motor current is higher than the Standby Max limit.
See chapter **7.8.6. Motor** page **71**.
Keep the power supply to the Converting unit disconnected until the error can be fixed.

"64 Alarm – Sample pump Motor Heater"

Raised in "StandBy" mode only as the heater can only be active in "StandBy" mode.
Two consecutive failures to start the heater of the sample pump motor.
Check the wiring to the sample pump motor.
The expected resistance between terminals 33 and 34 of the converting unit I/O PCB is 22 Ohm + the resistance of the wiring.
Remember to disconnect power supply to the Converting unit before measuring.

8.10. Miscellaneous Sample pump and Overboard Valve alarms.

"66 Alarm – Sample Pump Running feedback"

IMPORTANT: Verify that the sample pump is not running!
Raised in "StandBy" mode if the contactor feedback indicates that the sample pump is running.
The feedback contact from the sample pump motor control contactor is open.
If the alarm is reset but remaining, it will be activated at every touch screen timeout (about 30 minutes).
See chapter **7.8.9. System Configuration, Alarms&Extras** page **72** and
drawing **CTB110627.1el, internal cable diagram for electrical sample pump motor** page **142**.
It is recommended to monitor this contactor feedback.
Keep the power supply to the Converting unit disconnected until the error can be fixed.

“67 Alarm – Sample Pump no Running feedback”

Raised in “RUNNING” mode if the contactor feedback indicates that the sample pump in not running.
The feedback contact from the sample pump motor control contactor is closed.
See chapter **7.8.9. System Configuration, Alarms&Extras** page **72** and
drawing **CTB110627.1el, internal cable diagram for electrical sample pump motor** page **142**.
It is recommended to monitor this contactor feedback.
Keep the power supply to the Converting unit disconnected until the error can be fixed.

“68 Alarm – Work Pressure after Pump Stop”

IMPORTANT: Verify that the sample pump is not running!
The work pressure low limit is exceeded 5 seconds after the sample pump was stopped.
A possible reason is that the sample pump is not stopped due to a malfunction in the sample pump control.

“69 Alarm – Freezing risk Measuring cell”

The temperature in the Measuring cell is below 4°C and the water sensor is active. The alarm is raised only once and will not be activated again unless the Measuring cell temperature first has increased above 8 degrees.
Drain the Analyzing unit, see chapter **5.3. Close down procedure** page **40**.

“70 Warning – VALVE OPENED, Line#1”
“71 Warning – VALVE OPENED, Line#2”
“72 Warning – VALVE OPENED, Line#3”
“73 Warning – VALVE OPENED, Line#4”

The overboard valve feedback for the indicated line is active although another line is selected as the active overboard line in the computer menu.
Investigate if the valve is open or if the feedback is faulty.

“74 Alarm – Pump Switch is ON”

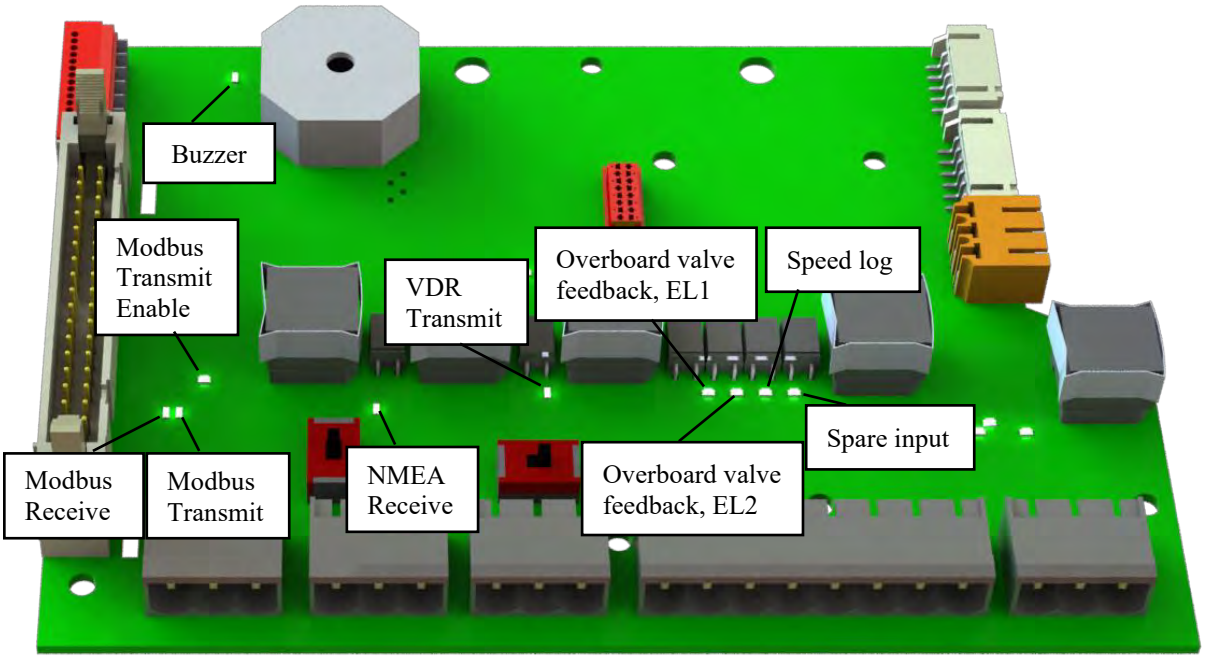
This alarm concerns the optional manual switch installed between the converting unit and the sample pump.
Raised in “StandBy” mode if the manual switch feedback indicates the switch in “ON” position.
The feedback from the auxiliary contact of the manual switch contact is open.
See chapter **7.8.9. System Configuration, Alarms&Extras** page **72**.
Connect manual switch auxiliary contact to terminals 13, 14 on the Converting unit I/O pcb.
Set the manual switch to “OFF” when the unit is not in use.

“75 Alarm – Pump Switch is OFF”

This alarm concerns the optional manual switch installed between the converting unit and the sample pump.
Raised in “RUNNING” mode if the manual switch feedback indicates the switch in “OFF” position.
The feedback from the auxiliary contact of the manual switch is closed.
See chapter **7.8.9. System Configuration, Alarms&Extras** page **72**.
Connect manual switch auxiliary contact to terminals 13, 14 on the Converting unit I/O pcb.
Set the manual switch to “ON” when the unit is in use.

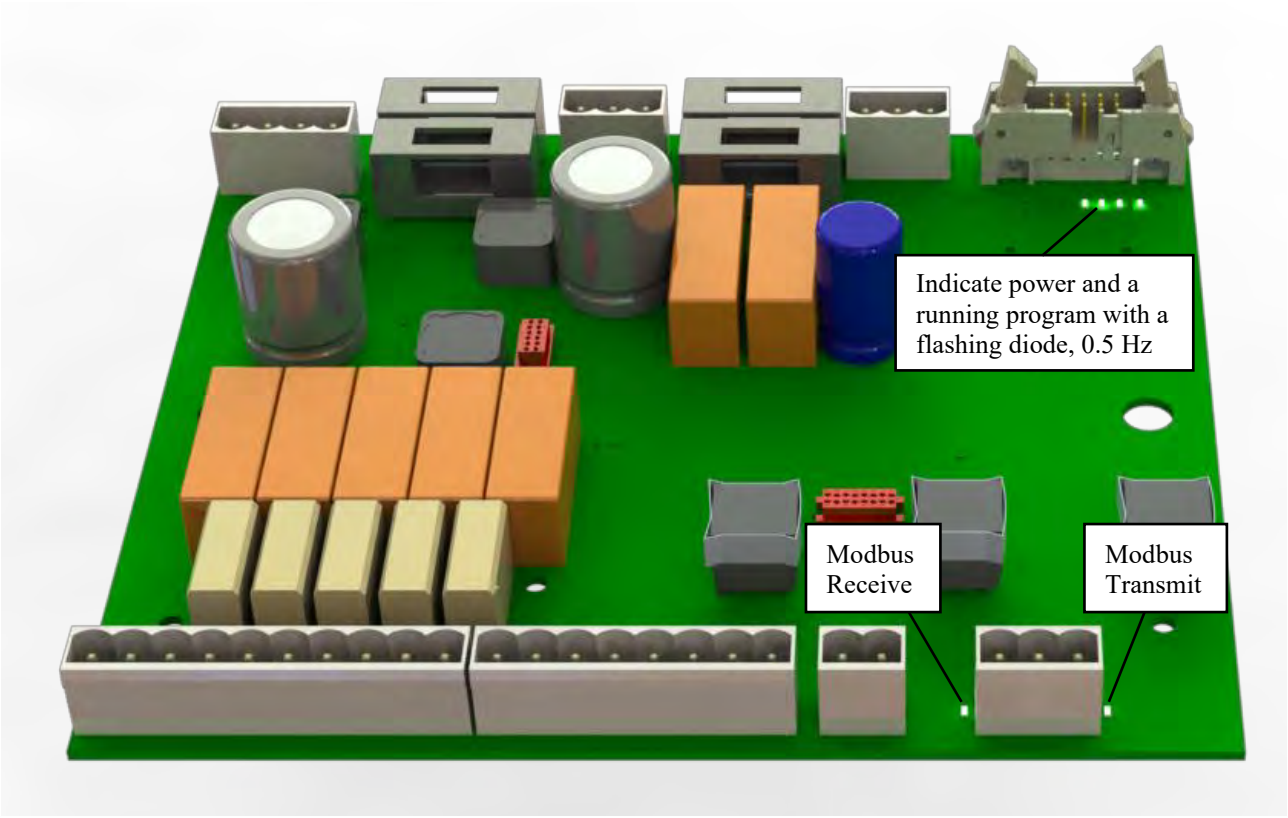
8.11. Indications on PCB's

8.11.1. Computer unit I/O PCB indications



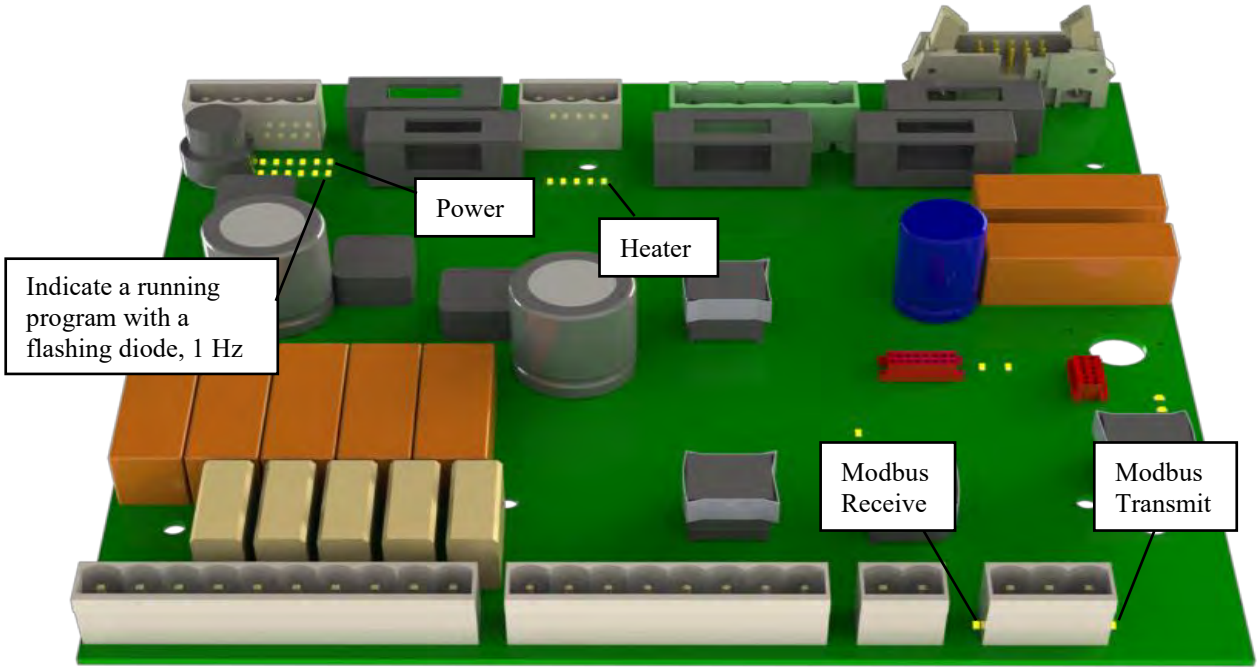
PCB located in the Computer unit, see **CTB10001p sheet 3, Computer Unit with open door** page **99**, d5.

8.11.2. Converting unit I/O PCB indications



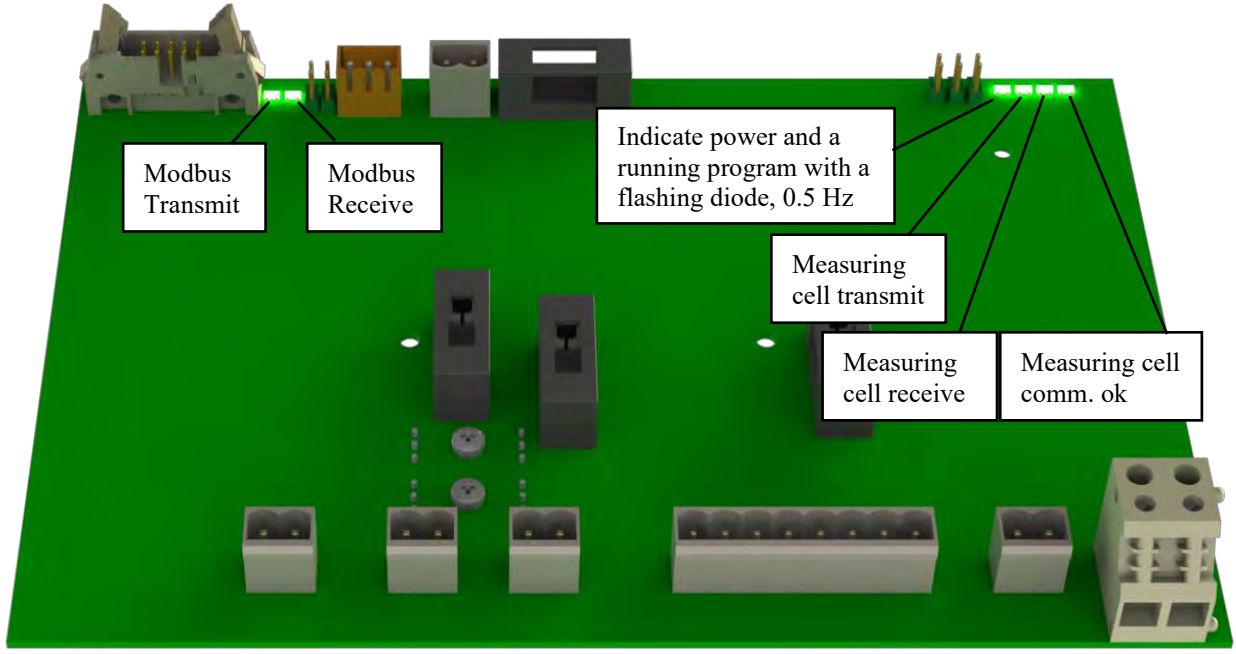
PCB located in the Converting unit, see **CTB10003 sheet 3 of 4, Converting Unit** page **103**, d5.

8.11.3. Extended Converting unit I/O PCB indications (Optional)



PCB located in the Converting unit, see **CTB10003 sheet 4 of 4, Converting Unit** page **104**, d5.

8.11.4. Zener barrier PCB indications



PCB located in the Converting unit, see **CTB10003 sheet 3 of 4, Converting Unit** page **103**, d6.

9. Maintenance, Spare parts and Consumables

9.1. Software upgrading

The software in the Computer unit can be upgraded via a USB memory stick attached to the USB port at the front of the computer unit.
It is recommended to contact an authorized agent for the software upgrade.

Three parts are needed for an upgrade:

1. A file containing the software. In the name of the software file the software version, year and day of creation are mentioned. The extension is ".deb".
2. A particular document, step by step guiding through the upgrade procedure. This document contains a description of the significant changes and might also recommend hardware updates needed to fully take use of the new software.
3. A serial number specific access password which the unit will ask for before the upgrade can take place. This password is normally provided by an authorized agent.

9.2. Battery replacement

The Computer unit CPU printed circuit board contains a Lithium battery, type CR1225 3V.
For location, see drawing **CTB10001p sheet 3, Computer Unit with open door** page **99**, d4.

The battery is powering the Real Time Clock for keeping time when power is switched off to the Computer Unit.
A battery failure will affect the Real Time Clock, the Power Off Time and Accumulated Total Oil Discharged.
After a battery failure and a power off:

Real Time Clock must be set, see chapter **7.9.2. Real Time Clock** page **74**
Power Off Time on Recorded data (1:st printout after Power On) will be faulty.
Accumulated Total Oil Discharged will need a reset, see chapter **7.2.2. Running Settings** page **48**

9.3. Saving Printouts and Settings on a USB memory stick

The recording device is formatted electronically as mentioned in MEPC.108(49) chapter 6.9.1.
Recorded data is stored in a non-volatile memory and can hold approximately 3,000,000 printouts.
Recorded data can be copied to a USB-memory stick.
Refer to chapter **7.1. Main Menu** page **46** and chapter **7.5. USB** page **57.**

All settings made to set up the individual CleanTrack can also be saved to a USB memory stick. This backup file named "CTB-####_setup.txt" can be used if the Computer unit CPU card needs to be replaced in the future. The file can then be mailed to info@brannstrom.se and be preinstalled on the new CPU card.
Refer to chapter **7.1. Main Menu** page **46** and chapter **7.5. USB** page **57.**

9.4. Periodic Checks and Servicing

Certain checks and servicing should be carried out at regular intervals in order to minimize the risk for unexpected malfunctions during operation. Below is a maintenance list to be carried out after each use and another list to be carried out at regular intervals of 6 months.

After each time of usage:

1. Check that chapter **5.3. Close down procedure** page **40** has been followed.
2. If the unit shall not be used for a longer time or sub-zero conditions might arise,
   See chapter **5.4. Closing down for a longer time or preserving for sub-zero conditions** page **41**.
3. Check mounting and cable penetrations of motor to be tightened and in order.
4. Check pump connections and fittings to be tightened and in order
5. Check the installation and the components for signs of leakage. Clean if necessary.
6. If bulkhead mounted sample pump: check the oil level in the sample pump shaft seal.
   a. See chapter **9.7. Sample Pump Shaft seal oil refilling** page **94**.
7. Check that all manually operated sample valves are closed.
8. If paper printer: check the amount of printer paper that is left and replace the roll, if necessary, for safeguarding uninterrupted operation during next discharge.
9. Consider storing "Recorded data" on a USB-memory stick. See chapter **7.5.1. USB-Memory stick** page **57**.

Every 6 months:

1. Inspect the interior of all cabinets for general condition and cleanliness.
2. Check all components with respect to mounting, clamping of cables, and any signs of damage.
3. Check all connections to be tightened and not leaking.
4. Check the cables to the analyzing unit and sample pump along their entire length with respect to any signs of chafe, wear or other damage and the bulkhead penetrations to be in proper condition.
5. Check the sample pump:
   If sample pump SPP-100 with Ex motor:
   See **Sample pump SPP-100 with Explosion proof electric motor** page **13.**
   1. Check the setting of the sample pump. In chapter **7.8.8. System Configuration, Standard** page **72** verify that the setting of property **"Sample Pump"** is **"Suzhong SPP-100".**
   2. Refer to makers MAINTENANCE part in chapter **12.10.1. Orange1 instructions** page **201**

   If sample pump is bulkhead mounted:
   See **Sample pump Nikuni 32MED22/Matre P06 for Bulkhead mounting** page **13**
   1. Check the setting of the sample pump. In chapter **7.8.8. System Configuration, Standard** page **72** verify that the setting of property **"Sample Pump"** is **"Nikuni 32MED22"** or **"Matre P06".**
   2. Check the oil level in the sample pump shaft seal.
      See chapter **9.7. Sample Pump Shaft seal oil refilling** page **94**

   If sample pump with air motor:
   See **Sample pump Speck Y-2951 with Air driven Gast motor** page **13**.
   1. Check that all air supply valves to the air motor are closed.
   2. Refer to makers MAINTENANCE part in chapter **12.11. Sample Pump, Speck pump with Gast air motor** page **211**.
6. For upgraded units with serial numbers earlier than CTB 2892 and with electrical sample pump motors:
   Check that the sample pump motor contactor feedback is wired and enabled.
   See chapter **7.8.9. System Configuration, Alarms&Extras** page **72** and the setting of the property **"ConvertingUnitType"** is **"PumpFeedback".**
7. If installed optional manual switch with connected feedback(electrical sample pump motors only):
   See chapter **7.8.9. System Configuration, Alarms&Extras** page **72** and the setting of the property **"PumpMotorDisconnect"** is **"ManualWithFeedback".**
8. In case of computer or converting unit malfunction:
   See chapter **8.1. Malfunction of Computer/Converting unit** page **83.**

Every 5 years, or whenever the Measuring cell is replaced. :

1. Replace the Measuring cell. The Factory calibration is valid for 5 years.
   The "Factory Calibration" time is found on the "CALIBRATION CERTIFICATE" delivered with each Measuring cell and in the computer menu. See chapter **7.7.1. Zero Calibration Status** page **64**.
   Within the validity time of the "Factory Calibration" a "Calibration Check" of the measuring cell can be made. The "Calibration Check" should be performed only by someone authorized by the manufacturer and within the specific guidelines given by the manufacturer.
2. **Check the software version** (see chapter **7.1. Main Menu** page **46**) **and contact one of the distributors to find out if there is a newer software version available.**
   Units with software version lower than 2.200 should be upgraded.

9.5. Verification of accuracy and access to restricted parts

User access to the internal parts of the Measuring cell is restricted with seals, which only Brannstrom Sweden AB can replace, in order to comply with clause 5.1 of MEPC. 108(49).
A calibration certificate is issued by Brannstrom Sweden AB when the CleanTrack 1000B is new. Later on, an "Accuracy Verification Certificate" can only be issued by Brannstrom Sweden AB or its approved agents.
The validity of the calibration certificate is max 5 years. Once the factory issued calibration certificate has expired the measuring cell must be replaced. The calibration certificate should be retained on board for inspection purpose.

9.6. Cleaning of Inlet Filter

When CleanTrack 1000B is in "StandBy" mode, close the sample inlet probe valves, open the drain valve and close the Analyzing unit inlet valve. Remove and clean the filter screen. Usage of CleanTrack 1000B sample pump unit without the inlet filter screen could harm the sample pump.
The Inlet Filter is item 15 in drawing **10.9.1. Partnames of typical arrangement** page **130**.

9.7. Sample Pump Shaft seal oil refilling

This part does only apply to CleanTrack 1000B versions with bulkhead penetration sample feed pumps.

The oil reservoir is positioned in the engine room side. Remove the oil reservoir cover nut. Be careful not to unscrew the reservoir from the pump. Refill up to the thread with recommended oil type. Be careful not to harm the plastic reservoir when the cover nut is mounted. Turn the cover nut Clockwise until it is in the right position.
See chapter **10.5. Nikuni Sample pump for Bulkhead mounting** page **122**
or chapter **10.6. Matre Sample pump for Bulkhead mounting** page **125**.

9.8. Spare parts

9.8.1. Computer Unit

- Computer CPU PCB — **CTB10001p sheet 3, Computer Unit with open door** page **99**, item d6.
- LCD screen
- Touch panel
- Power supply unit — **CTB10001p sheet 3, Computer Unit with open door** page **99**, d1
- Computer unit I/O PCB — **CTB10001p sheet 3, Computer Unit with open door** page **99**, d5
- Paper printer (optional) — **CTB10001p sheet 3, Computer Unit with open door** page **99**, d2
- Paper rewinder (optional) — **CTB10001p sheet 3, Computer Unit with open door** page **99**, d3

9.8.2. Converting Unit

- Converting Unit PCB — **CTB10003 sheet 3 of 4, Converting Unit** page **103**, d5
- Zener Barrier PCB — **CTB10003 sheet 3 of 4, Converting Unit** page **103**, d6
  See chapter **4.9. Zener Barrier Instructions and Replacement** page **26**
- Pump relay — **CTB10003 sheet 3 of 4, Converting Unit** page **103**, d2
- Overcurrent relay — See current limits for different Sample pumps below.
- Transformer — **CTB10003 sheet 3 of 4, Converting Unit** page **103**, d4

9.8.3. Analyzing Unit

- Measuring Cell — **CTB10010 sheet 5 of 5, Analyzing unit with air motor sample pump** page **119**,d2
  See chapter **4.10. Measuring Cell Instructions and Replacement** page **31**
- Pressure transmitter — **CTB10010 sheet 5 of 5, Analyzing unit with air motor sample pump** page **119**,d4

9.8.4. Sample pump

9.8.4.1. Ex. motor Sample pump, SPP-100

Note that it is not allowed for unauthorized personnel to do any repair work on the motor.
*Refer to makers MAINTENANCE AND REPAIR part in chapter **12.10.1. Orange1 instructions** page **201.***

- Seal kit for sample pump.
- Overcurrent relay, 1-1.6A — **CTB10003 sheet 3 of 4, Converting Unit** page **103**, d1

9.8.4.2. Bulkhead mounted Sample pump, Nikuni 32MED22

- Seal kit for sample pump.
- Overcurrent relay, 4-6A — **CTB10003 sheet 3 of 4, Converting Unit** page **103**, d1

9.8.4.3. Bulkhead mounted Sample pump, Matre P06

- Seal kit for sample pump.
- Overcurrent relay, 4-6A — **CTB10003 sheet 3 of 4, Converting Unit** page **103**, d1

9.8.4.4. Air motor Sample pump, Speck Y2951

- Pressure gauge. — **CTB10010 sheet 5 of 5, Analyzing unit with air motor sample pump** page **119**,d6
- Seal kit for sample pump.

9.8.5. Fuses

Power Supply Unit, see drawing **CTB10001p sheet 3, Computer Unit with open door** page **99, d1.**

- Fuse F1, T1A, Subminiature 8.5mm Time-Lag T, 250VAC, Schurter 0034.6615
- Fuse F2, T1A, Subminiature 8.5mm Time-Lag T, 250VAC, Schurter 0034.6915
- Fuse F3, T1A, Subminiature 8.5mm Time-Lag T, 250VAC, Schurter 0034.6915
- Fuse F4, T1A, Subminiature 8.5mm Time-Lag T, 250VAC, Schurter 0034.6915
- Fuse F5, T1A, Subminiature 8.5mm Time,-Lag T,250VAC, Schurter 0034.6915

"Standard" Converting Unit PCB – BE382C, see drawing **CTB10003 sheet 3 of 4, Converting Unit** page **103, d5.**

- Fuse F1, T500mA, Tube 5x20mm, Time-Lag T, 250VAC
- Fuse F2, T3.15A, Tube 5x20mm, Time-Lag T, 250VAC
- Fuse F3, T1A, Tube 5x20mm, Time-Lag T, 250VAC
- Fuse F4, T1A, Tube 5x20mm, Time-Lag T, 250VAC

"Extended" Converting Unit PCB – BE450B, see drawing **CTB10003 sheet 4 of 4, Converting Unit** page **104, d5.**

- Fuse F11, T3.15A, Tube 5x20mm, Time-Lag T, 250VAC
- Fuse F12, T2A, Tube 5x20mm, Time-Lag T, 250VAC
- Fuse F13, F1,25AH, Tube 5x20mm, IR 1500A/250VAC
- Fuse F14, F1,25AH, Tube 5x20mm, IR 1500A/250VAC
- Fuse F15, F1,25AH, Tube 5x20mm, IR 1500A/250VAC

Zener Barrier PCB, BE381C, see drawing **CTB10003 sheet 3 of 4, Converting Unit** page **103, d6.**

- Fuse F5, T400mA[9] or T315mA, Tube 5x20mm, Time-Lag T, 250VAC
- IMPORTANT: 3 x fuses inside lid must be of approved types printed on the lid of the zener barrier pcb.
  When creating this document, Revision 2.20x, the 2 types are:
  Littelfuse 217.063, 63 mA Quick Blow, 250VAC
  Schurter FSF 0034.1530, 63 mA Quick Blow, 250VAC
  For instructions, see chapter **4.9. Zener Barrier Instructions and Replacement** page **26**.

9.9. Recommended Spare parts

- 1 set of fuses:
  1 pc T315mA, Tube 5x20mm, Time-Lag T, 250VAC
  1 pc T400mA, Tube 5x20mm, Time-Lag T, 250VAC
  1 pc T500mA, Tube 5x20mm, Time-Lag T, 250VAC
  1 pc T1A, Tube 5x20mm, Time-Lag T, 250VAC
  1 pc T3.15A, Tube 5x20mm, Time-Lag T, 250VAC
  2 pcs 63 mA according to chapter **9.8.5. Fuses** page **96**.
  2 pcs T1A, Subminiature 8.5mm Time-Lag T, 250VAC, Schurter 0034.6915
- 2 pcs cleaning brush for cleaning of glass pipe in Measuring Cell.

If Extended converting unit (optional)

- 1 extra set of fuses:
  1 pc T2A, Tube 5x20mm, Time-Lag T, 250VAC
  4 pcs F1,25AH, Tube 5x20mm, IR 1500A/250VAC

9.10. Consumables

Lithium Battery

The Computer unit CPU printed circuit board contains a Lithium battery, type CR1225 3V.
See chapter **9.2. Battery replacement** page **93.**

Paper Printer Roll (optional)

The paper shall fit to printer: Custom PCPLUS II-S2B.
Printer manage thermal roll paper with heat-sensitive side on outside of roll.
Paper roll width: max 58 mm and diameter: max 50 mm.

Cleaning Brush

Cleaning brush for CleanTrack 1000 B (cleaning of glass pipe in Measuring Cell).

[9] Zener Barrier PCB fuse F5 upgraded to T400mA, previous value of T315mA can also be used.

9.11. Storage before installation

Prior to installation the unit should be stored in a tempered and dry location protected from sunlight.

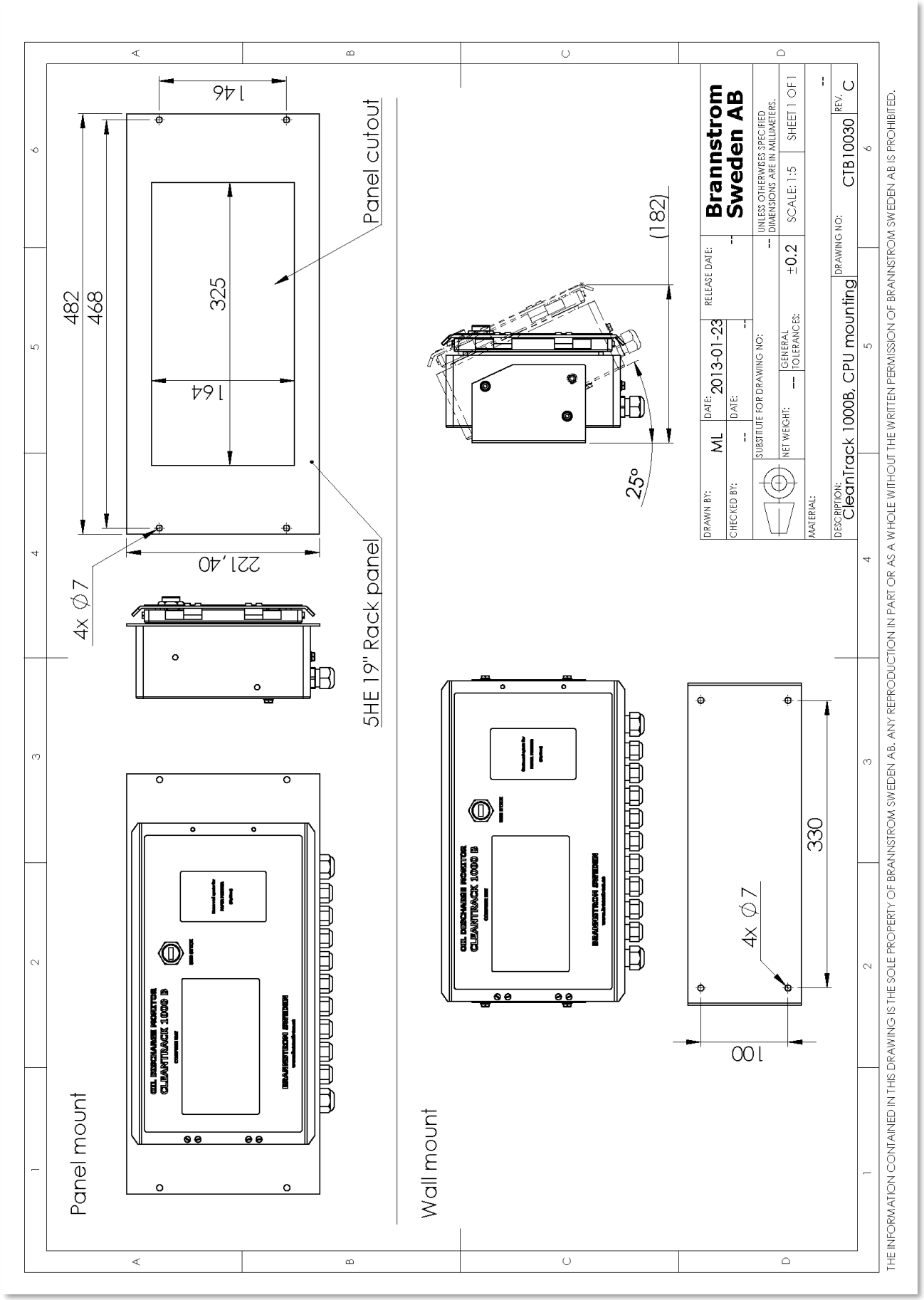
10. Figures and Drawings

This chapter contains standard drawing alternatives and options.
For project specific drawings, refer to chapter **14. Project specific drawings and data sheet** page **217**.

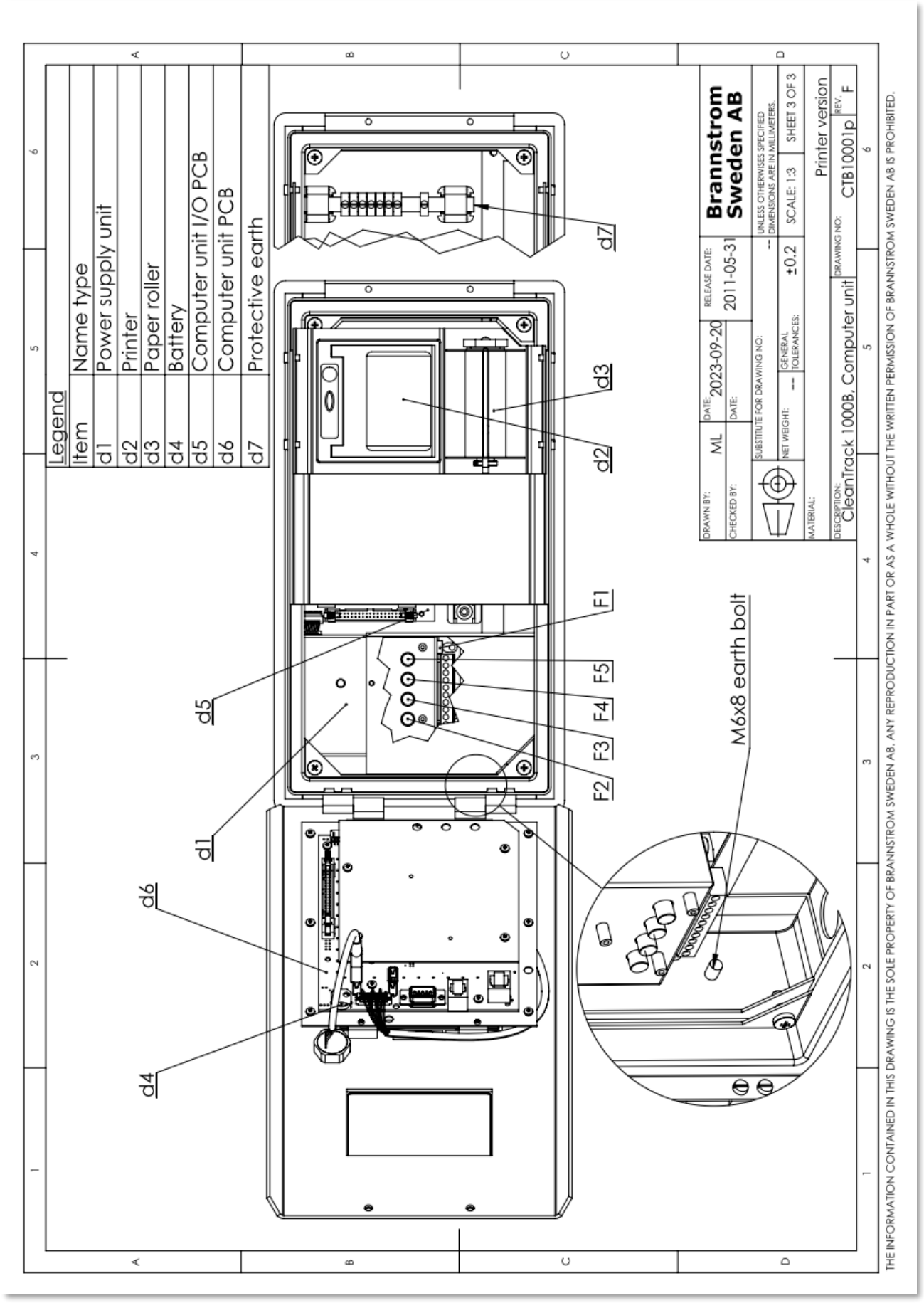
The rest of the page is intentionally left blank.

10.1. Computer Unit

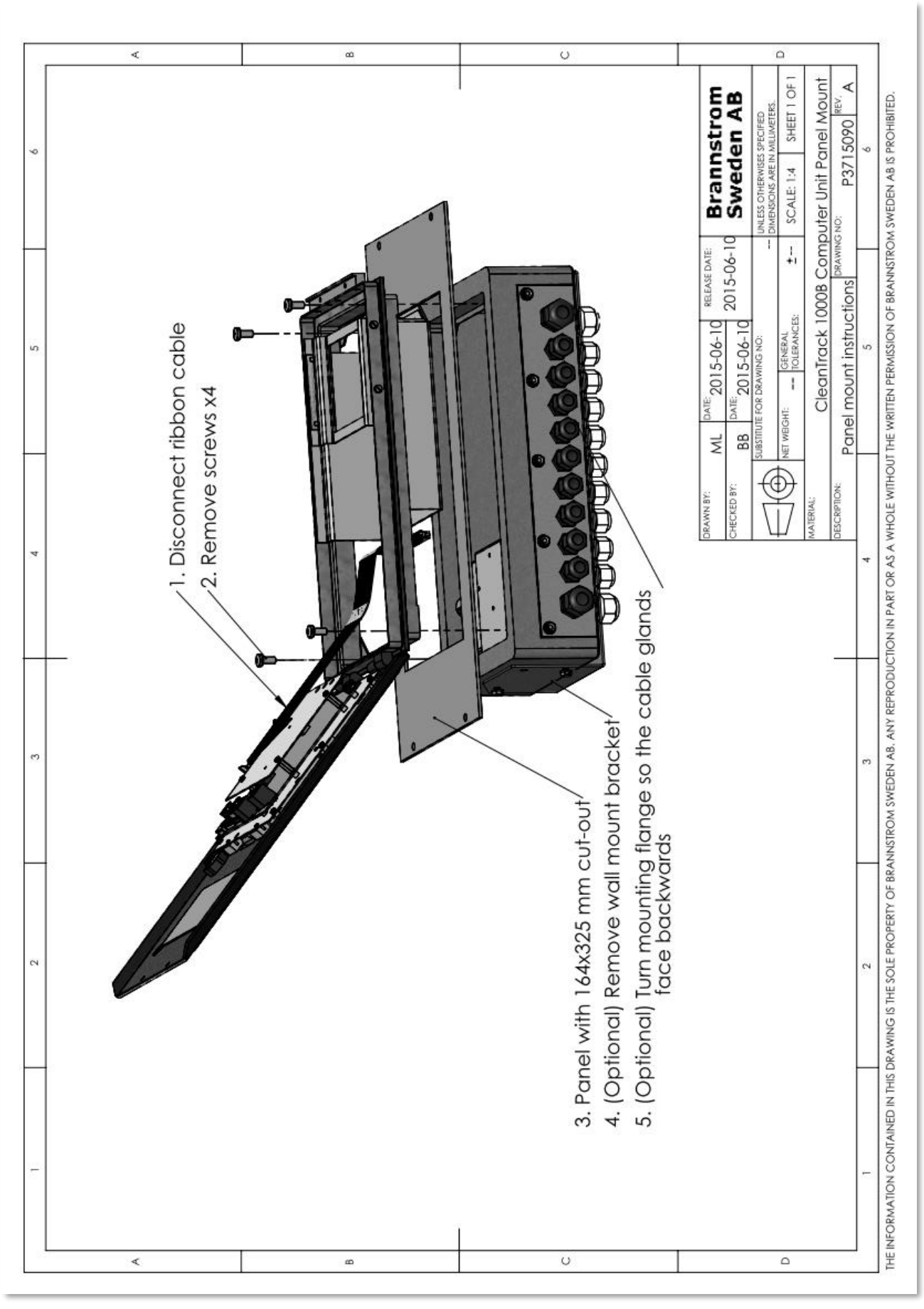
Drawing: CTB10030 sheet 1, Computer Unit mounting



Drawing: CTB10001p sheet 3, Computer Unit with open door.
Note: printer is optional. Standard version is without items d2 and d3.

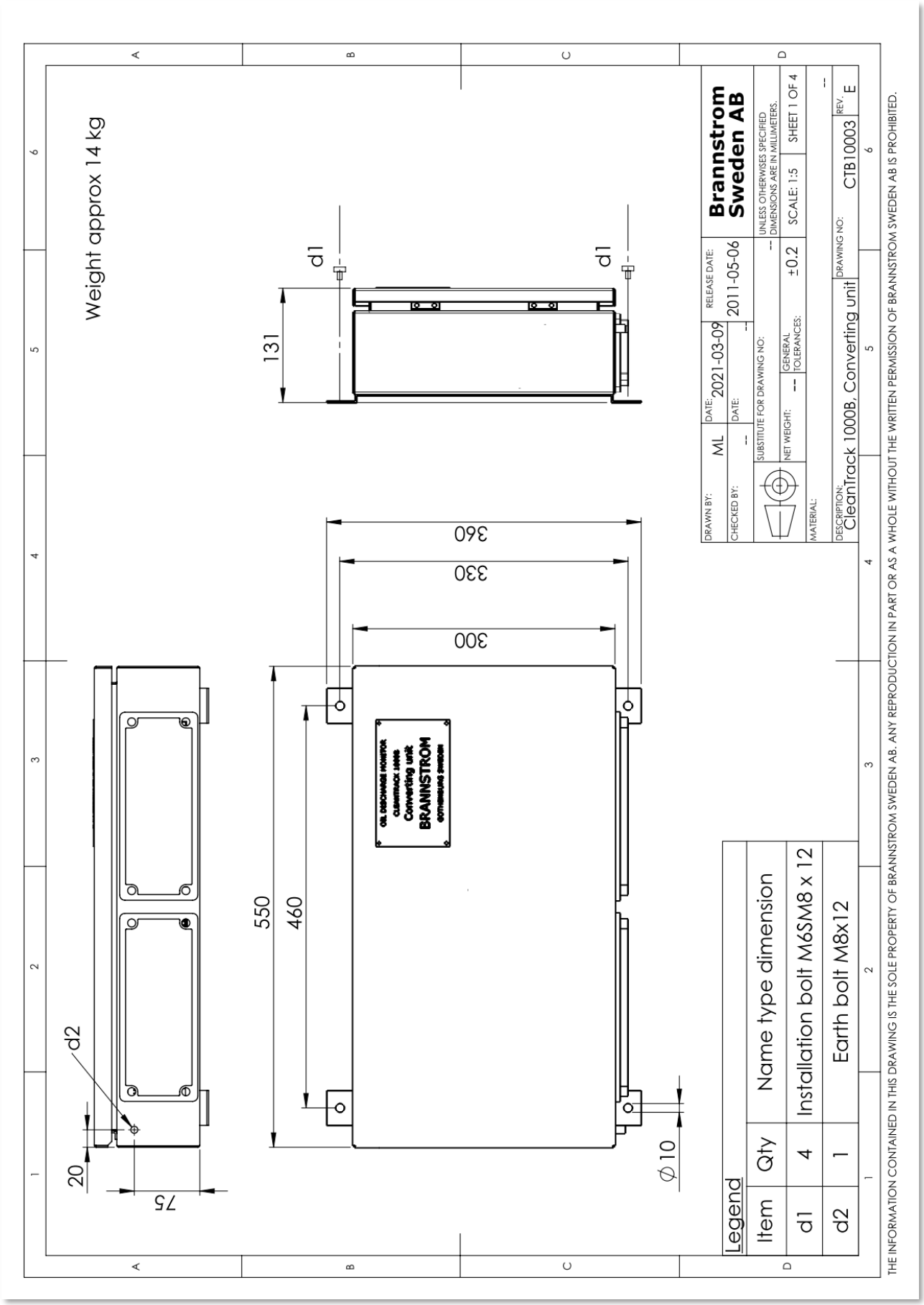


Drawing: P3715090 sheet 1, Computer Unit panel mount instructions.

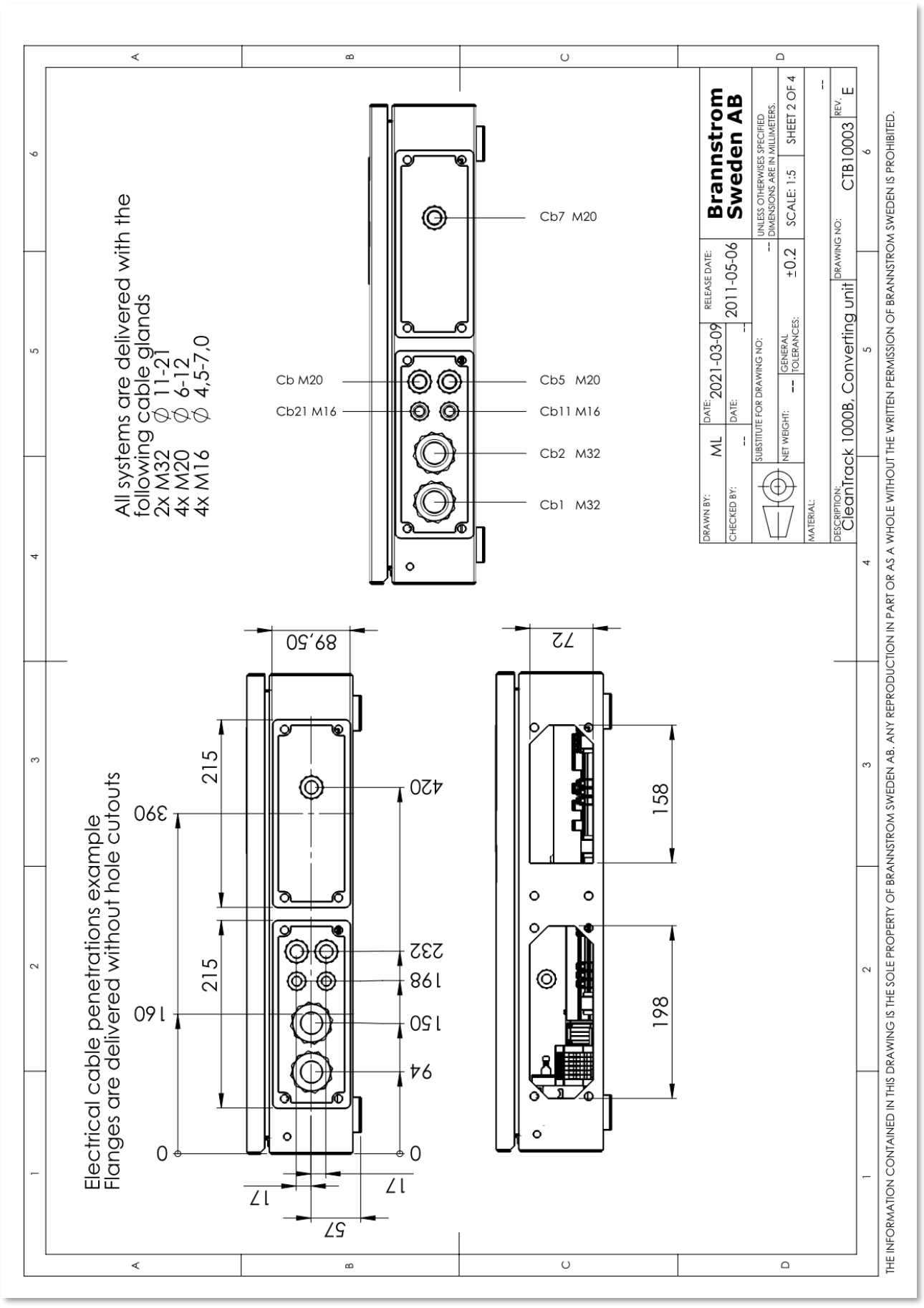


10.2. Converting Unit

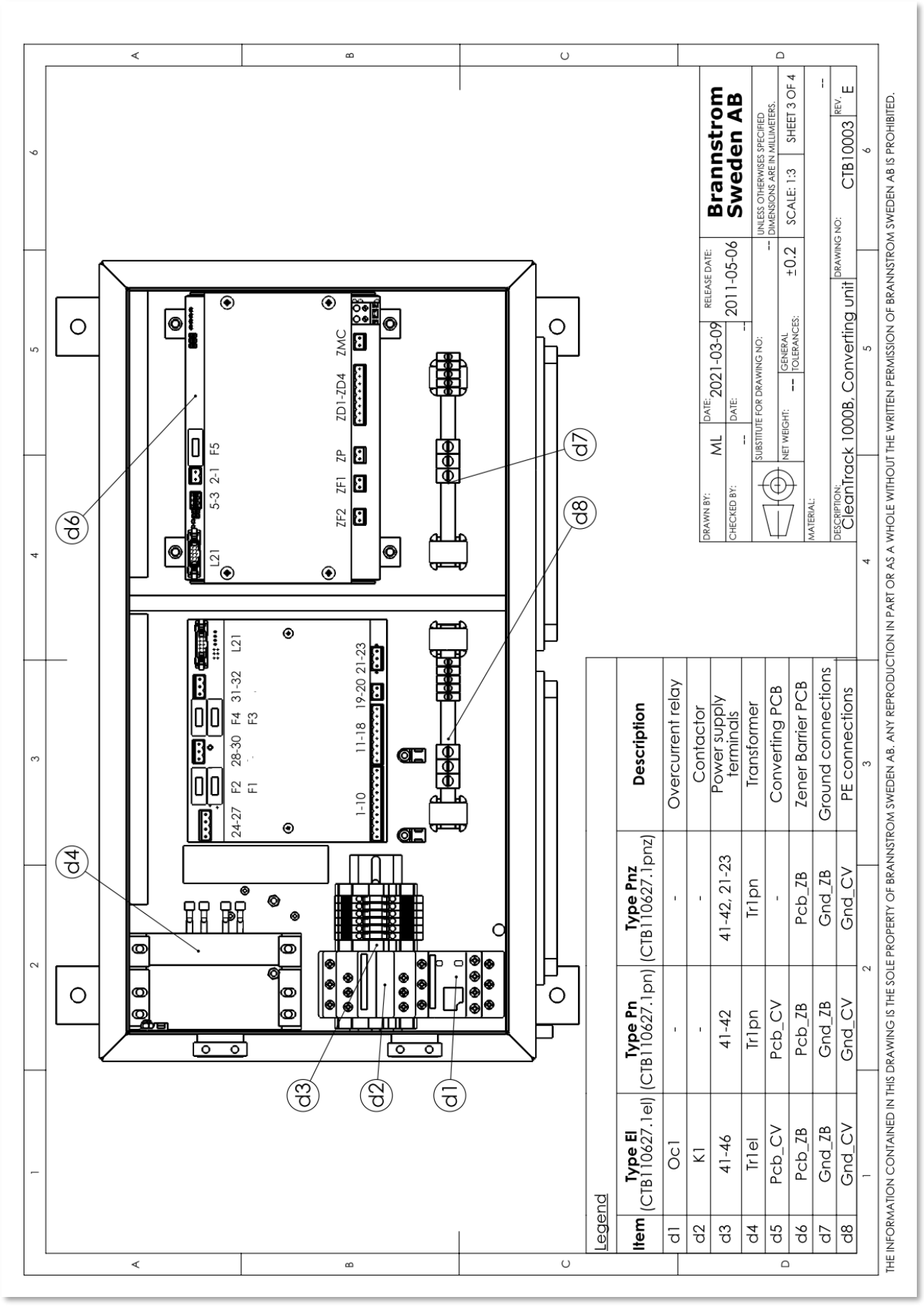
Drawing: CTB10003 sheet 1 of 4, Converting Unit.



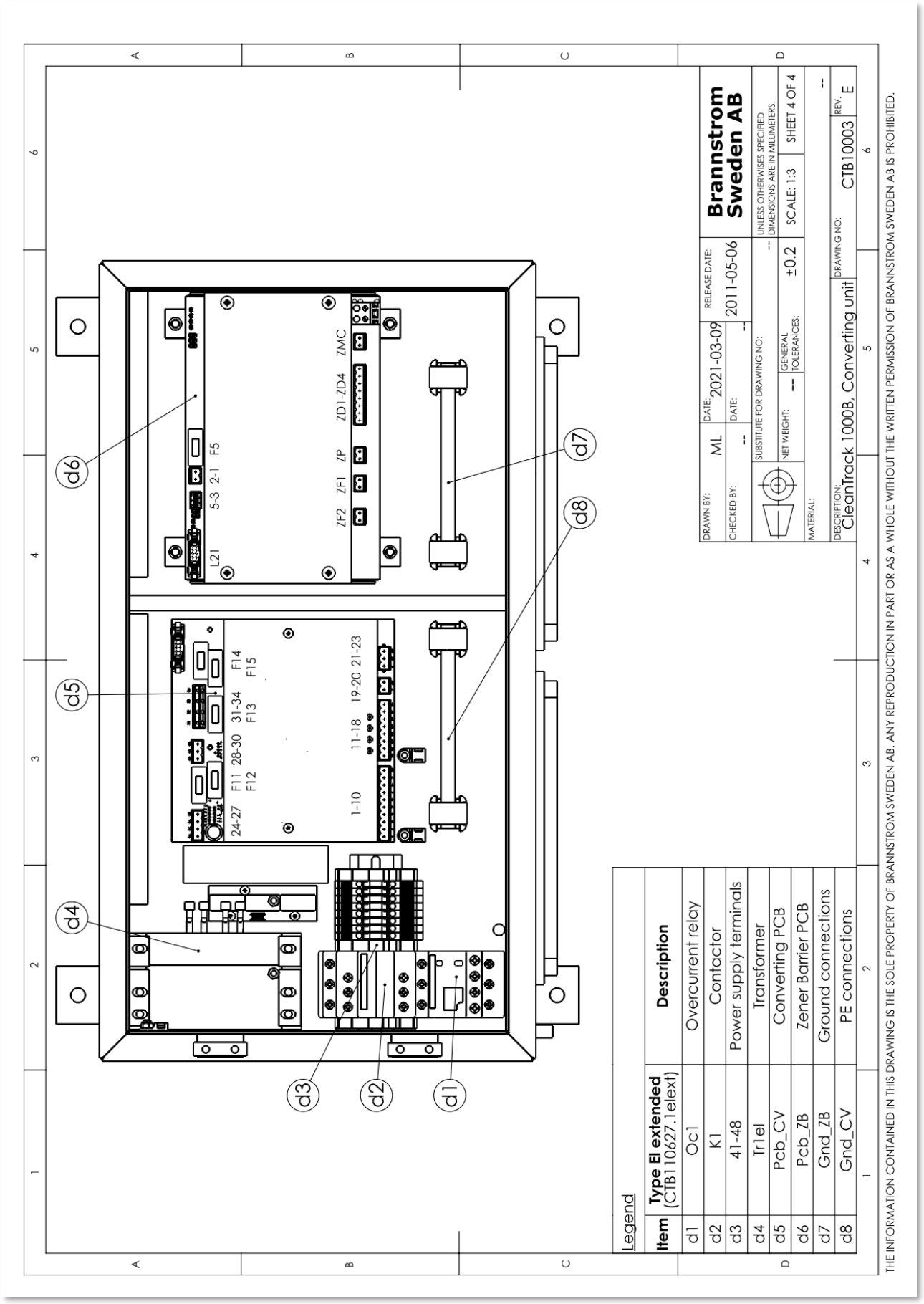
Drawing: CTB10003 sheet 2 of 4, Converting Unit.



Drawing: CTB10003 sheet 3 of 4, Converting Unit.



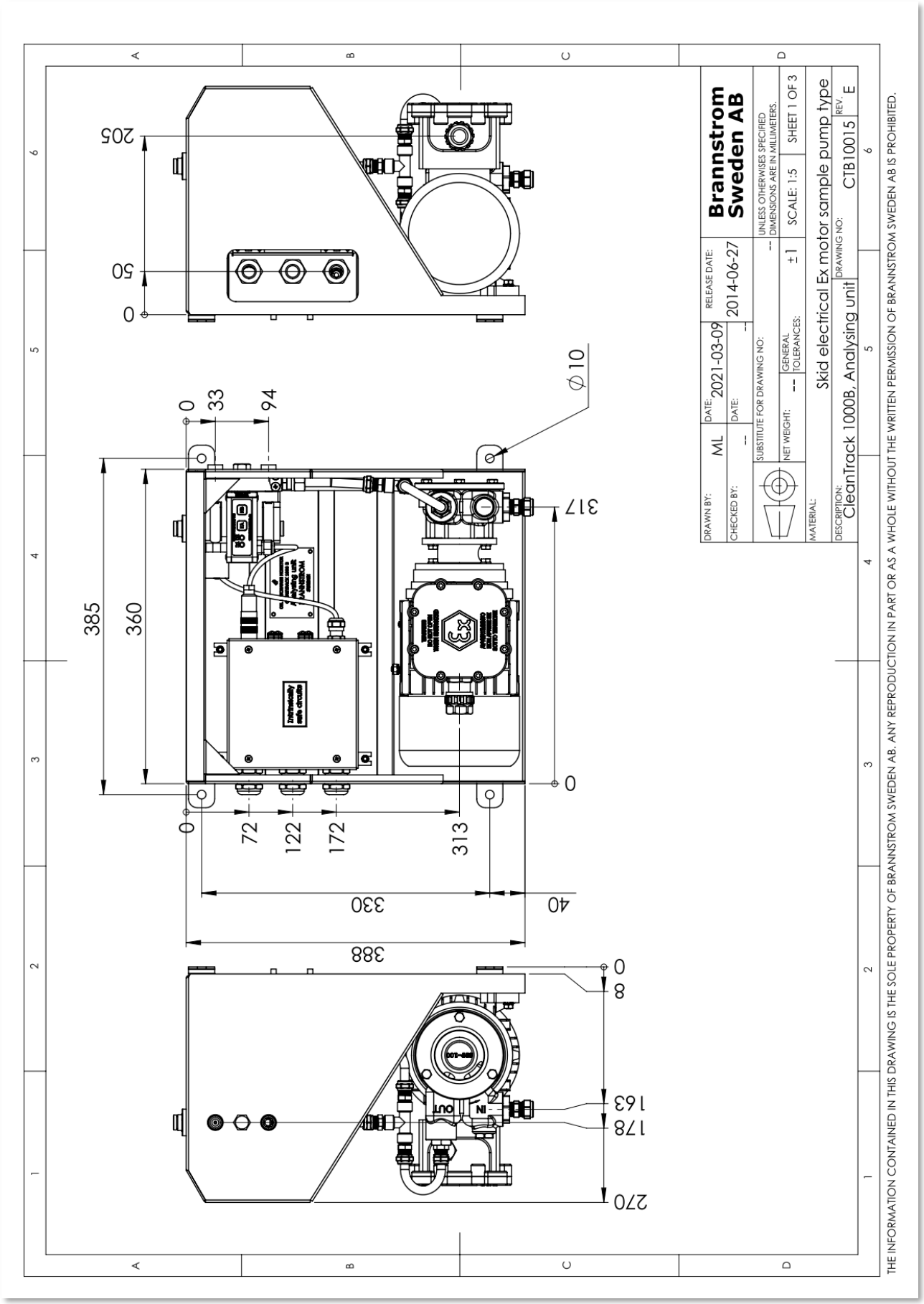
Drawing: CTB10003 sheet 4 of 4, Converting Unit.



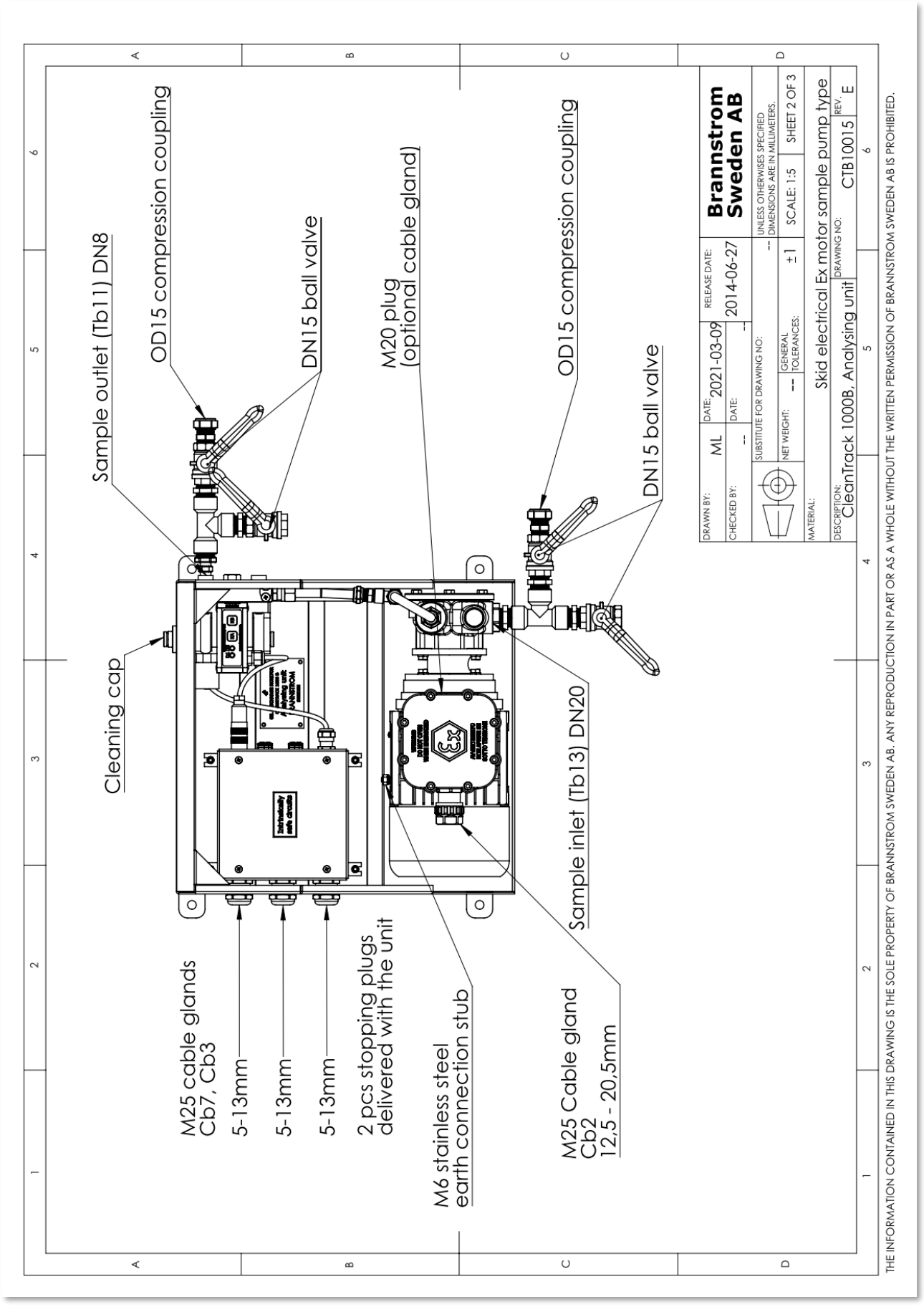
10.3. Analyzing Unit

10.3.1. Analyzing Unit skid with Ex. motor Sample pump

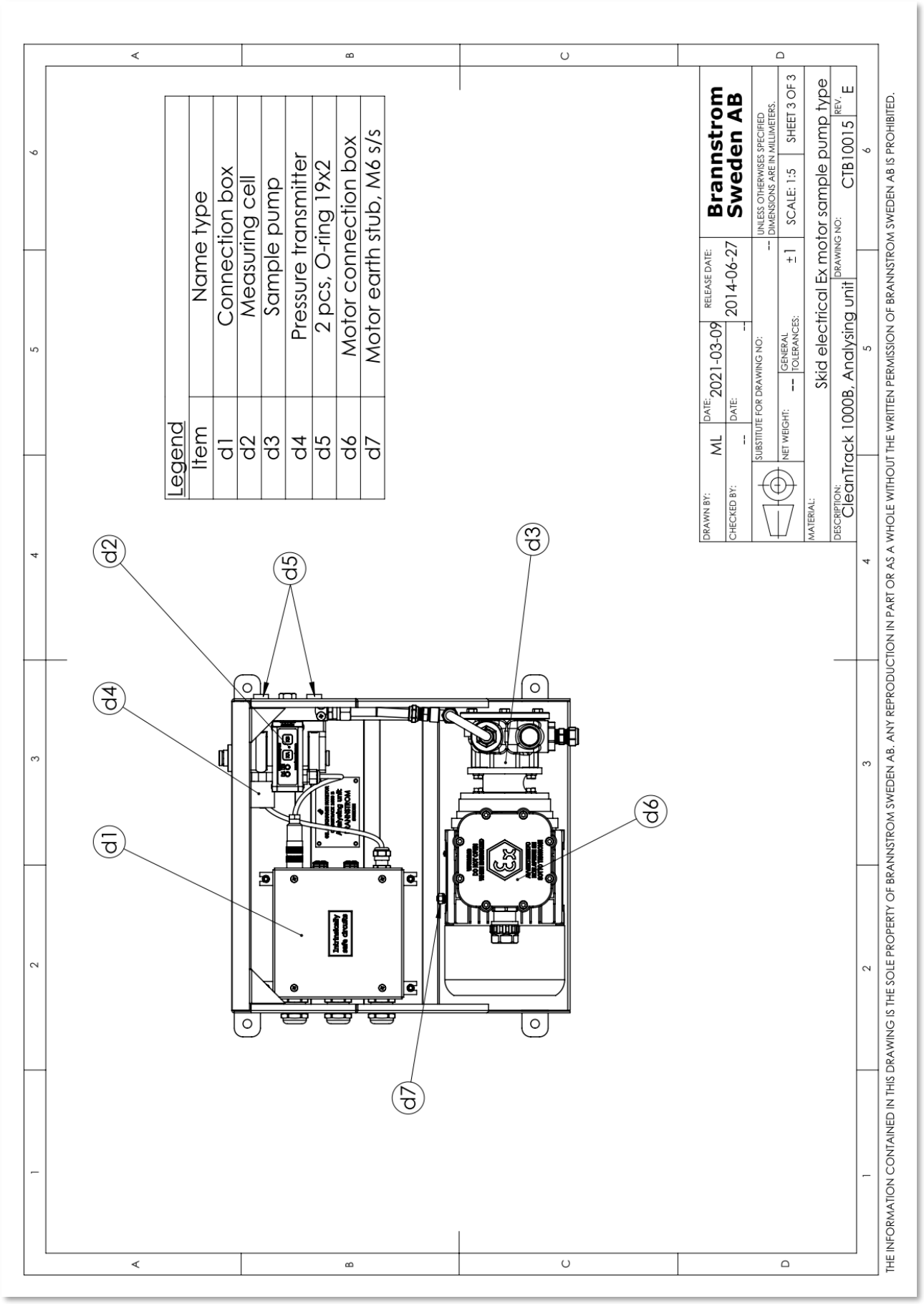
Drawing: CTB10015 sheet 1 of 3, Analyzing unit skid with electrical Ex. motor sample pump.



Drawing: CTB10015 sheet 2 of 3, Analyzing unit skid with electrical Ex. motor sample pump.

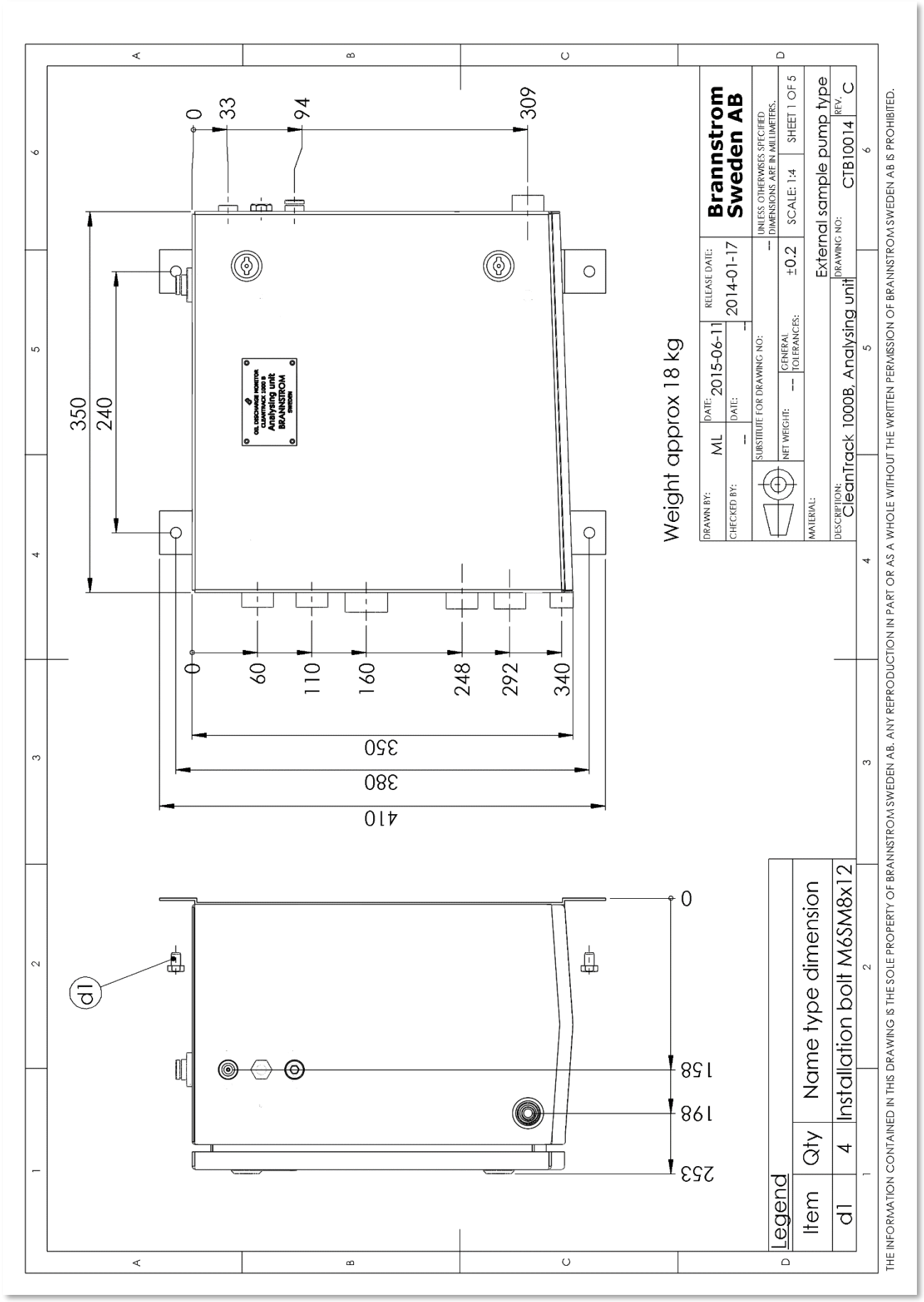


Drawing: CTB10015 sheet 3 of 3, Analyzing unit skid with electrical Ex. motor sample pump.

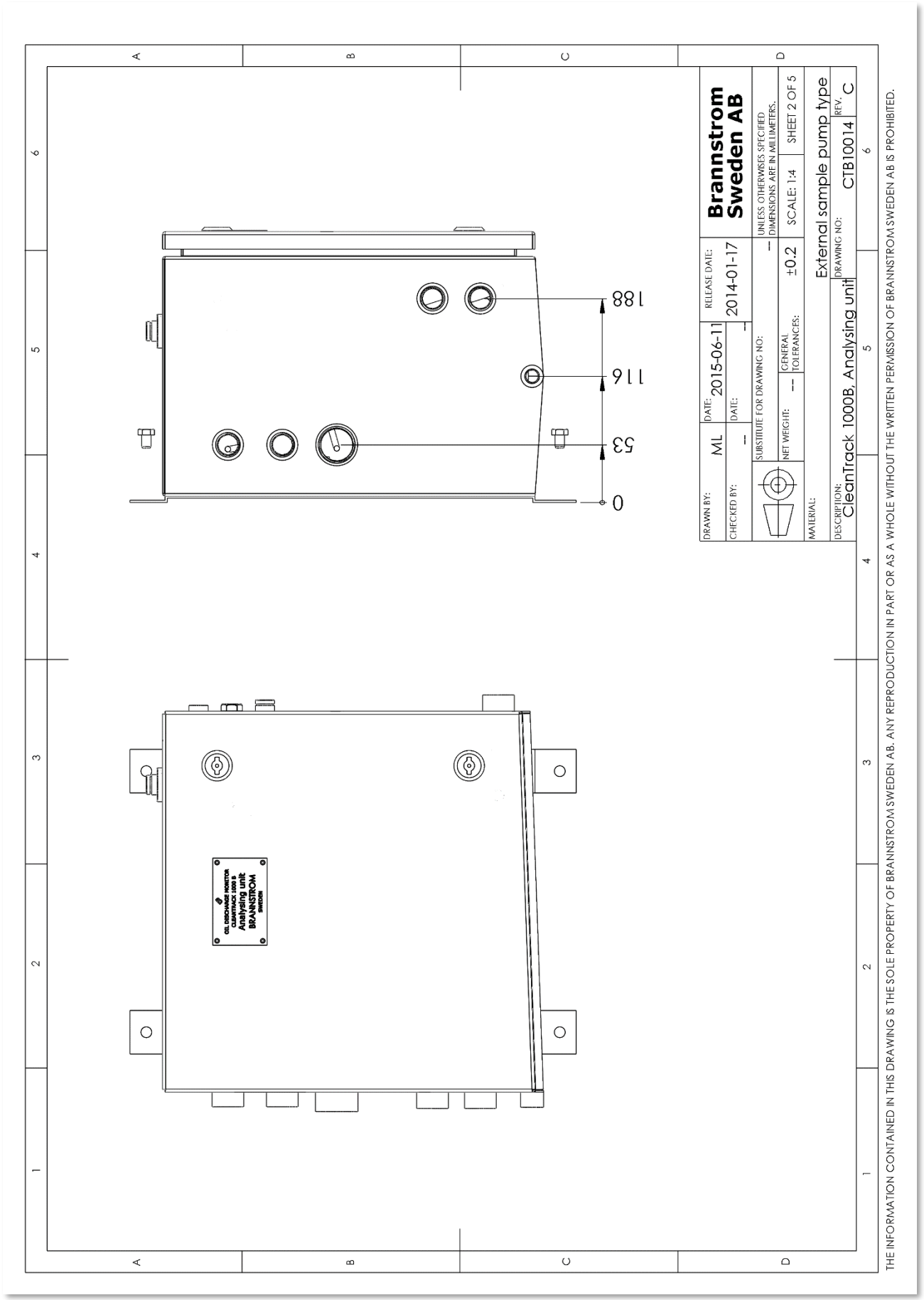


10.3.2. Analyzing Unit with external Sample pump

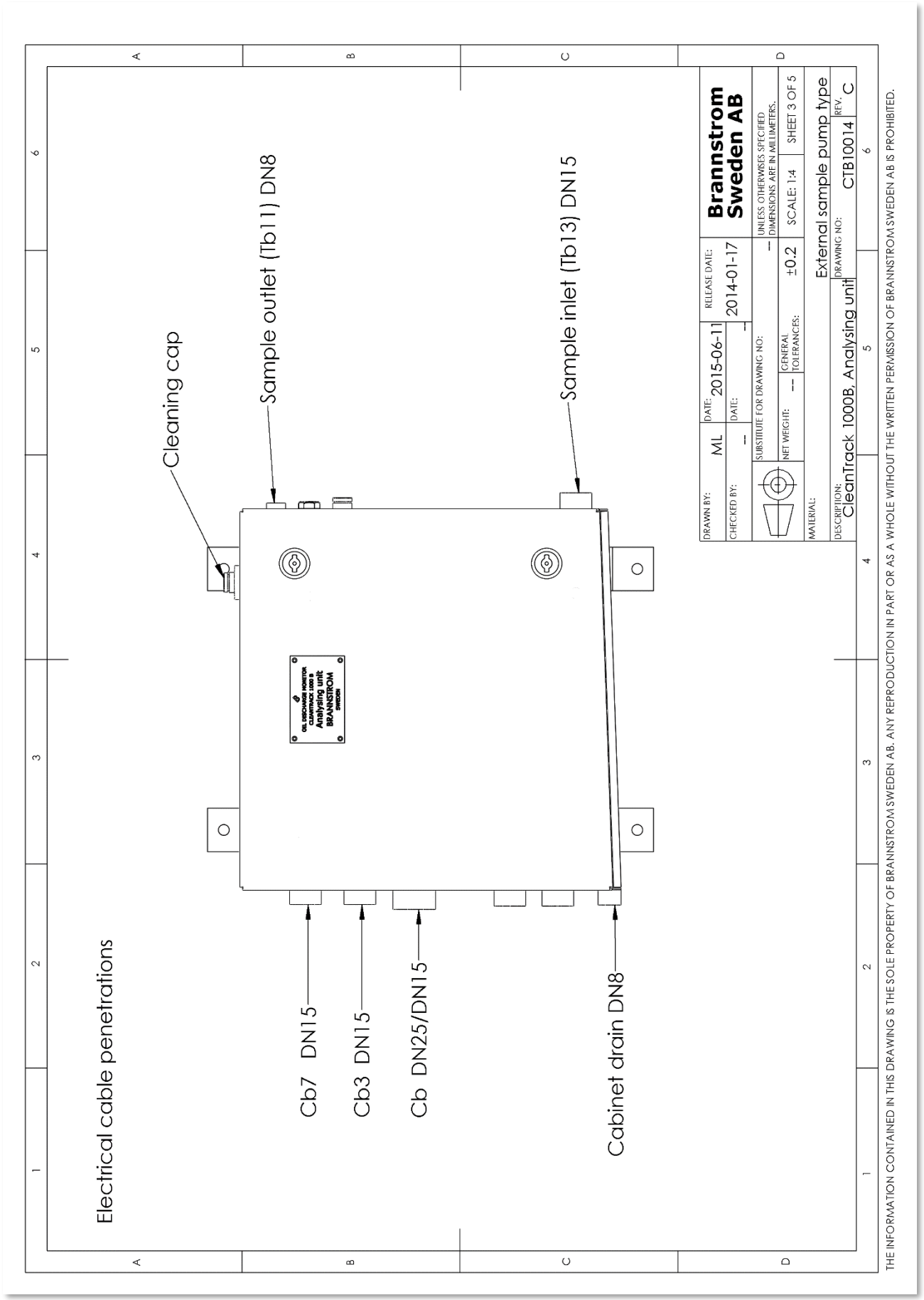
Drawing: CTB10014 sheet 1 of 5, Analyzing unit with external sample pump.



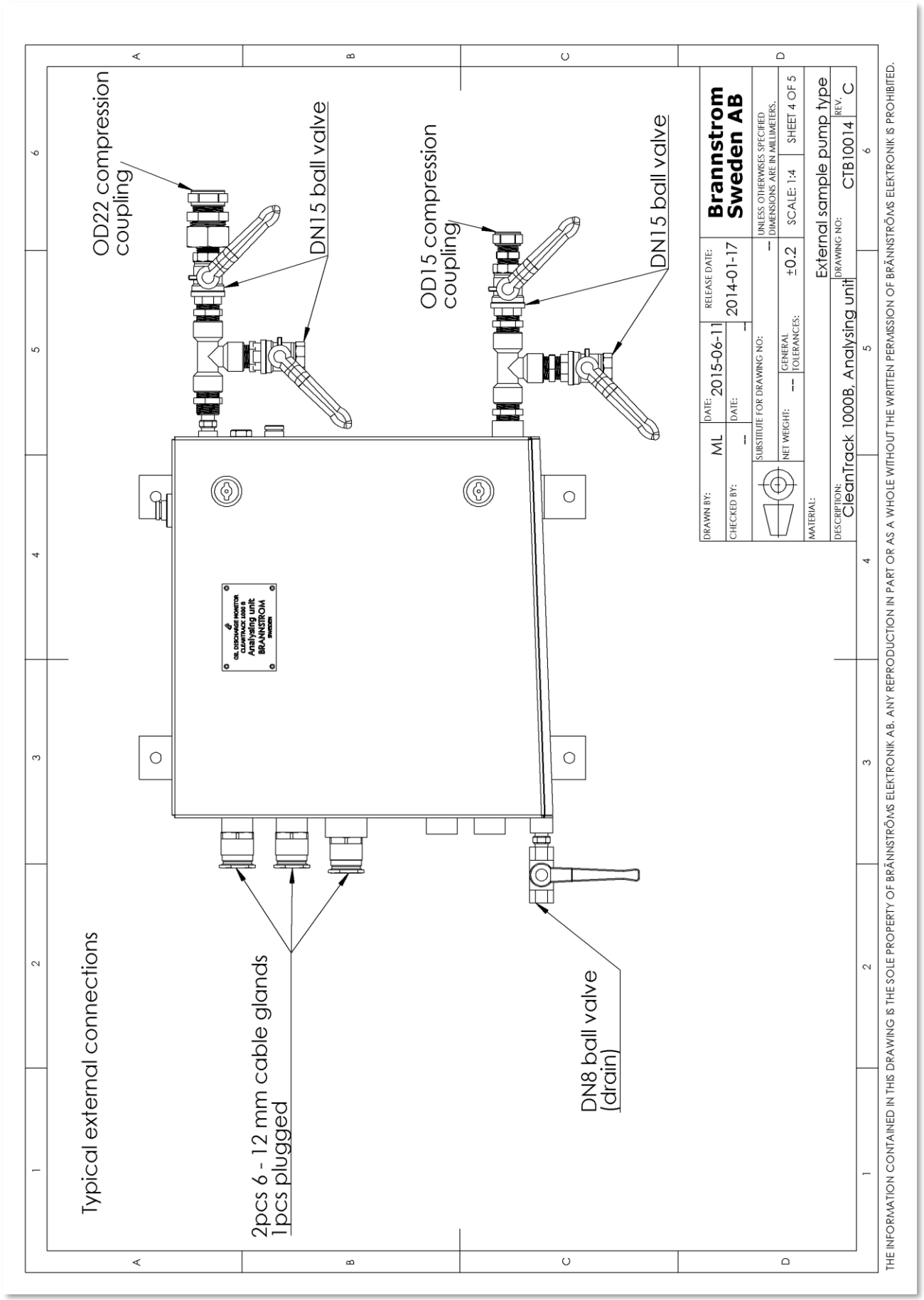
Drawing: CTB10014 sheet 2 of 5, Analyzing unit with external sample pump.



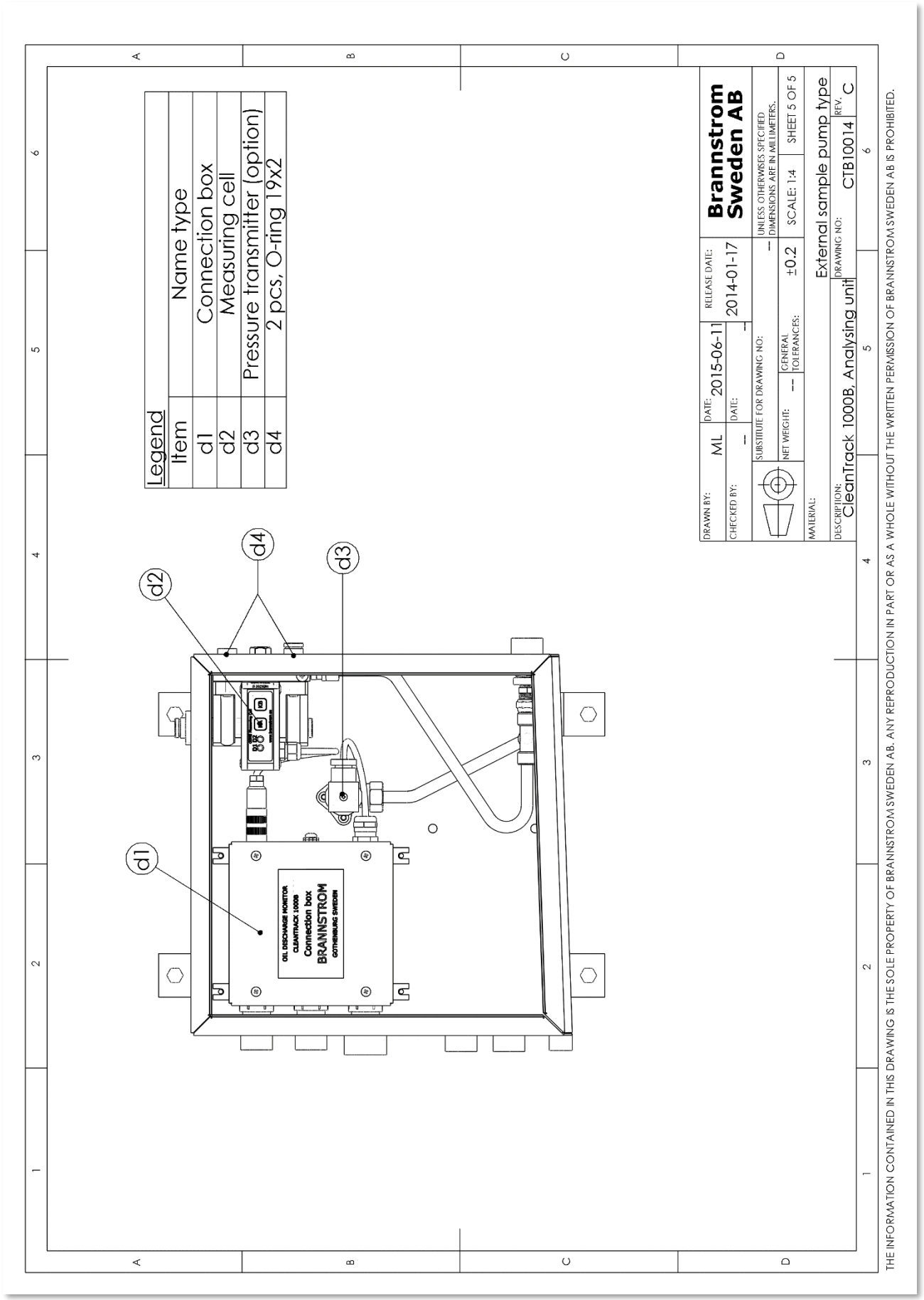
Drawing: CTB10014 sheet 3 of 5, Analyzing unit with external sample pump.



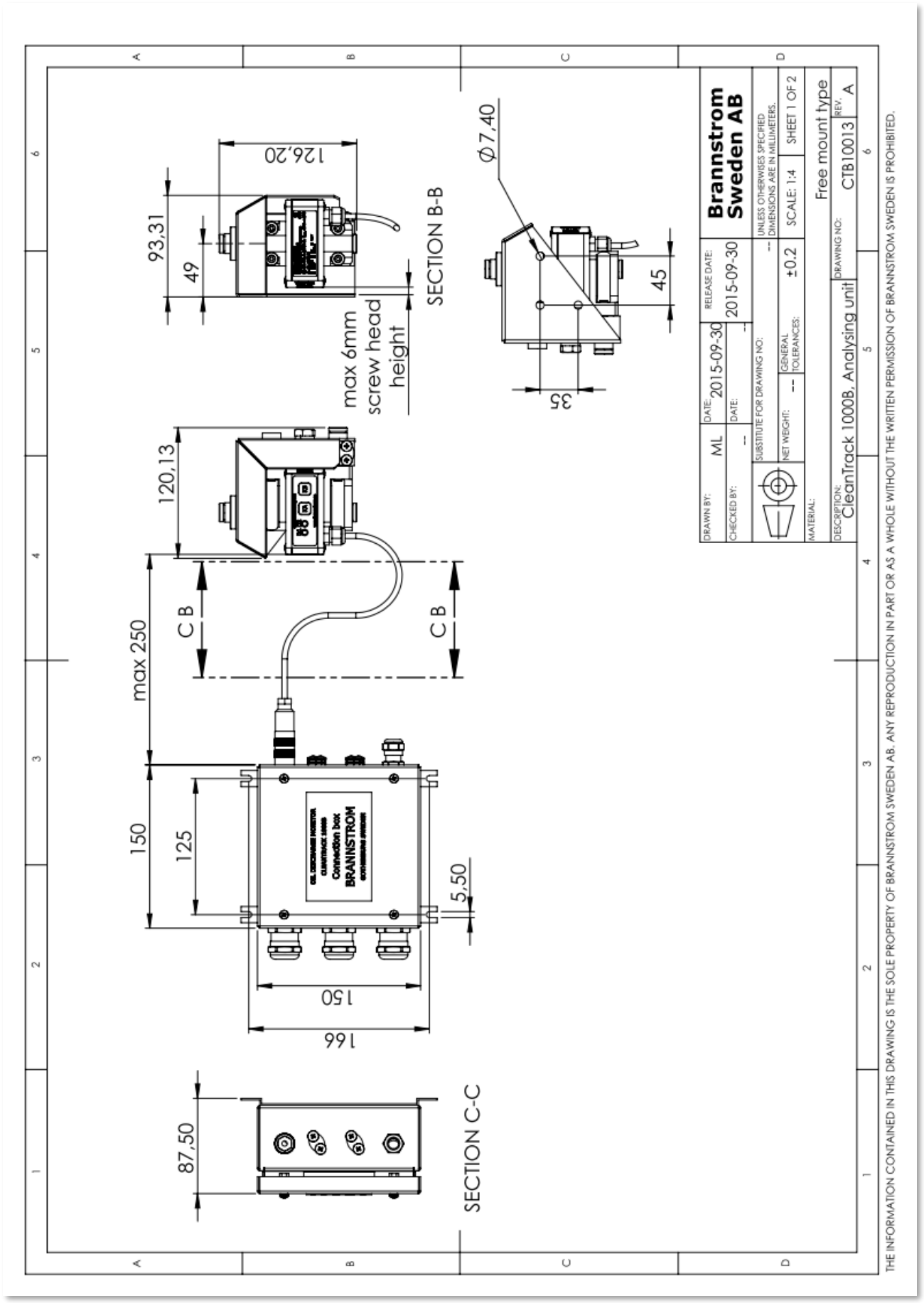
Drawing: CTB10014 sheet 4 of 5, Analyzing unit with external sample pump.

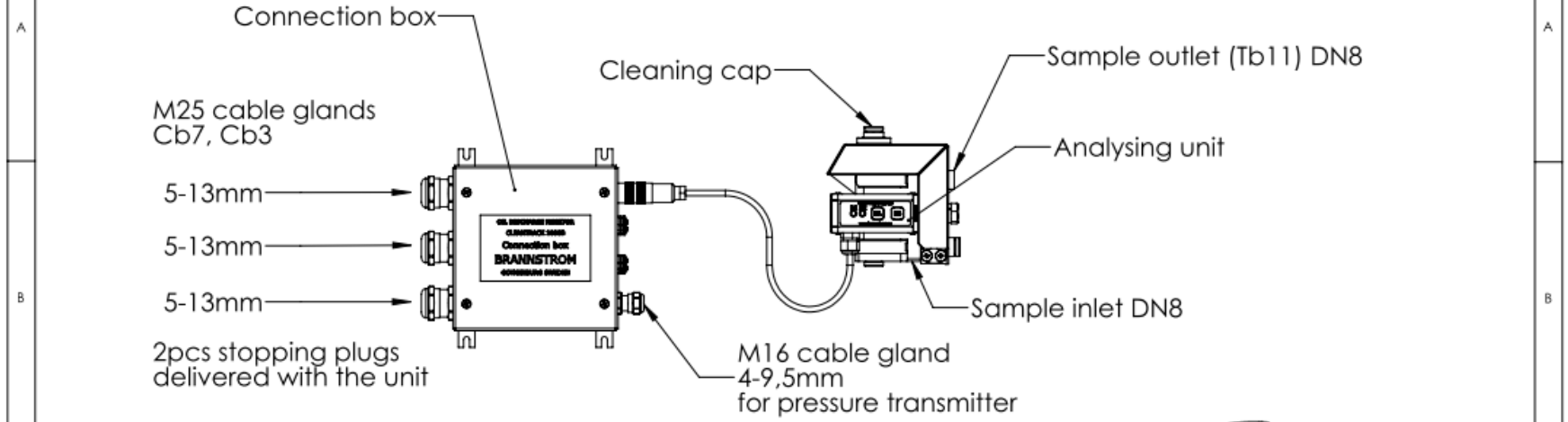


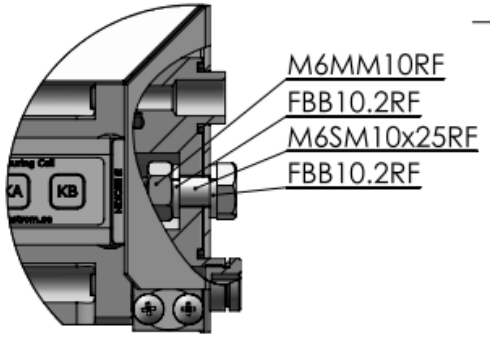
Drawing: CTB10014 sheet 5 of 5, Analyzing unit with external sample pump.



10.3.3. Analyzing Unit with Freestanding items for External Sample pump







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MATERIAL: Free mount type				
DESCRIPTION: CleanTrack 1000B, Analysing unit		DRAWING NO: CTB10013	REV. A	

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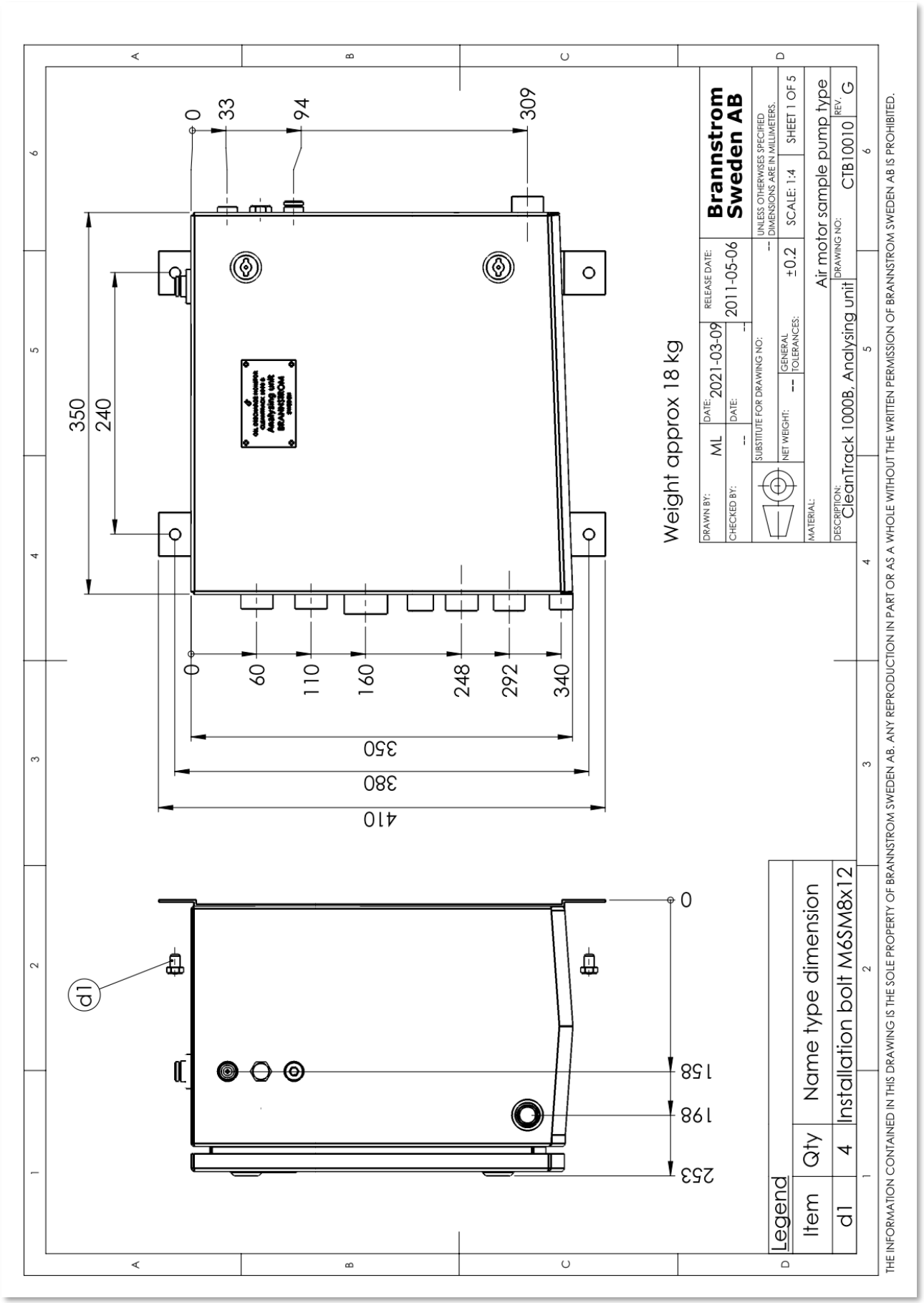
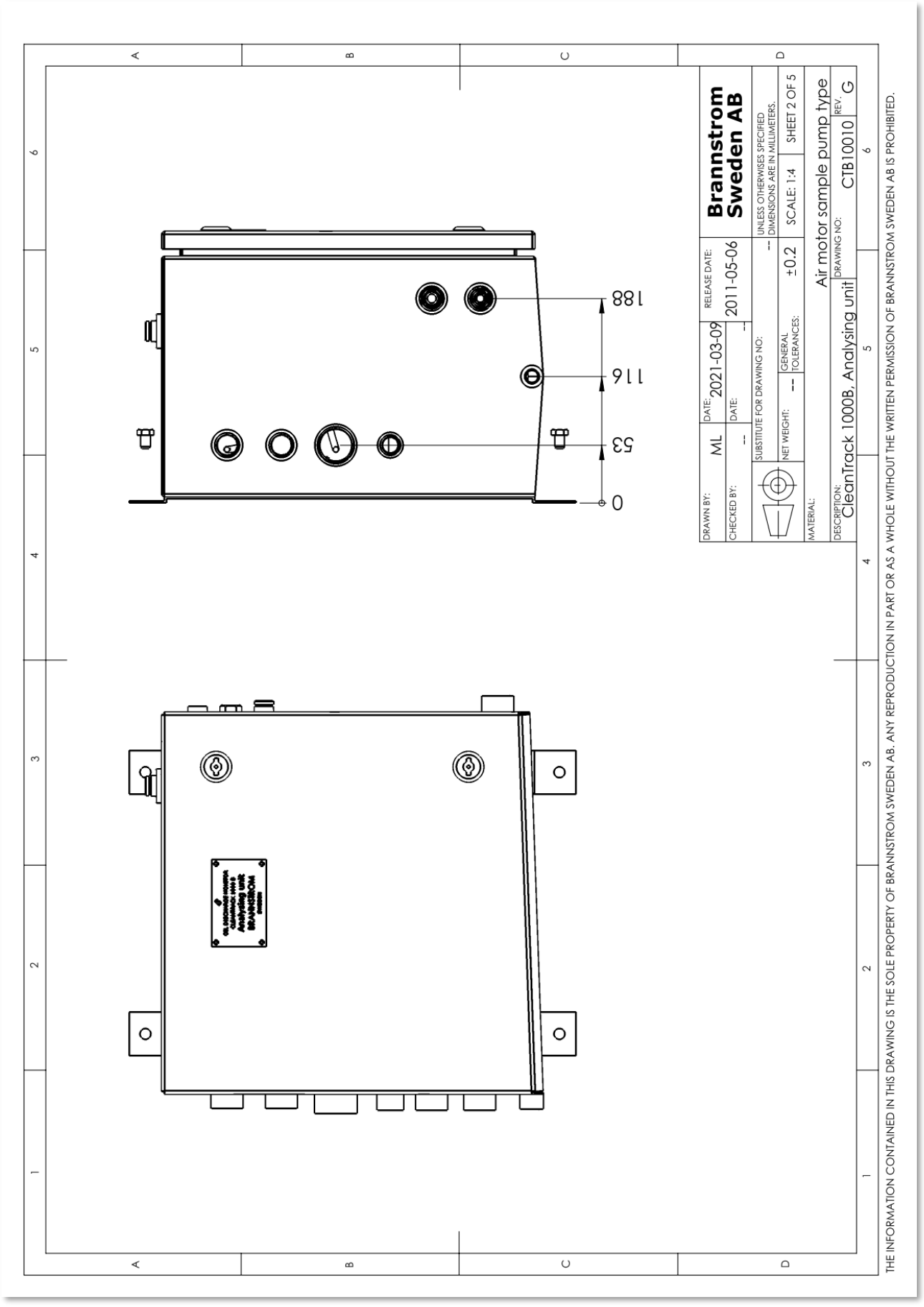
10.3.4. Analyzing Unit with Air motor Sample pump

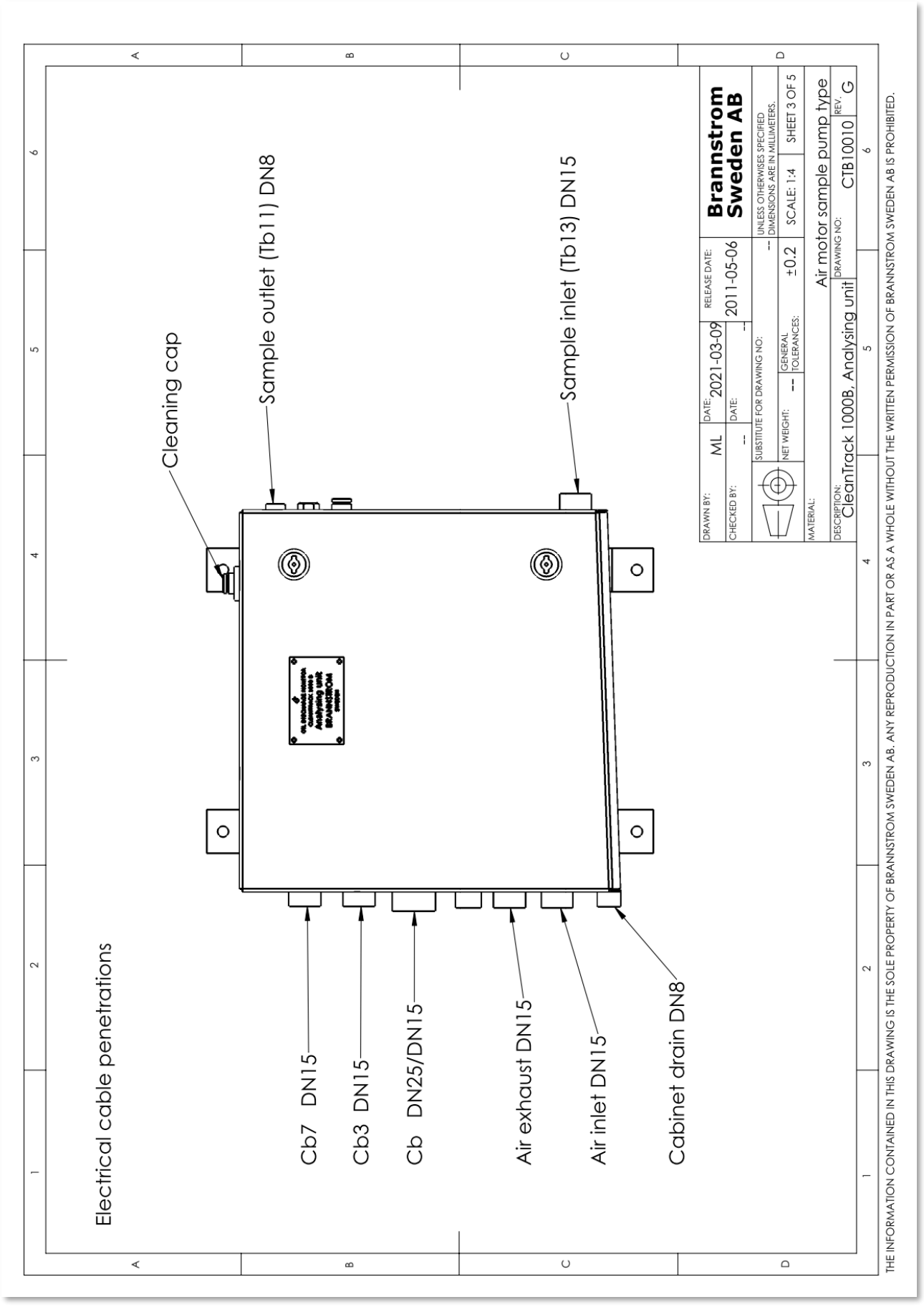
Drawing: CTB10010 sheet 1 of 5, Analyzing unit with air motor sample pump.



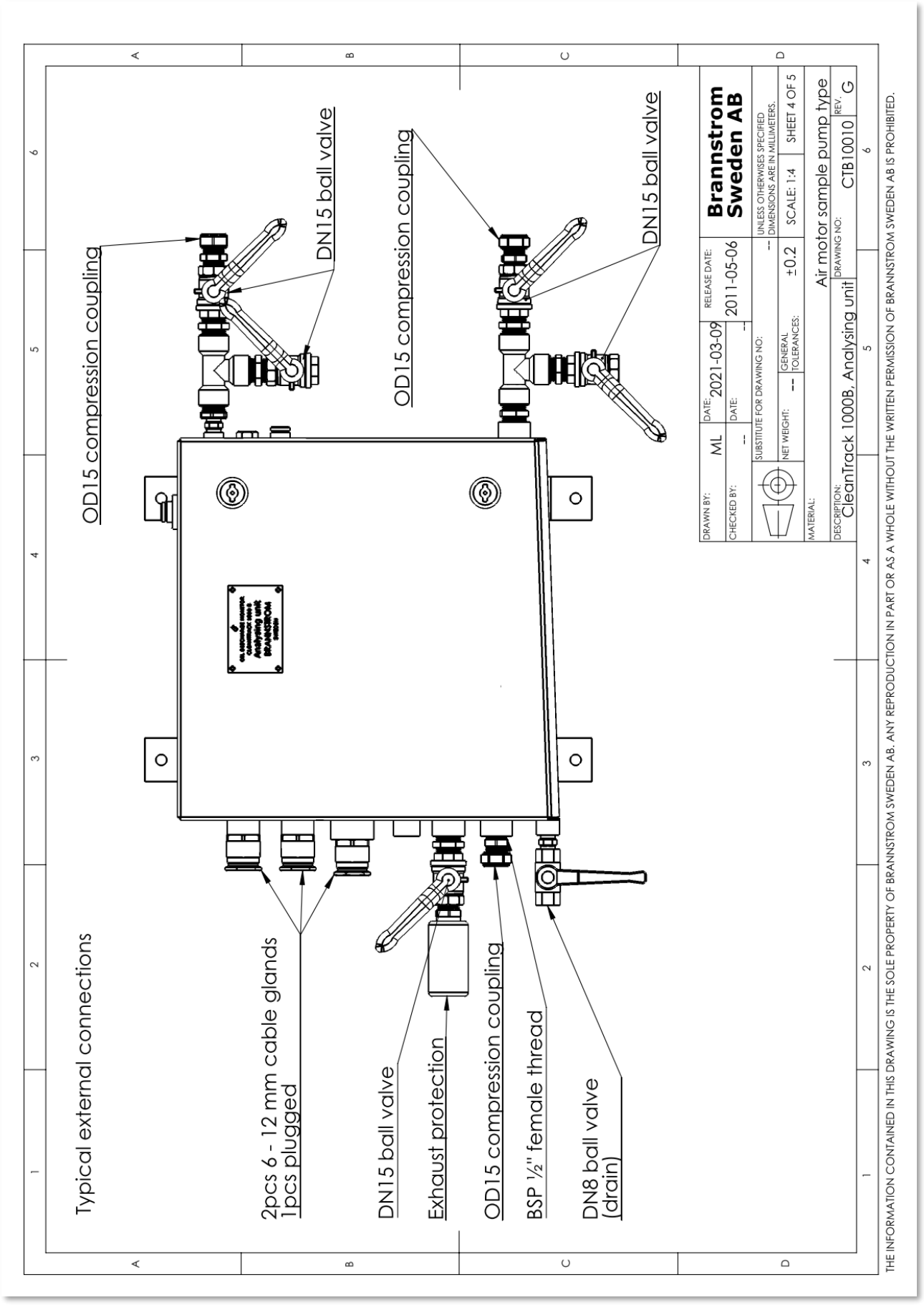
Drawing: CTB10010 sheet 2 of 5, Analyzing unit with air motor sample pump.



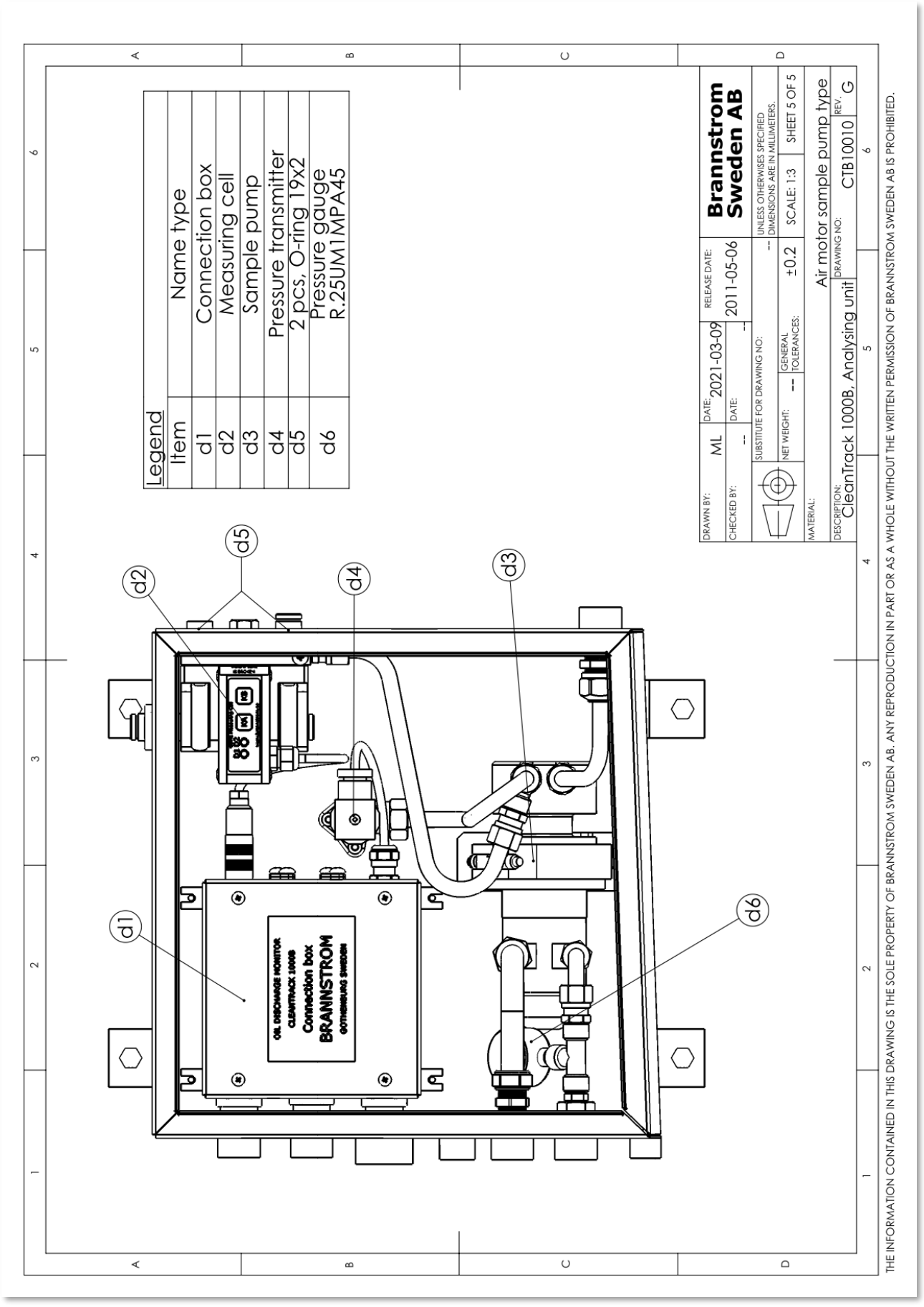
Drawing: CTB10010 sheet 3 of 5, Analyzing unit with air motor sample pump.



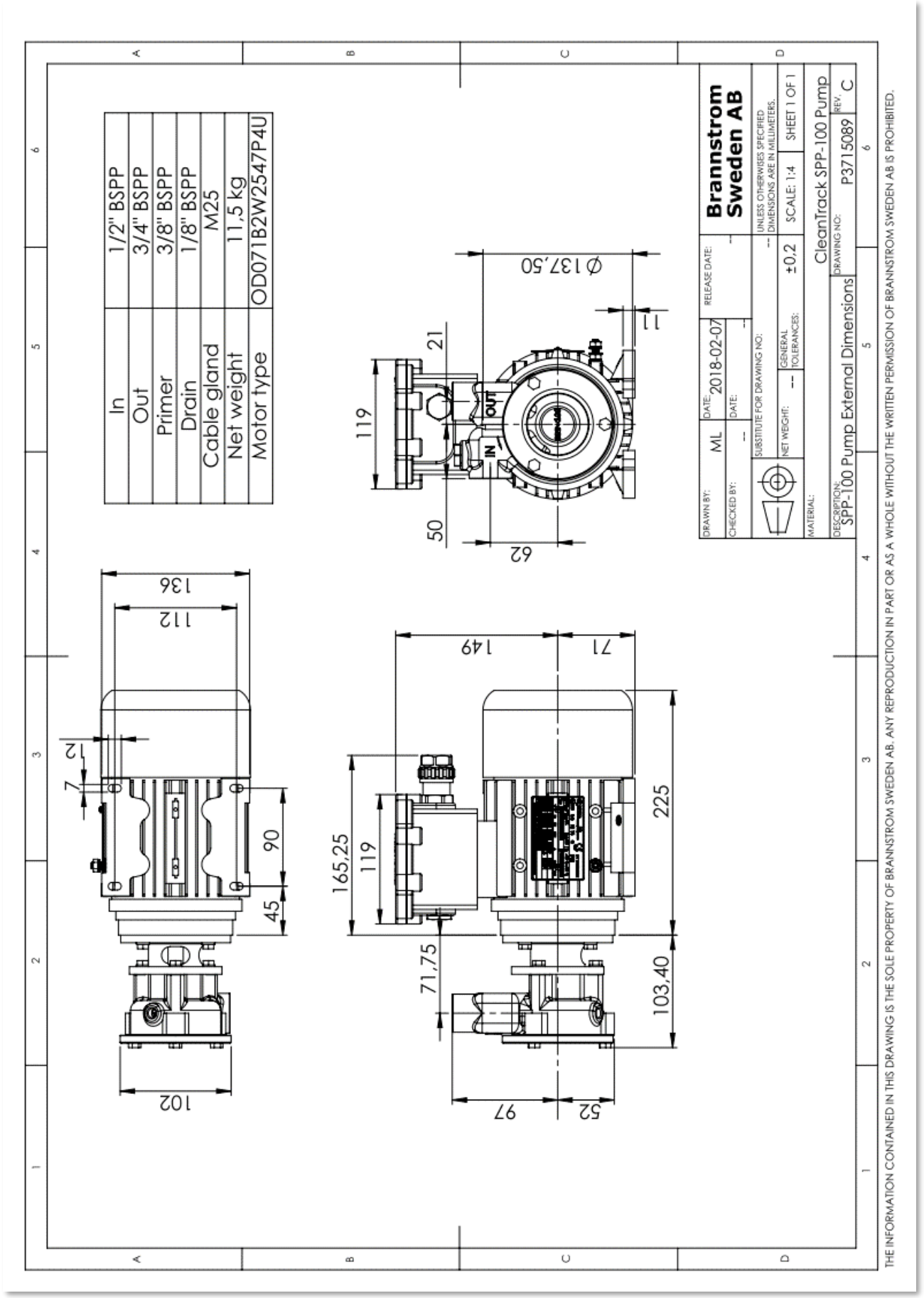
Drawing: CTB10010 sheet 4 of 5, Analyzing unit with air motor sample pump.



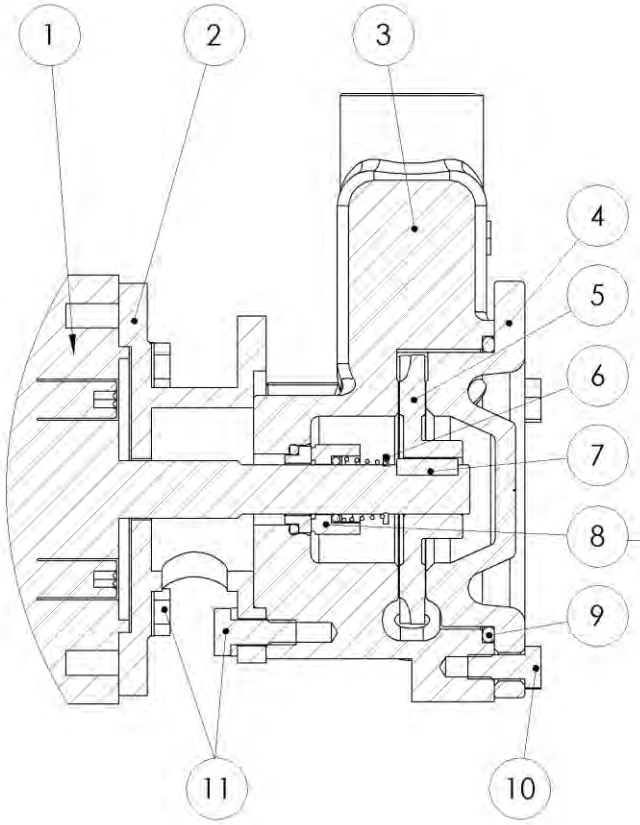
Drawing: CTB10010 sheet 5 of 5, Analyzing unit with air motor sample pump.



10.4. SPP-100 Sample pump with Ex. motor



ITEM NO.	Description	ArticleNo	Material	QTY.
1	B14 Flange motor	P3713056 rev. C	–	1
2	Adapter Flange B14 - Suzhong SPP-100	P3713057 rev. D	316L	1
3	Pump House SPP-100	P3714071 rev. A	316L	1
4	Pump Cover SPP-100	P3714071 rev. A	316L	1
5	Impeller SPP-100	P3714063*	JM 7 Bronze	1
6	External retaining ring	SGA 12	A2	1
7	Key SPP-100	P3714072 rev. A	AISI 329 / EN 1.4460	1
8	Mechanical Seal	TS M2Nx12	O-ring: viton	1
9	O-ring 67x3,55	OR67x3,55	PTFE	1
10	M6x14 Hex	M6S M6x14 A4	A4	3
11	M6x16 Hex	M6S M6x16 A4	A4	7



* revision may vary

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CHECKED BY: BB	DATE: 2017-08-30			
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MATERIAL: –				
DESCRIPTION: Suzhong SPP-100 Section View		DRAWING NO: P3714073		REV. C

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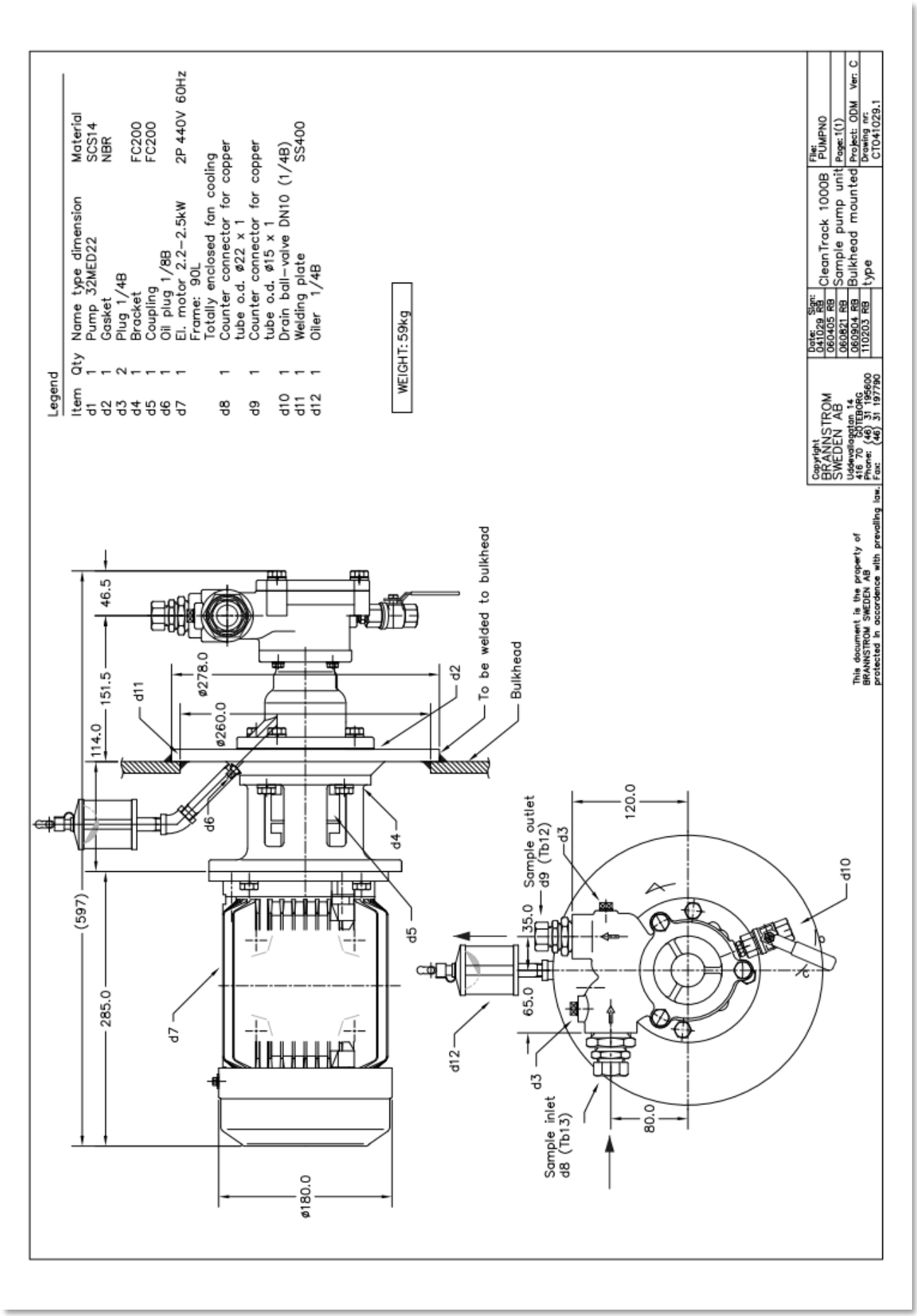
10.5. Nikuni Sample pump for Bulkhead mounting

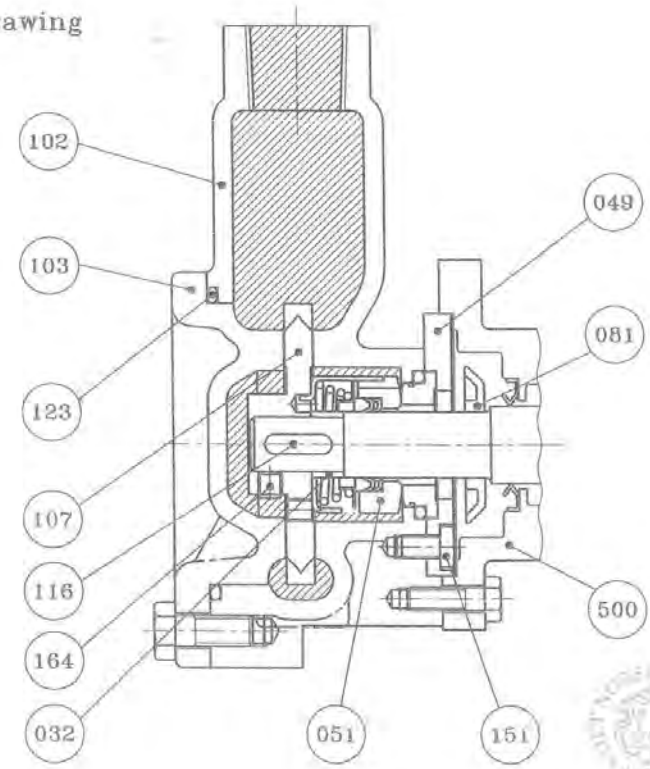
Drawing: CT041029.1, Nikuni Bulkhead Sample pump.



NIKUNI

MODEL:NPD

Sectional Drawing



Size of O-rings and Mechanical seals

SIZE	O-Rings	Mechanical Seals
15A	ø3.5-ø56id	ø15
20A	ø3.5-ø67id	ø15
25A	ø3.5-ø73id	ø17
32A	ø3.5-ø84id	ø17
40A	ø3.5-ø90id	ø20

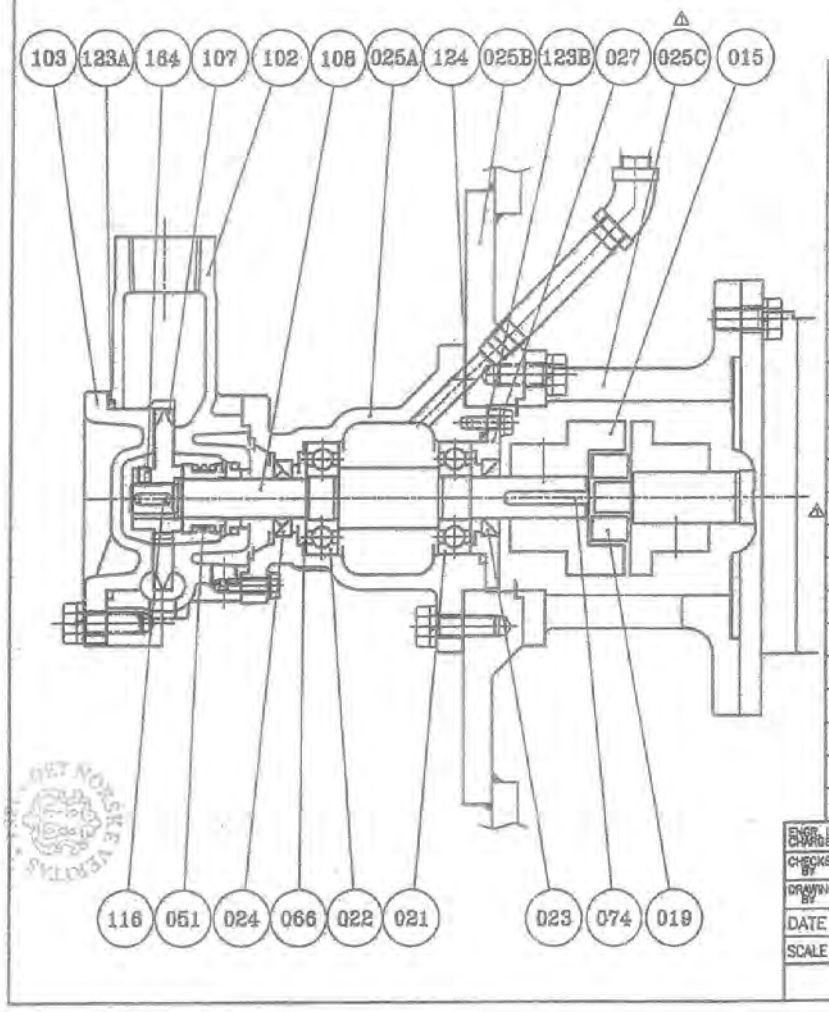
Materials(The numbers in the list refer to the sectional drawing)

No.	NAME OF PARTS	SET	MATERIALS	No.	NAME OF PARTS	SET	MATERIALS
032	Collar	1	SUS304	107	Impeller	1	SUS304
049	Mechanical Gland	1	SUS304	116	Key	1	SUS304
051	Mechanical Seal	1	SiC - SiC	123	O-Ring	1	PTFE
081	Slinger	1	NBR	151	Bolts	3	SUS304
102	Casing	1	SCS13	164	Set Screws	2	SUS304
103	Cover	1	SCS13	500	Motor	1	

-Remarks-

For special applications.Mechanical seal and sliding parts can be changed to SiC - CARBON and o-ring can be changed to PTEF.(NPD-J)

NIKUNI CO.,LTD.



NO.	DESCRIPTION	DATE	DRAWN BY
△x2	025C added	'06.3.7	A.Ito
△x			
△x			

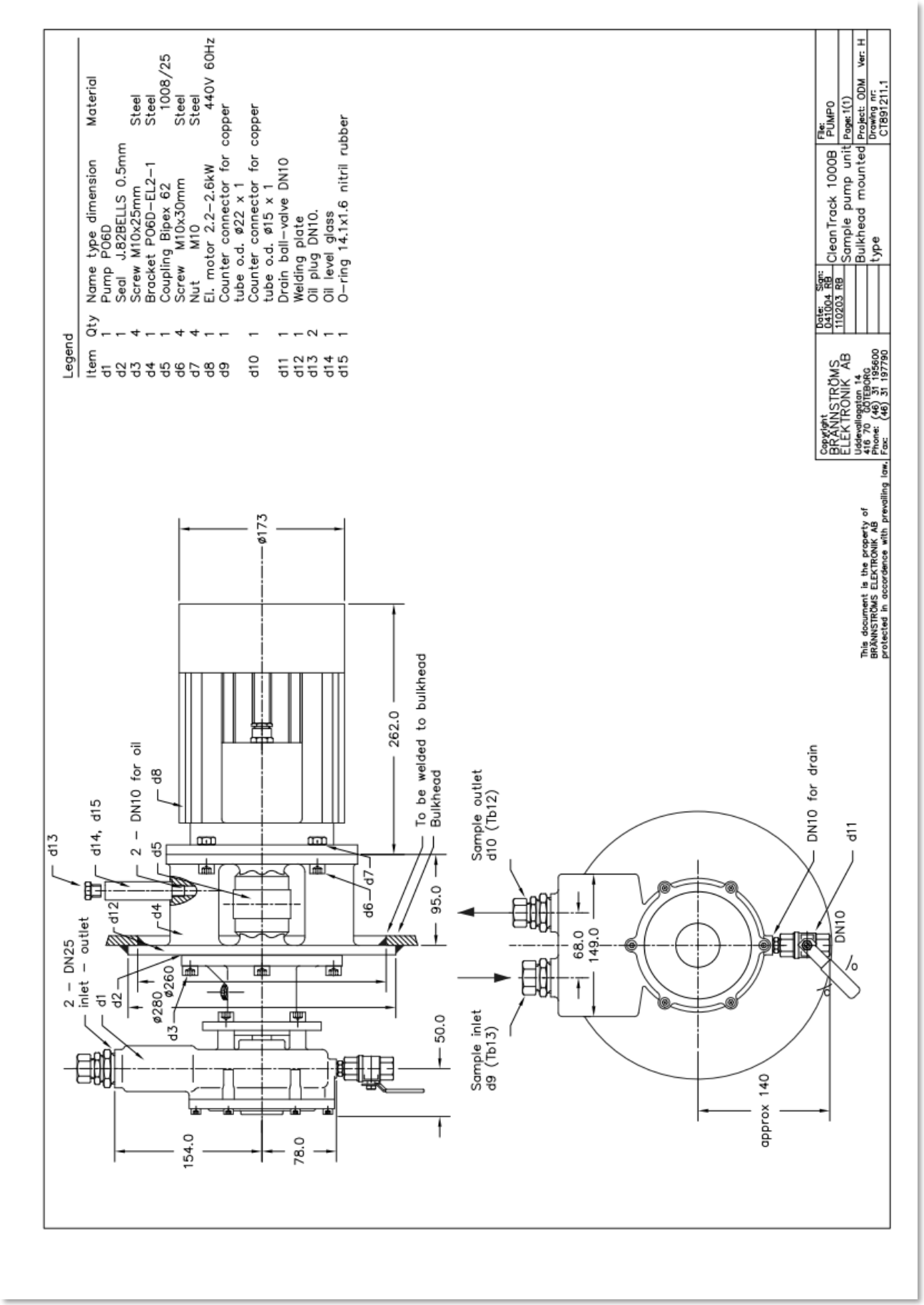
164	Set Screws	2	SUS316	
124	Gasket	1	NBR	
123B	O-ring	1	NBR	AN6230 #5
123A	O-ring	1	FKM	AN6230 #14
116	Key	1	SUS316	
108	Shaft	1	SUS316	
107	Impeller	1	SUS316	
103	Cover	1	SCS14	
102	Casing	1	SCS14	
074	Key	1	S45C	
066	Wave Washers	1	SK	
051	Mechanical Seal	1	SIC VS CARBON / FKM	φ16
027	Bearing Gland	1	FCD400	
025C	Bracket	1	FC200	
025B	Bracket	1	SS400	
025A	Bracket	1	FCD400	
024	Oil Seal	1	NBR	
023	Oil Seal	1	NBR	
022	Ball Bearing	1		6304
021	Ball Bearing	1		6304
019	Coupling Rubber	1	NBR	
015	Coupling	1	FC200	
NO.	NAME OF PARTS	SET	MATERIAL	REMARKS

DET NORSKE VERITAS * 1864 * Tetter 2016-04-21

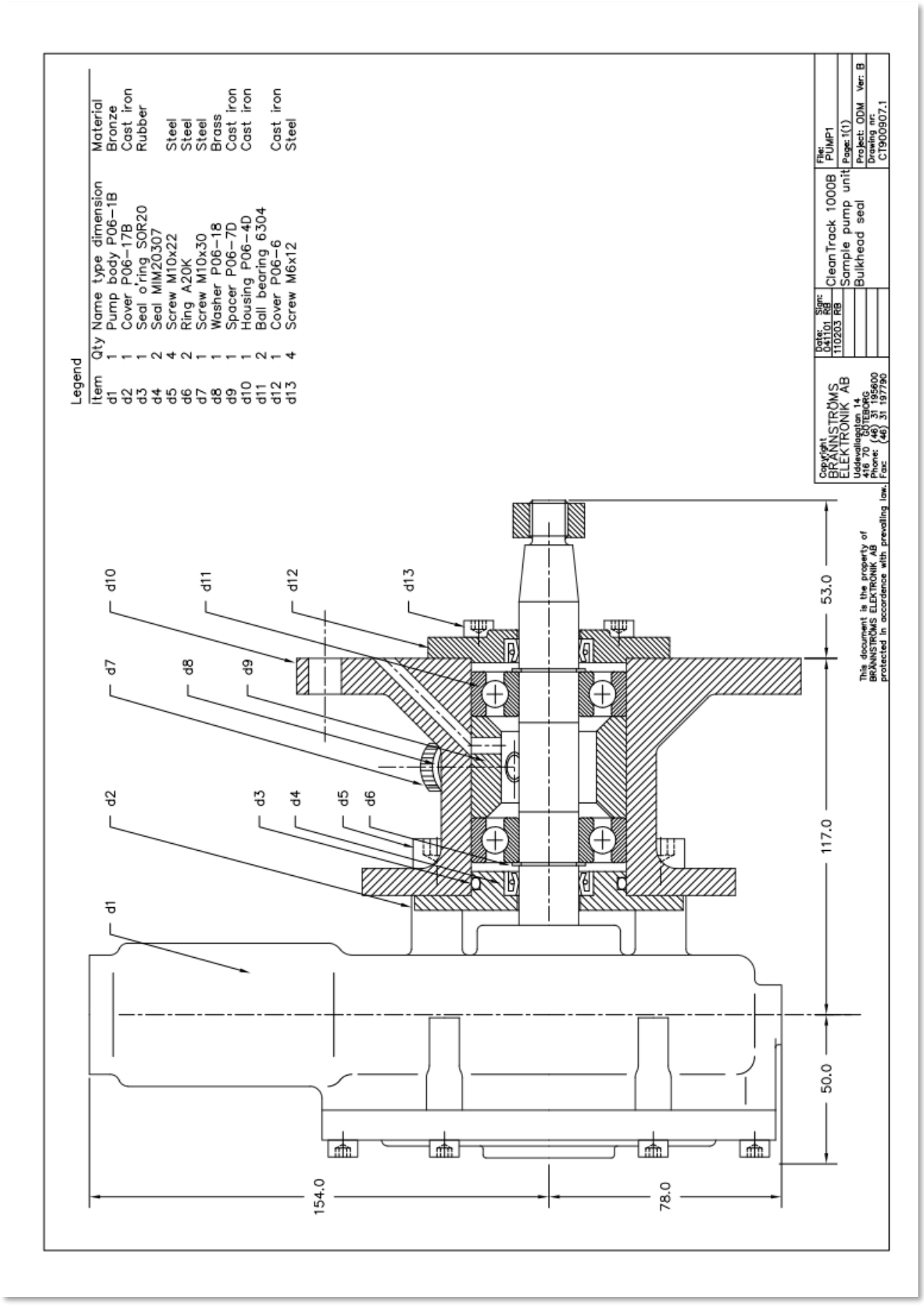
ENGR. IN CHARGE	K.Nagasawa	SECTIONAL VIEW	PAGE 1
CHECKED BY			LAST PAGES 1
DRAWING BY	A.Ito	TYPE 32MED22	
DATE	2004.10.19	DRAWING NO. CS-32MED001	△1
SCALE	free	NIKUNI CO., LTD.	

10.6. Matre Sample pump for Bulkhead mounting

Drawing: CT891211.1, Matre Bulkhead Sample pump.

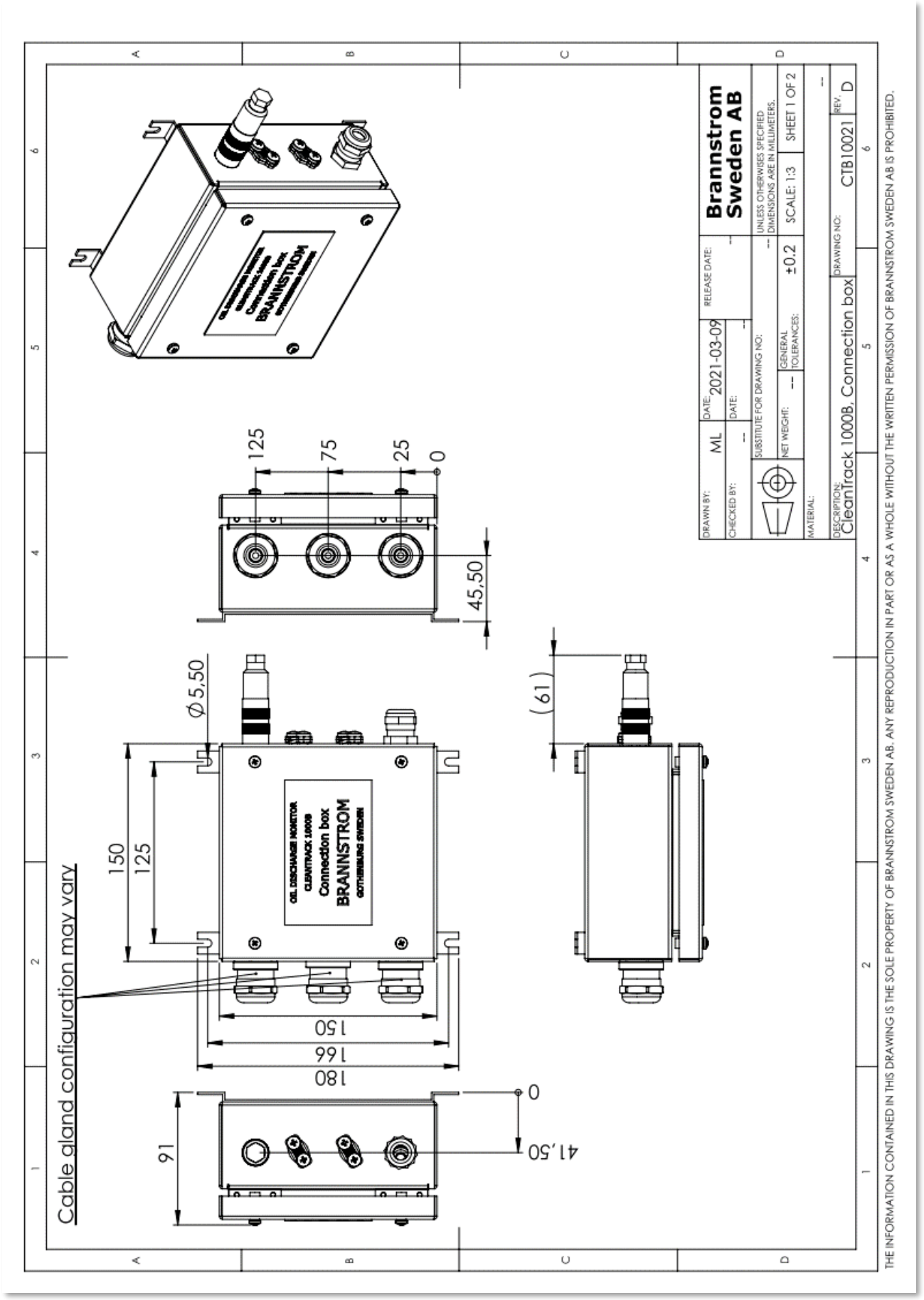


Drawing: CT900907.1, Matre Bulkhead Sample pump.

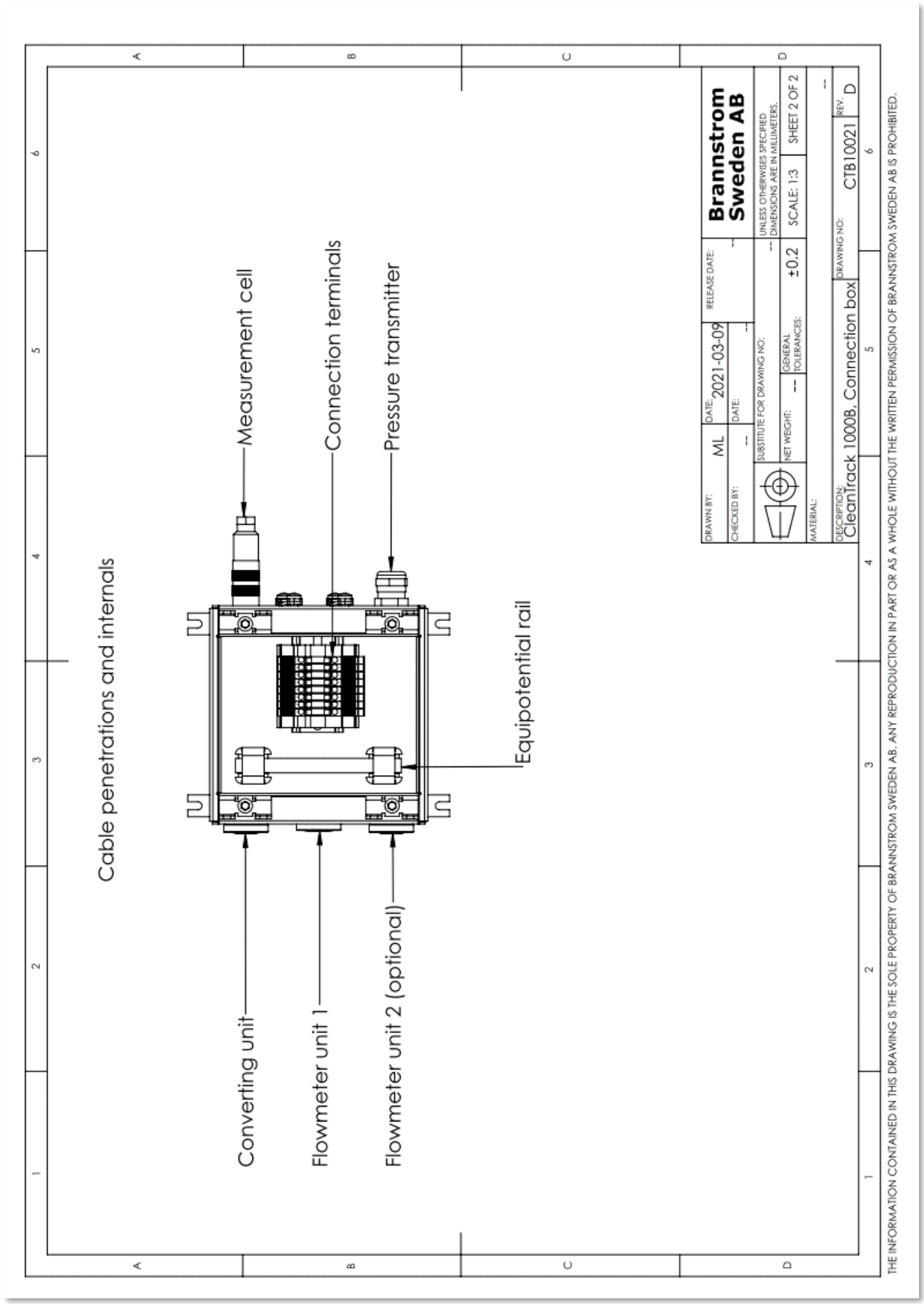


10.7. Connection box

Drawing: CTB10021 sheet 1 of 2, Connection box.



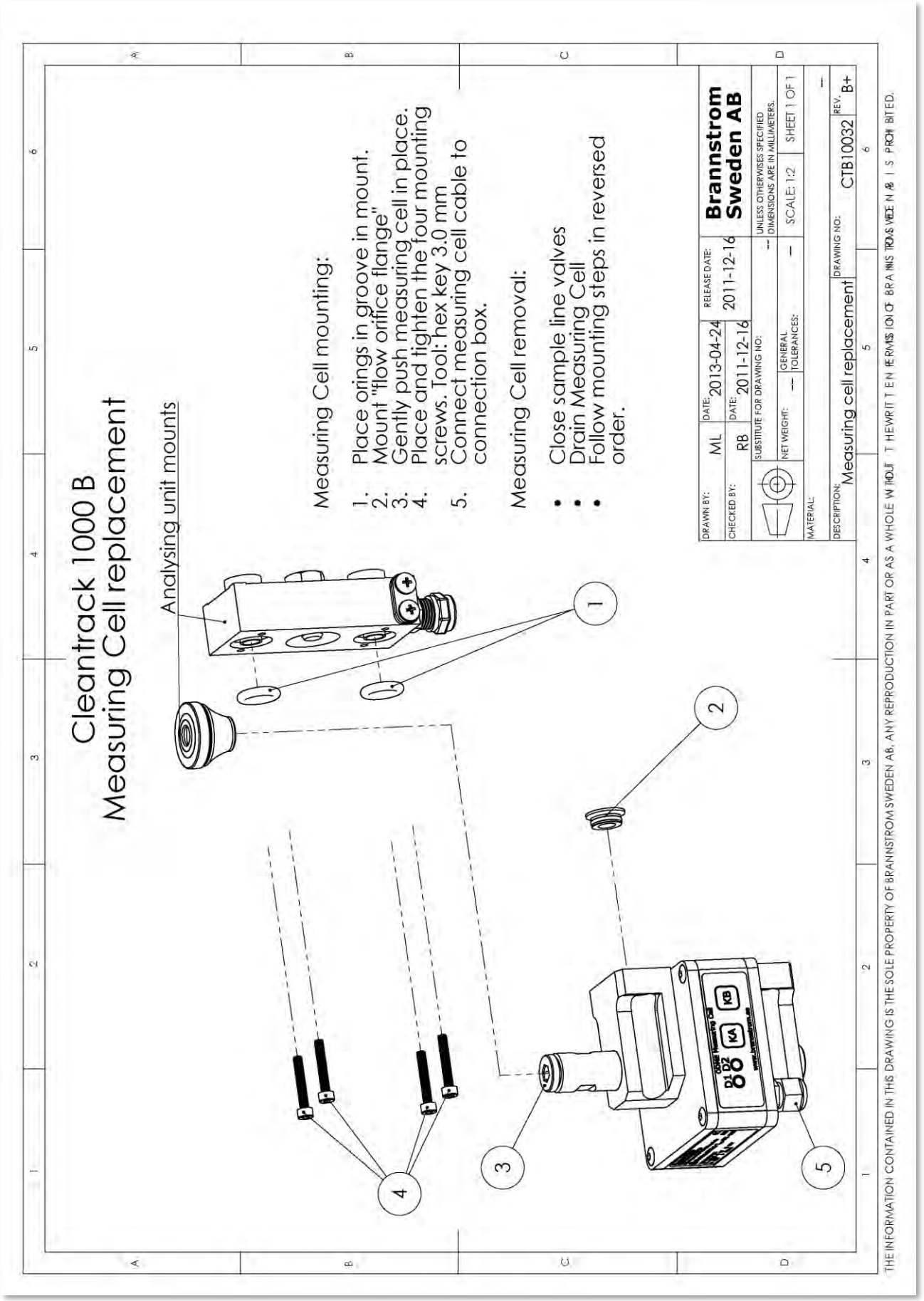
Drawing: CTB10021 sheet 2 of 2, Connection box



10.8. Measuring Cell replacement

Drawing: CTB10032 sheet 1 of 1, Measuring Cell replacement.

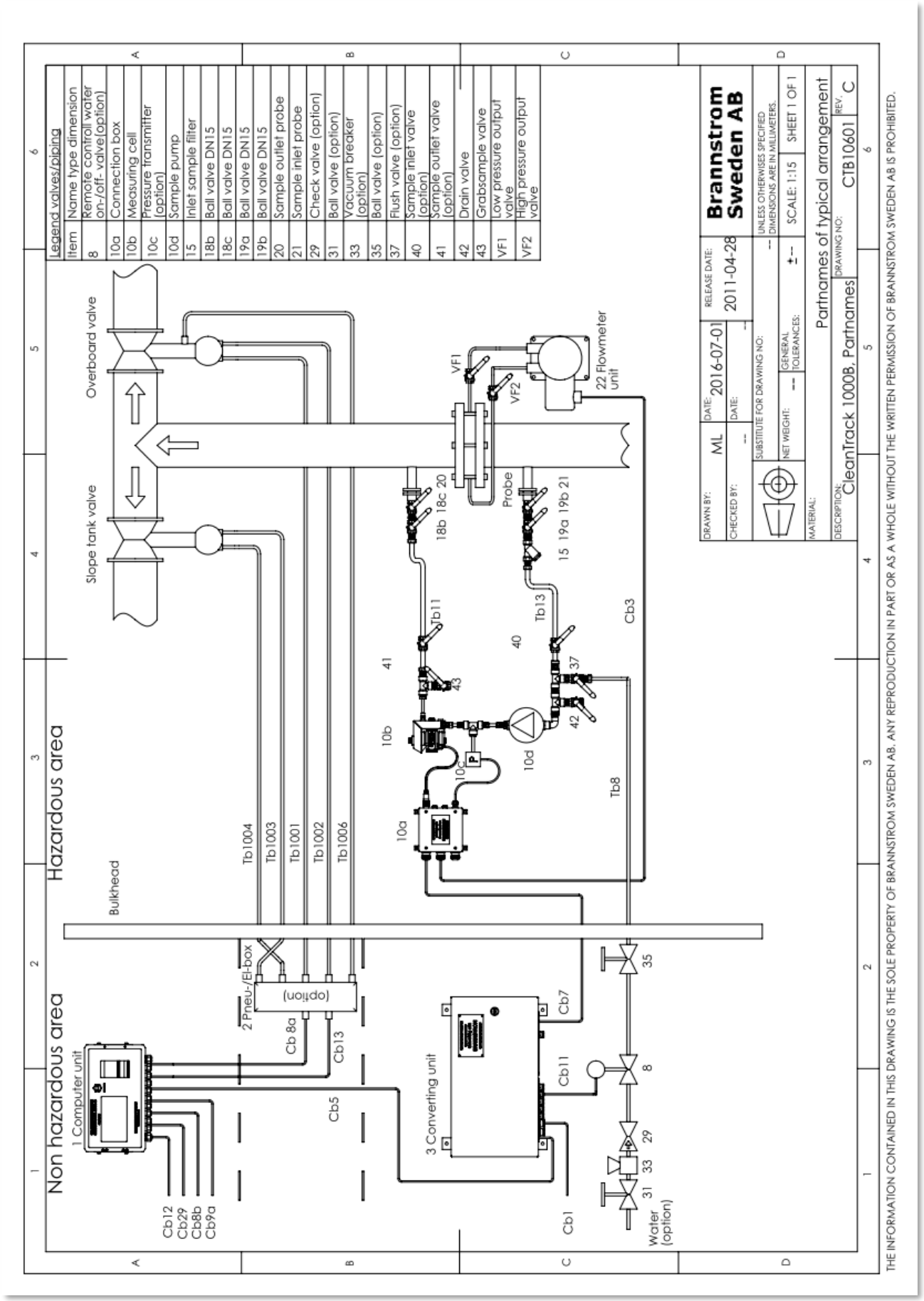
For replacement instructions, see chapter **4.10. Measuring Cell Instructions and Replacement** page **31.**



10.9. GA-plans

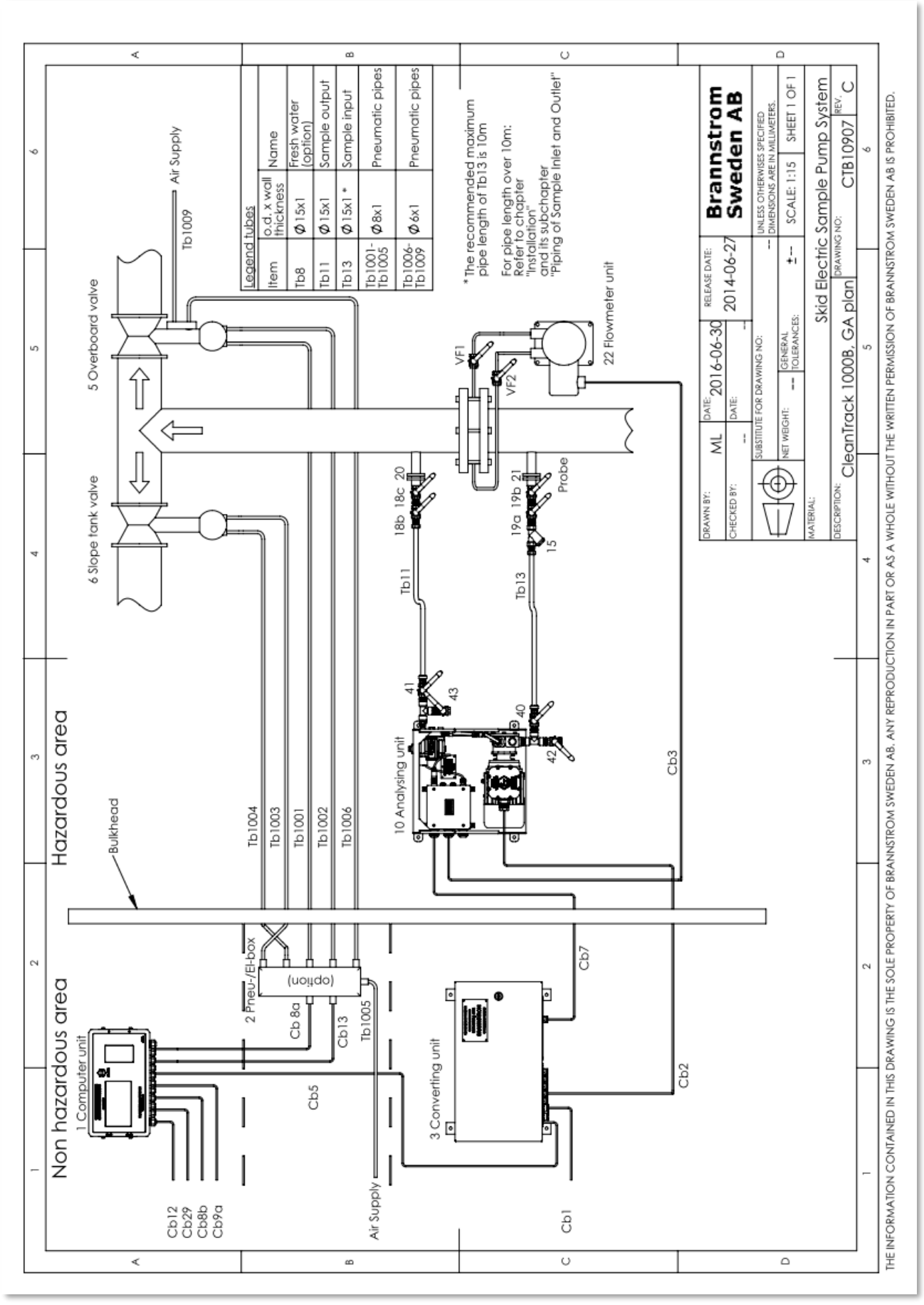
10.9.1. Partnames of typical arrangement

Drawing: CTB10601 sheet 1 of 1, Partnames of typical arrangement.

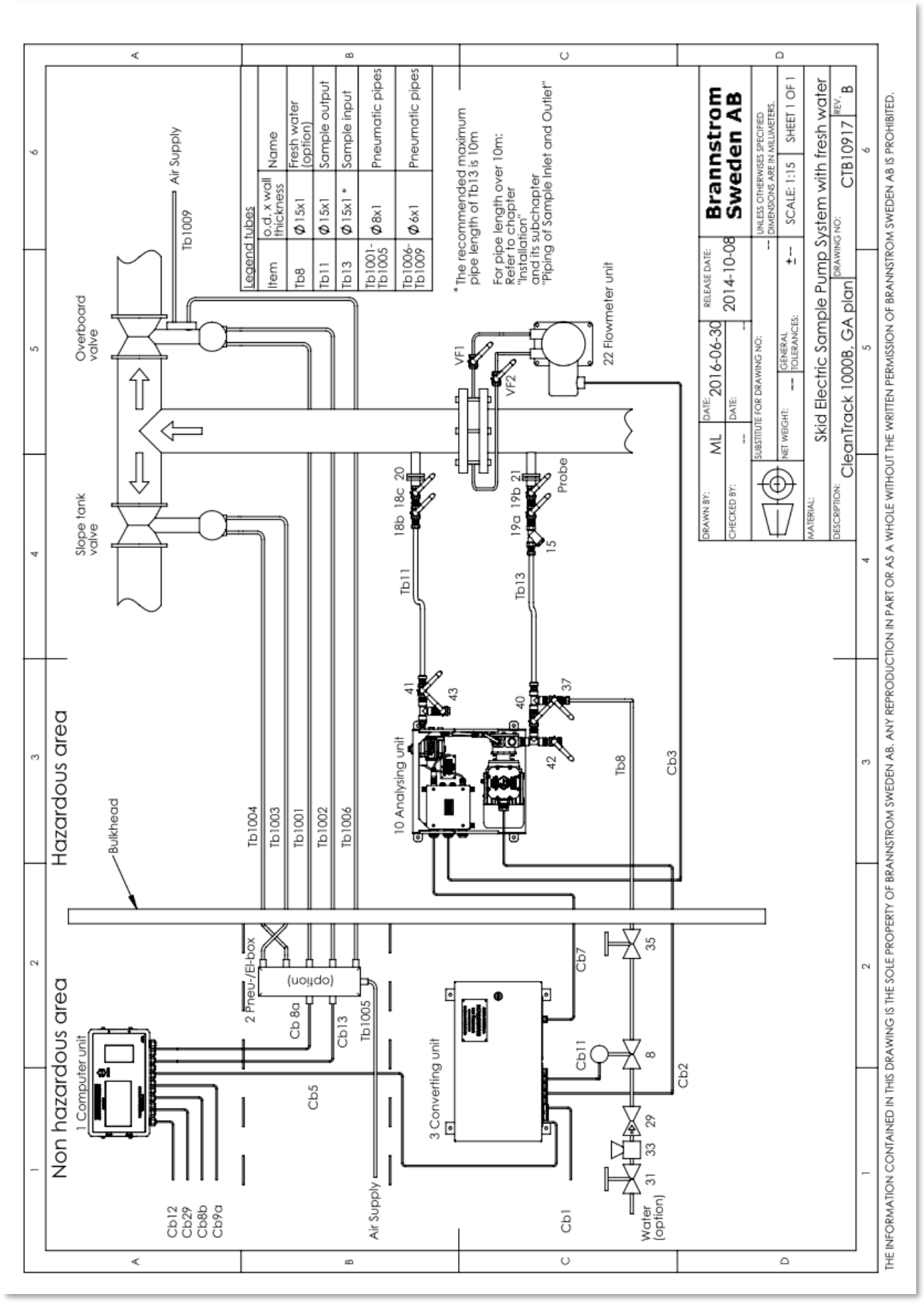


10.9.2. GA-plan with Ex. motor Sample pump

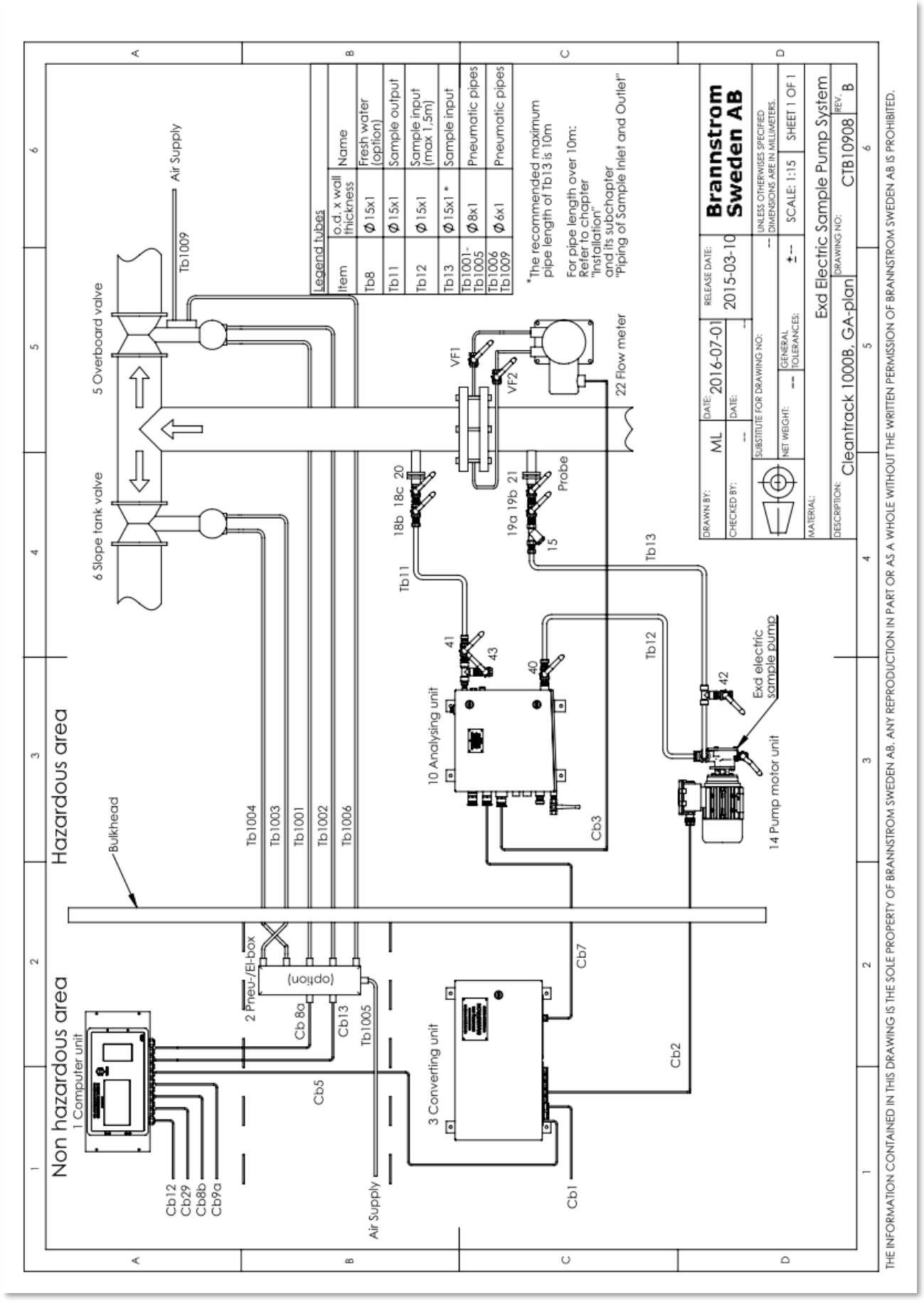
Drawing: CTB10907 sheet 1 of 1, GA-plan with skid Ex. motor sample pump.



Drawing: CTB10917 sheet 1 of 1, GA-plan with skid Ex. motor sample pump and flushing.

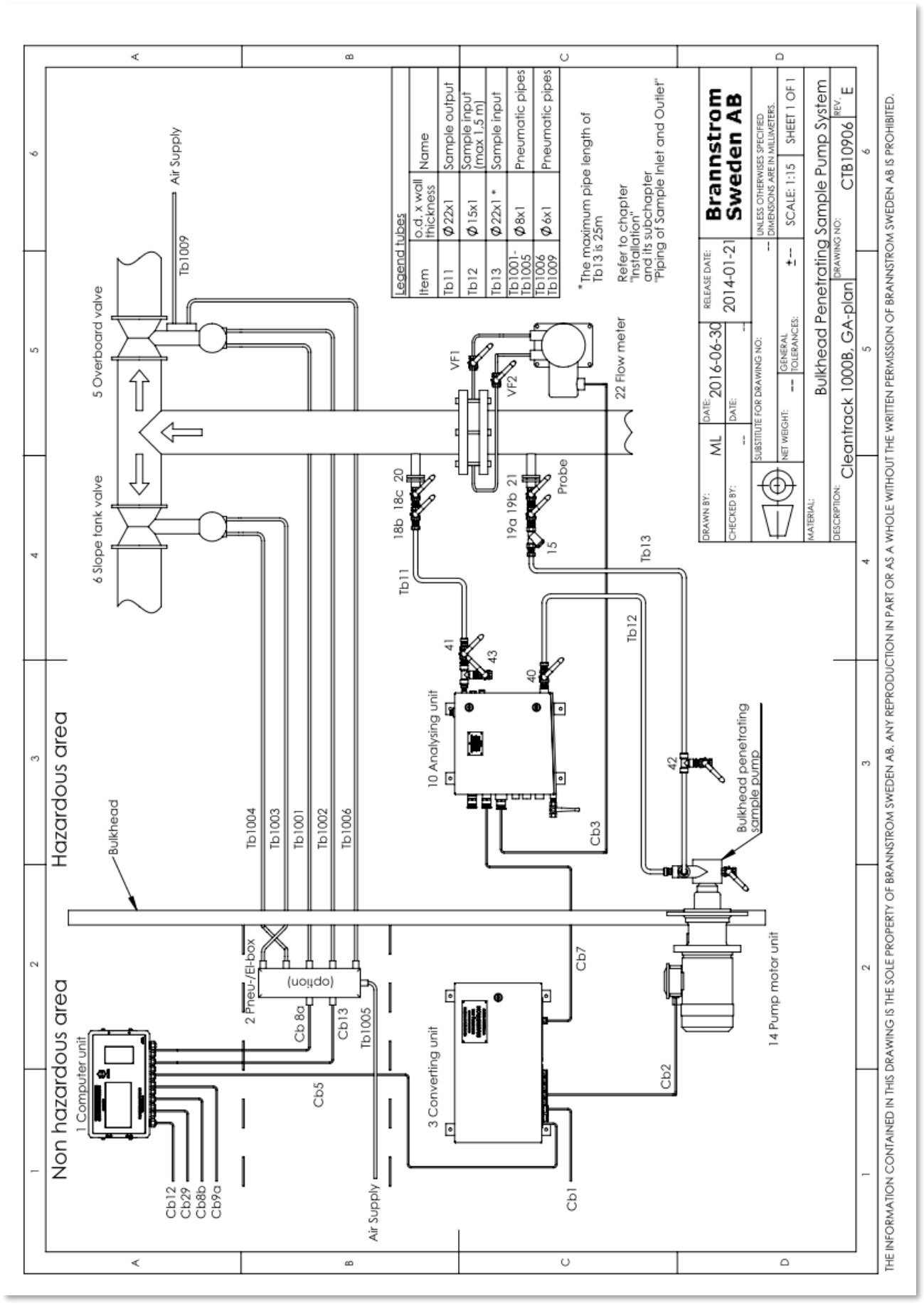


Drawing: CTB10908 sheet 1of 1, GA plan with free standing Ex. Motor sample pump.

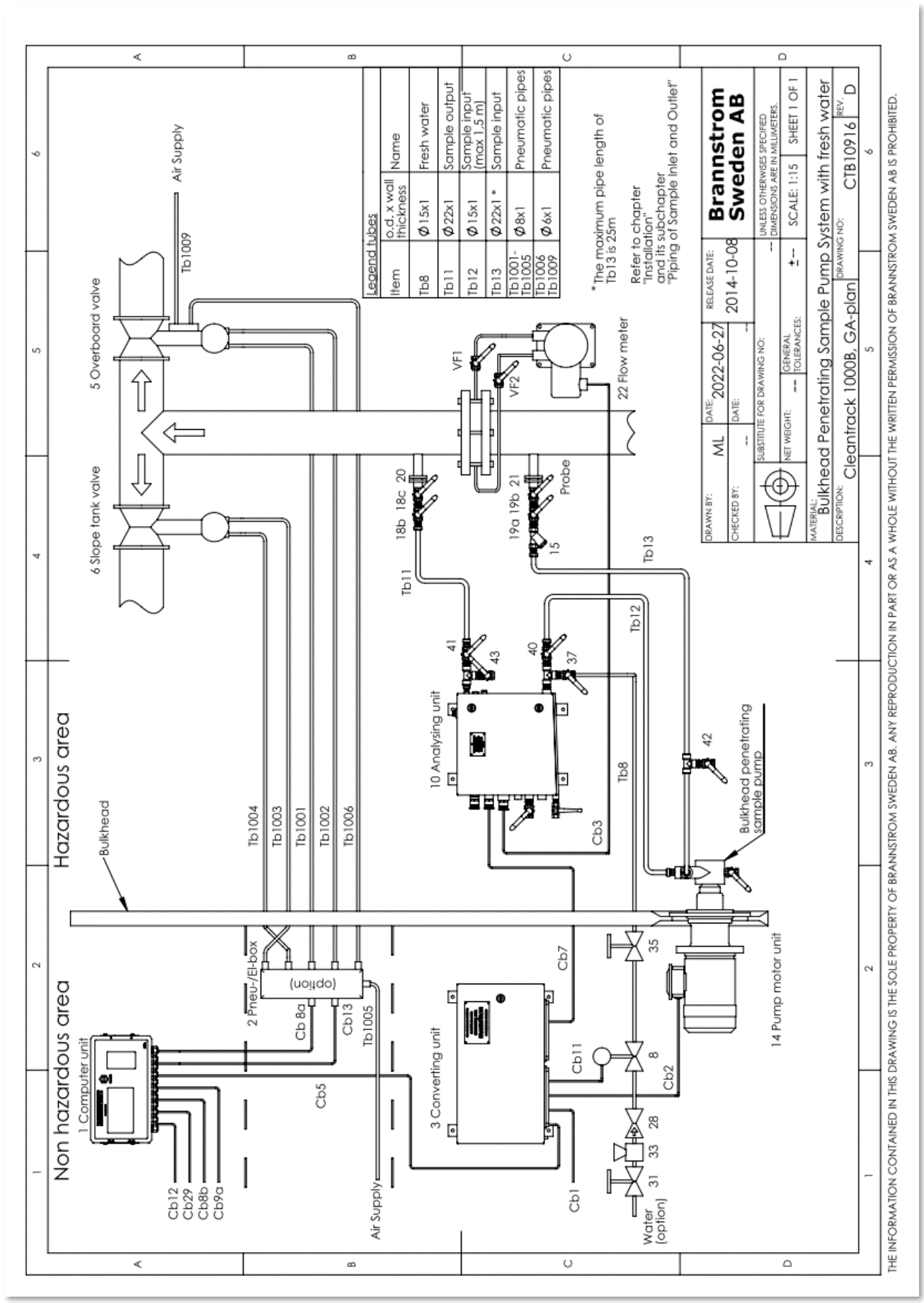


10.9.3. GA-plan with bulkhead penetrating Sample pump

Drawing: CTB10906 sheet 1 of 1, GA-plan with bulkhead penetrating Sample pump.

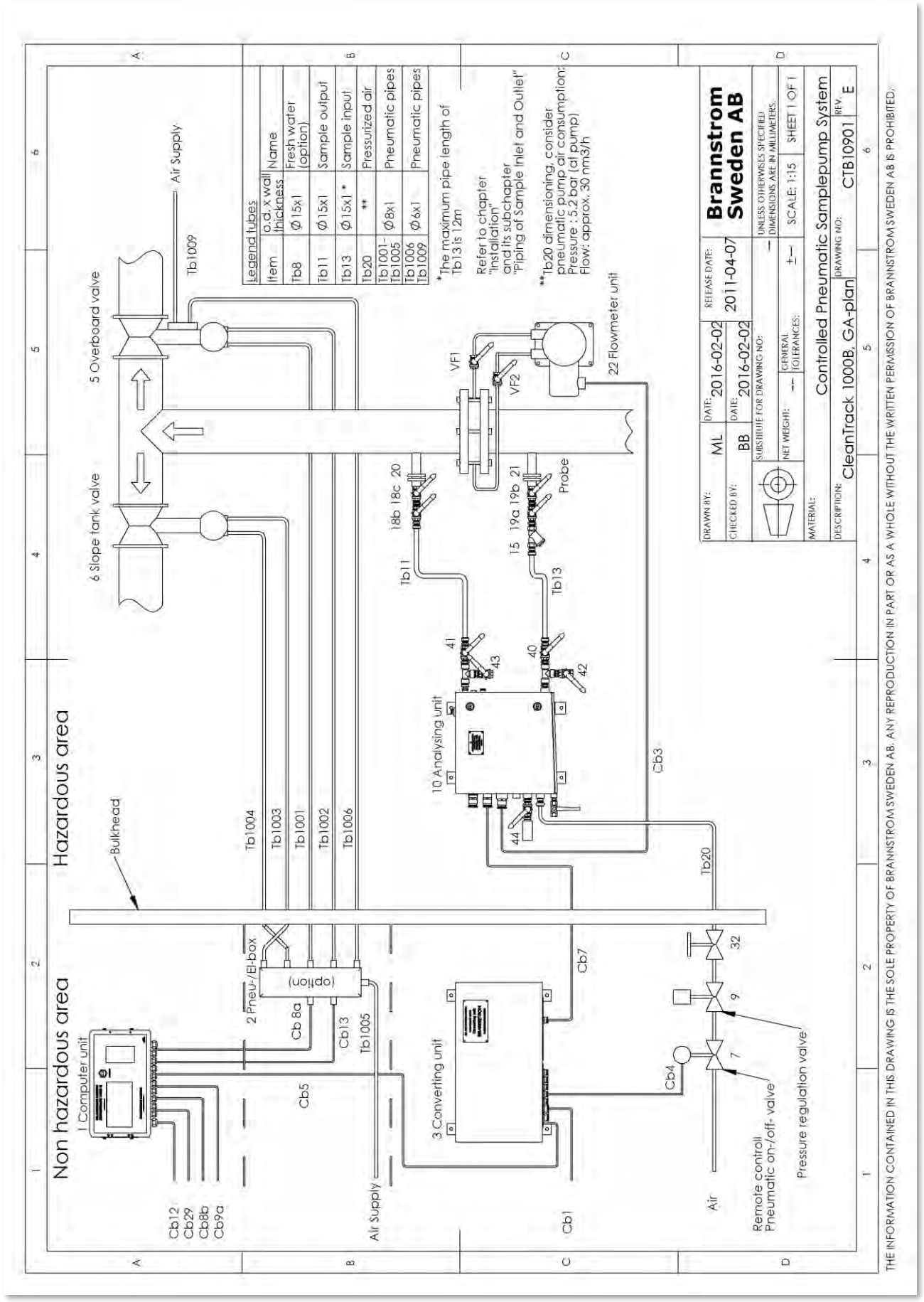


Drawing: CTB10916 sheet 1 of 1, GA-plan with bulkhead penetrating Sample pump and flushing.

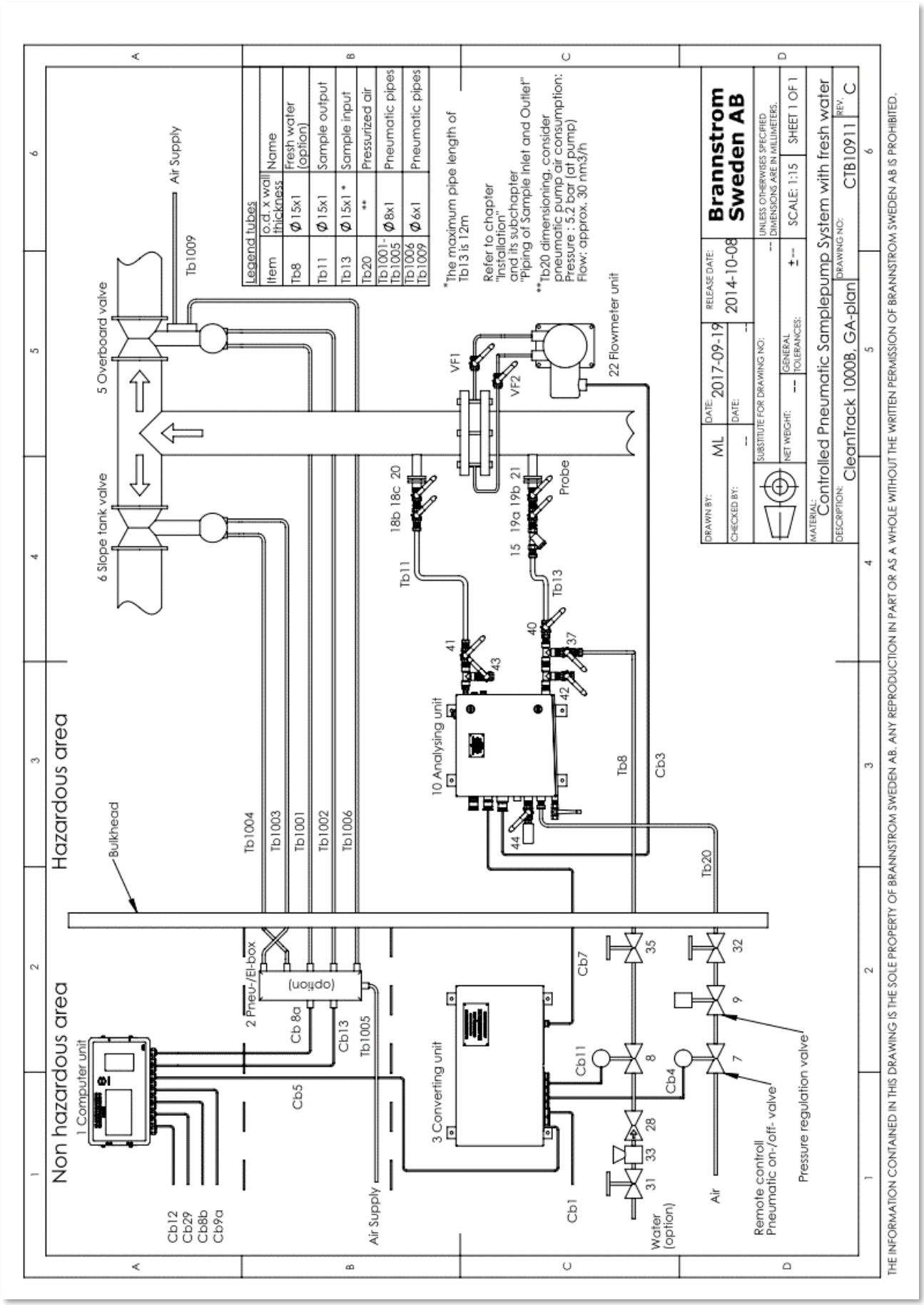


10.9.4. GA-plan with Air motor Sample pump

Drawing: CTB10901 sheet 1 of 1, GA-plan with air motor sample pump.

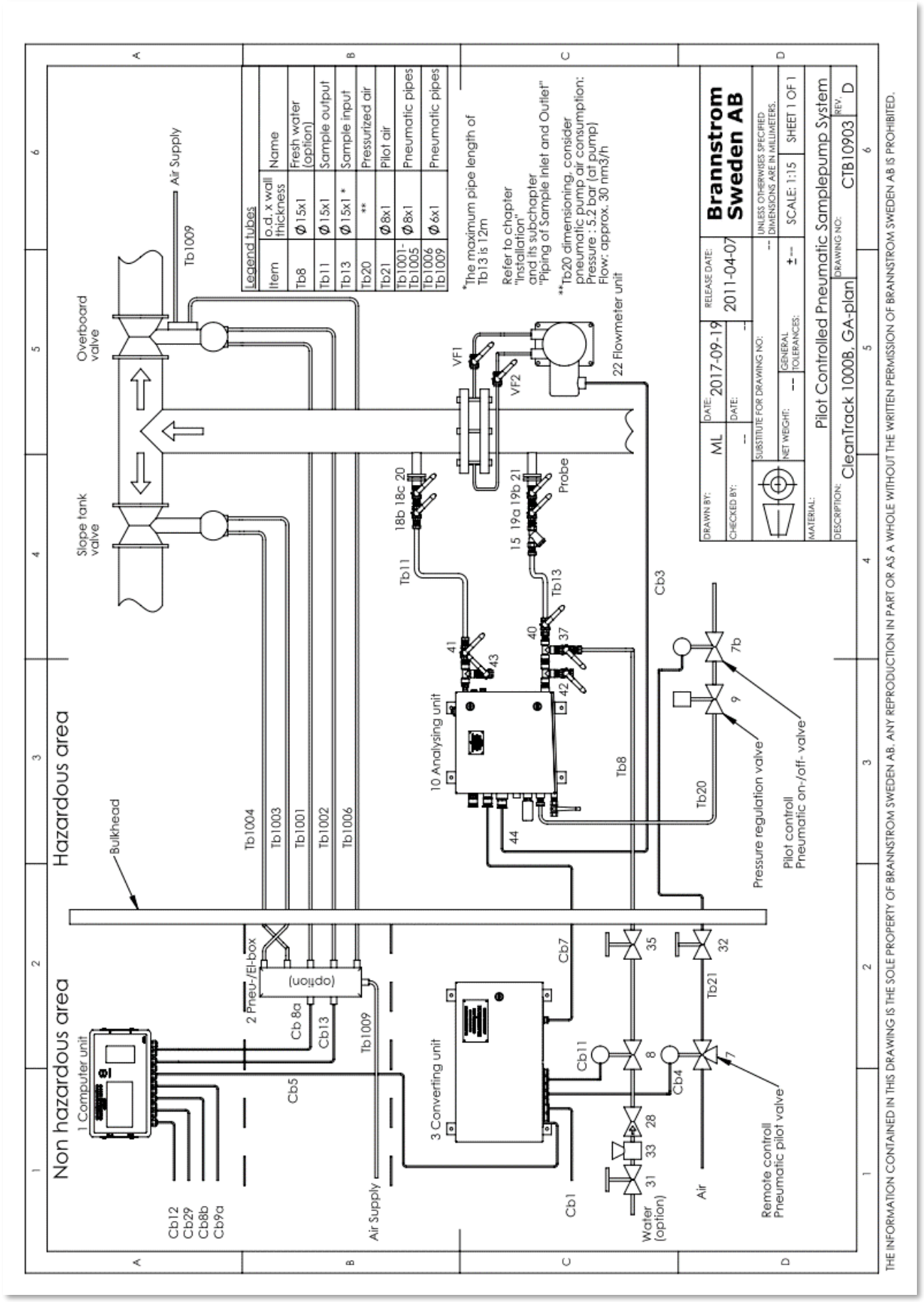


Drawing: CTB10911 sheet 1 of 1, GA-plan with air motor Sample pump and flushing.



10.9.5. GA-plan with pilot-controlled Air motor Sample pump

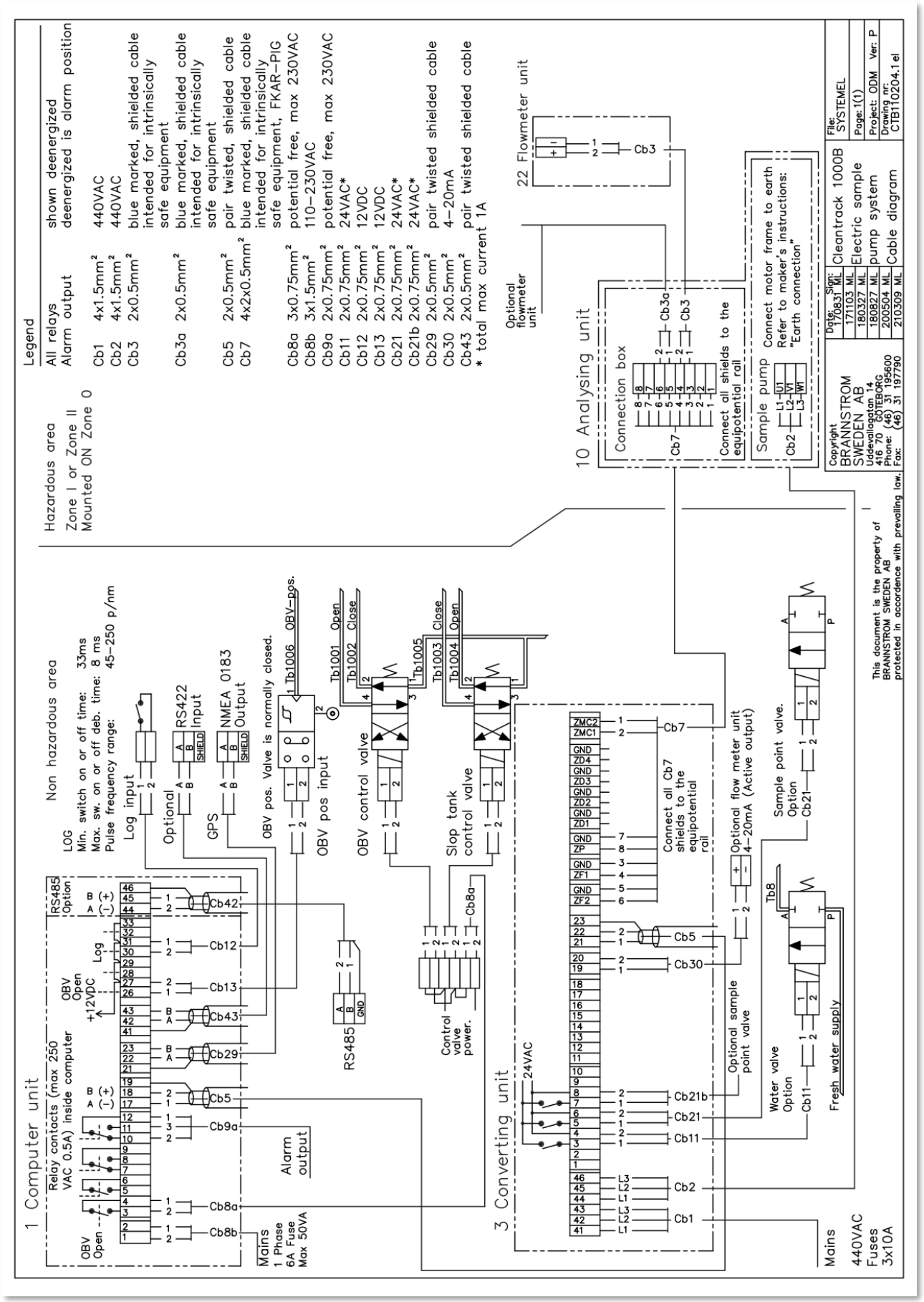
Drawing: CTB10903 sheet 1 of 1, GA-plan with pilot-controlled air motor sample pump.



10.10. Electrical

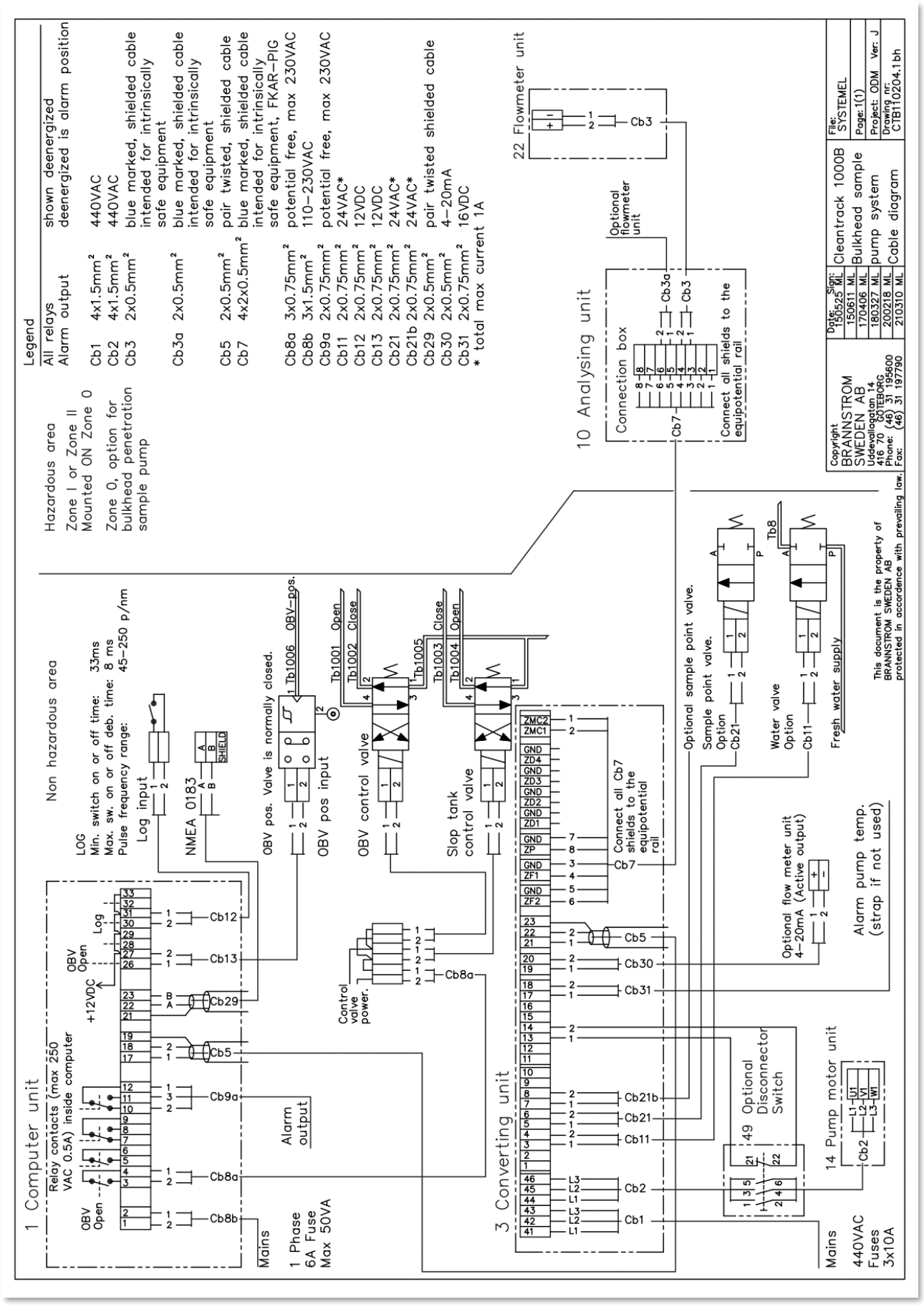
10.10.1. Electrical cable diagram for electrical Ex. motor sample pump

Drawing: CTB110204.1el, electrical cable diagram for electrical Ex. motor sample pump.



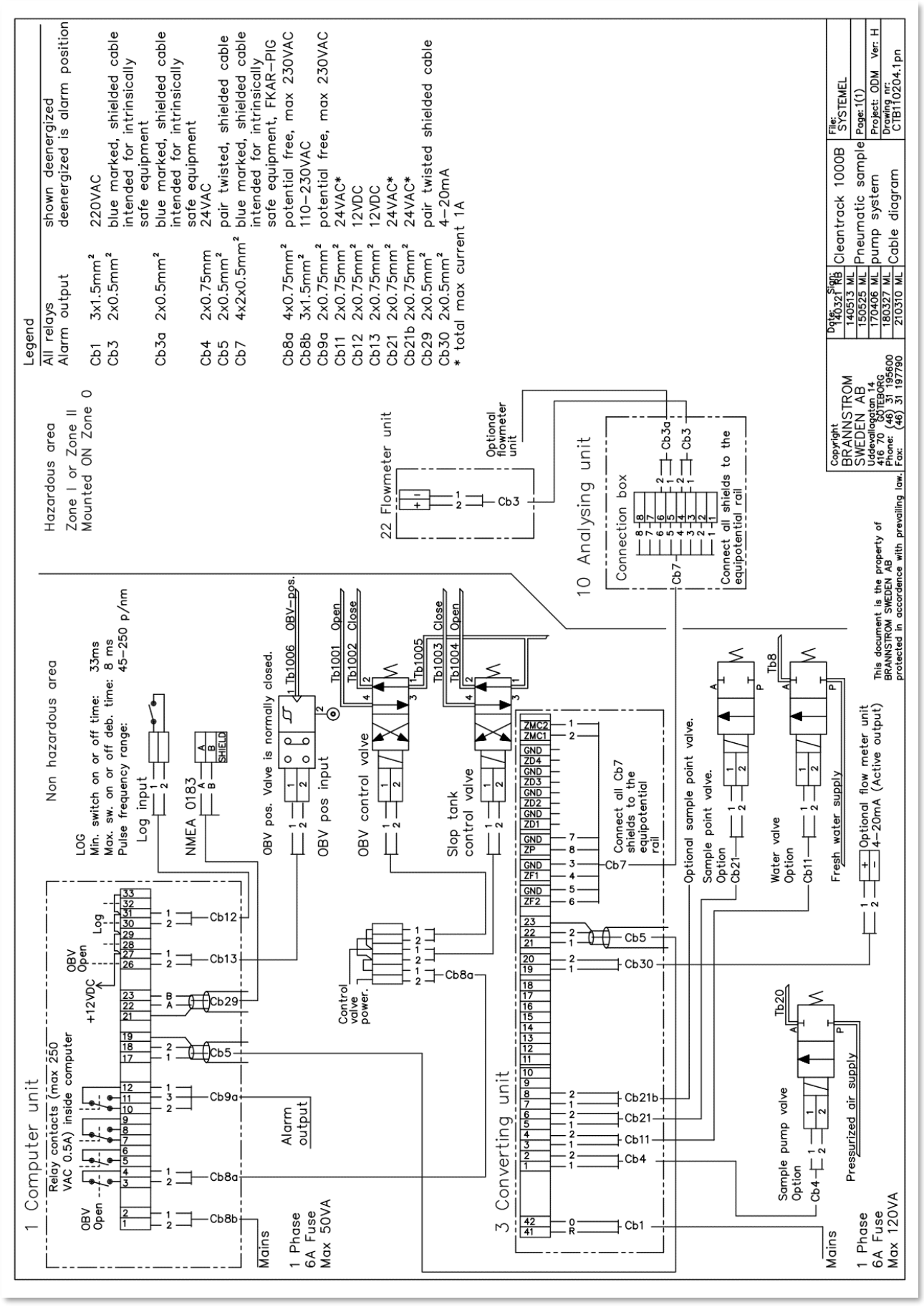
10.10.2. Electrical cable diagram for bulkhead mounted sample pump

Drawing: CTB110204.1bh, electrical cable diagram for bulkhead mounted sample pump.



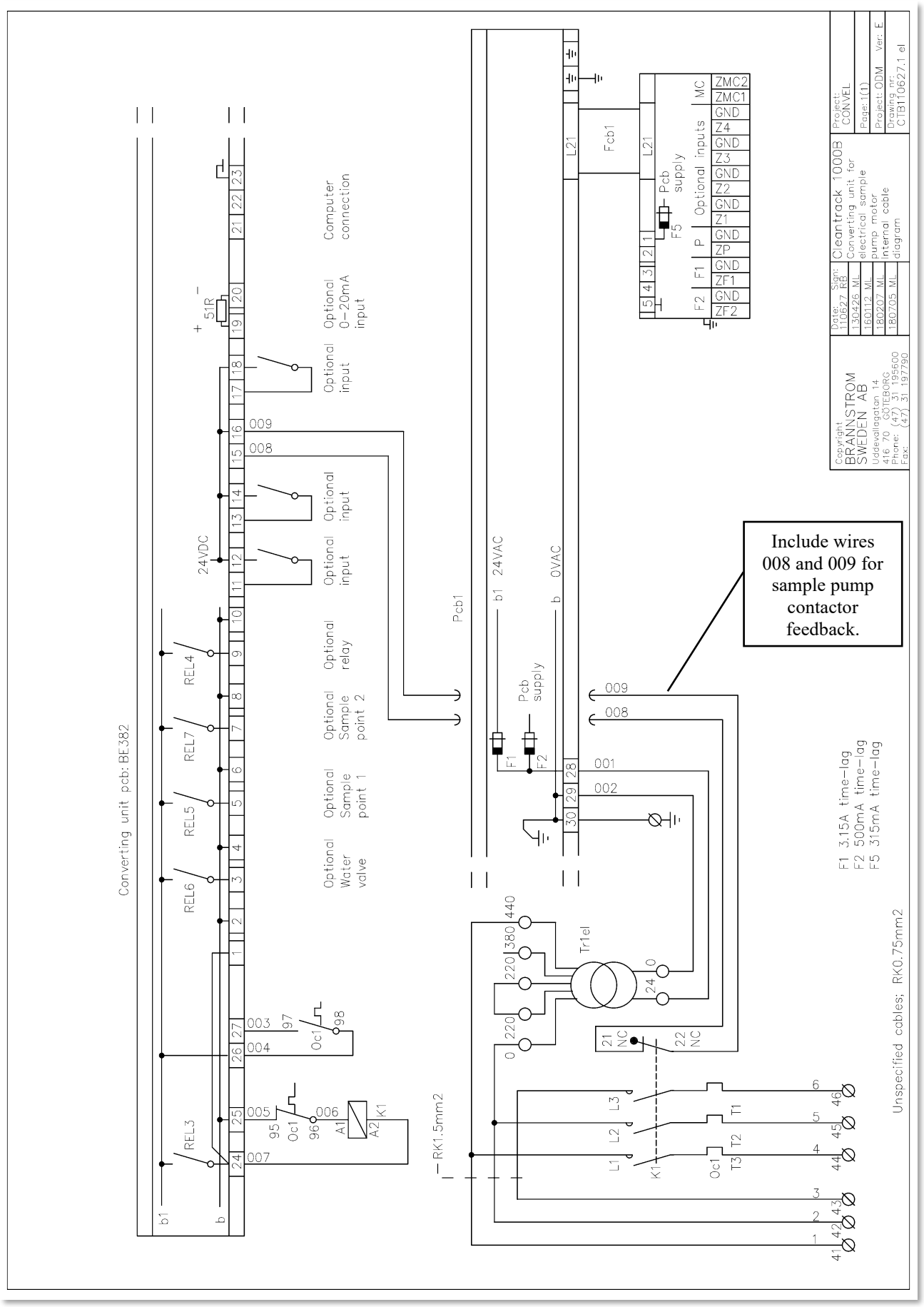
10.10.3. Electrical cable diagram for air motor sample pump

Drawing: CTB110204.1pn, electrical cable diagram for air motor sample pump.



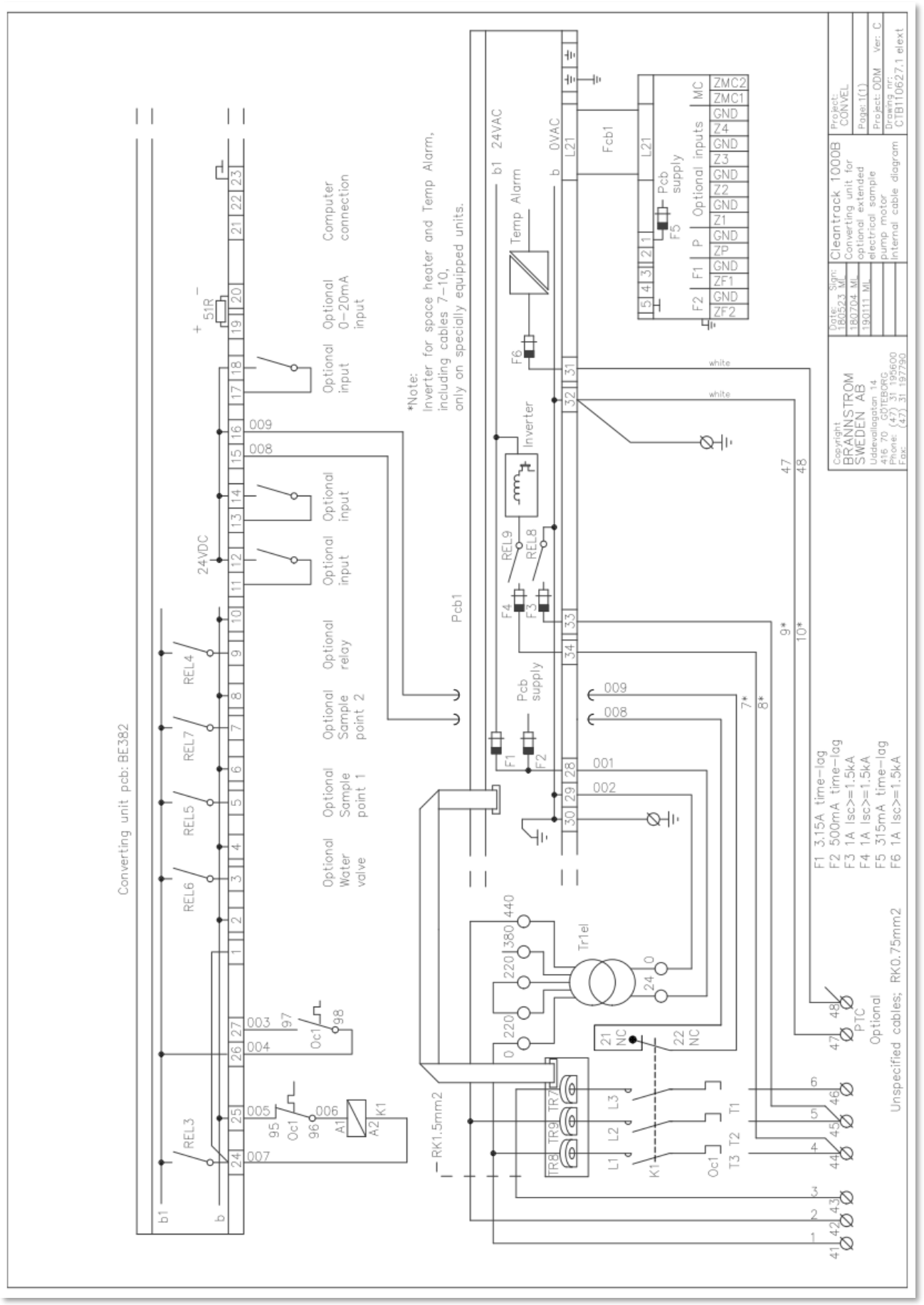
10.10.4. Internal cable diagram for electrical sample pump motor

Drawing: CTB110627.1el, internal cable diagram for electrical sample pump motor.



10.10.5. Internal cable diagram for Extended SPP-100 sample pump motor (Optional)

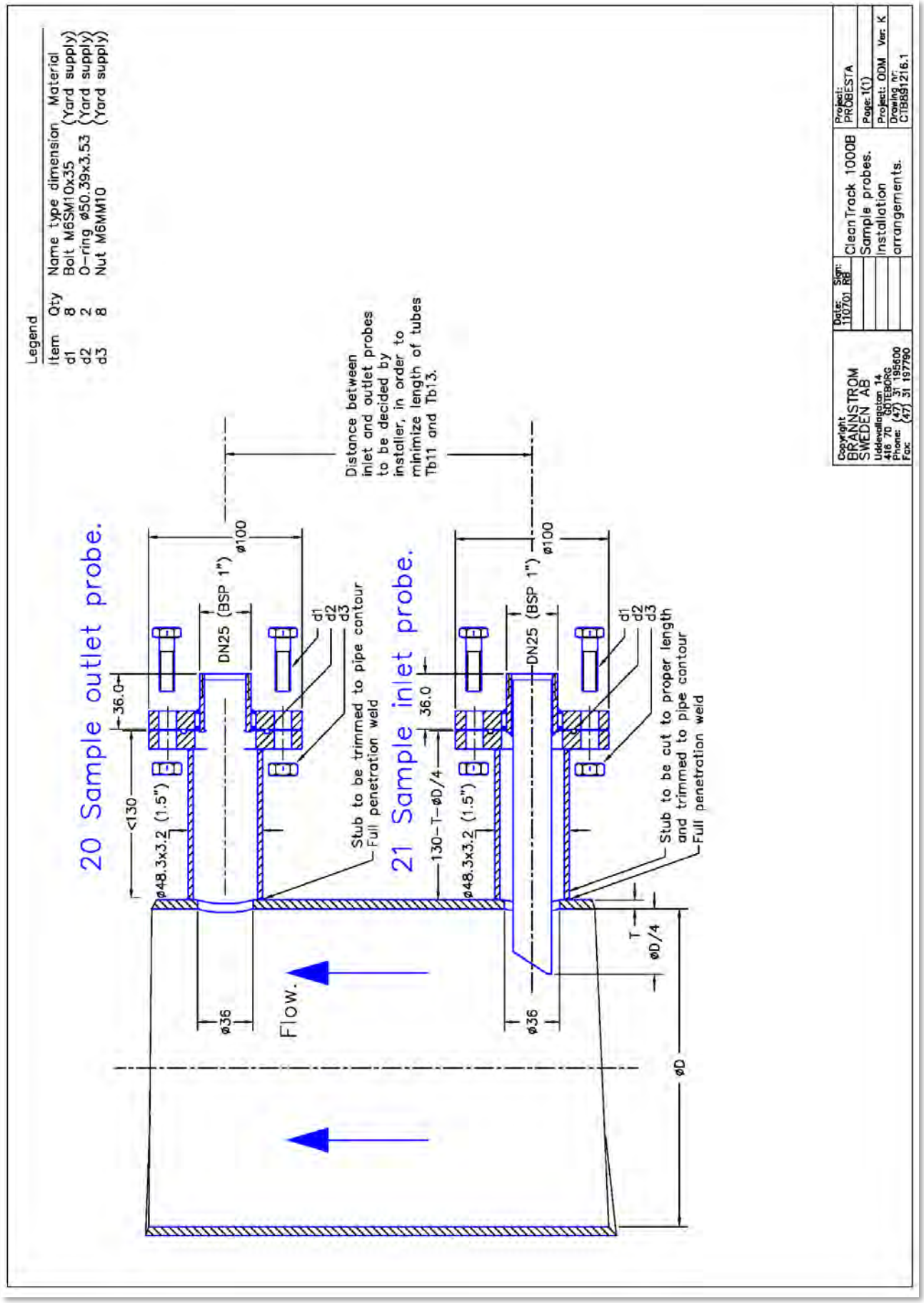
Drawing: CTB110627.1elext, internal cable diagram for optional extended SPP-100 sample pump motor



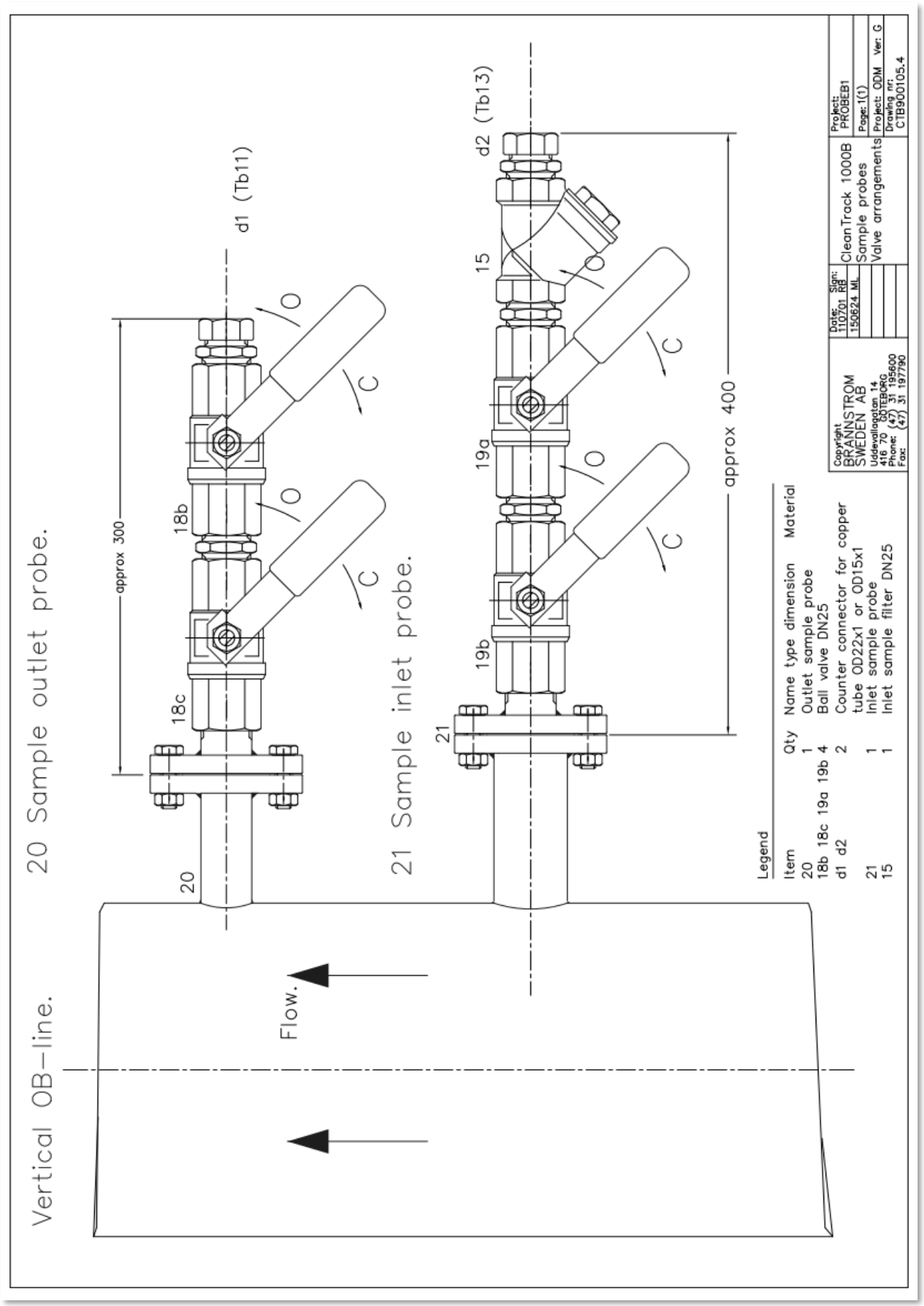
10.11. Sample probes

10.11.1. Sample probes installation arrangements 1”

Drawing: CTB891216.1, Sample probes installation arrangements 1”.

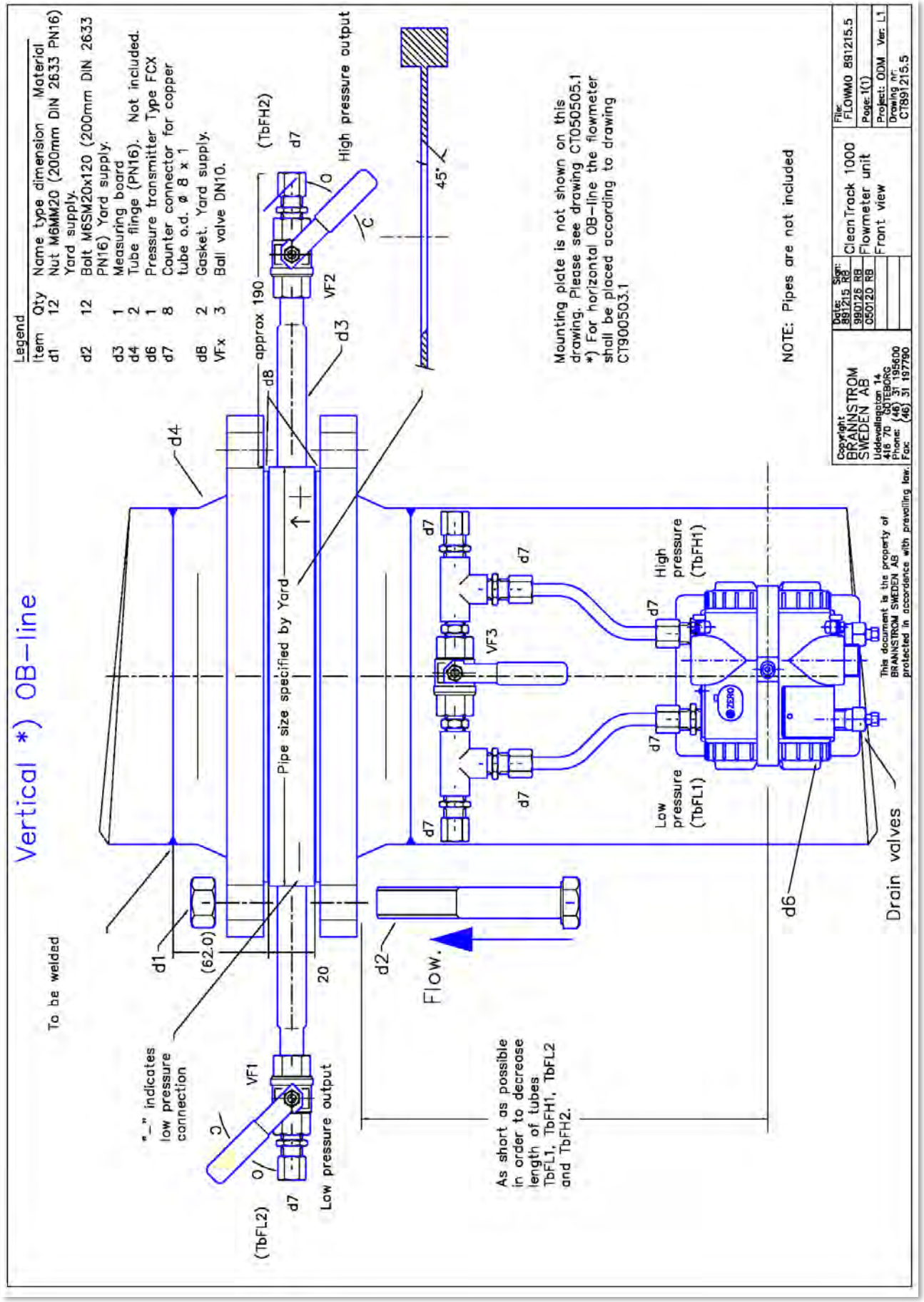


Drawing: CTB900105.4, Sample probes valve arrangements 1".

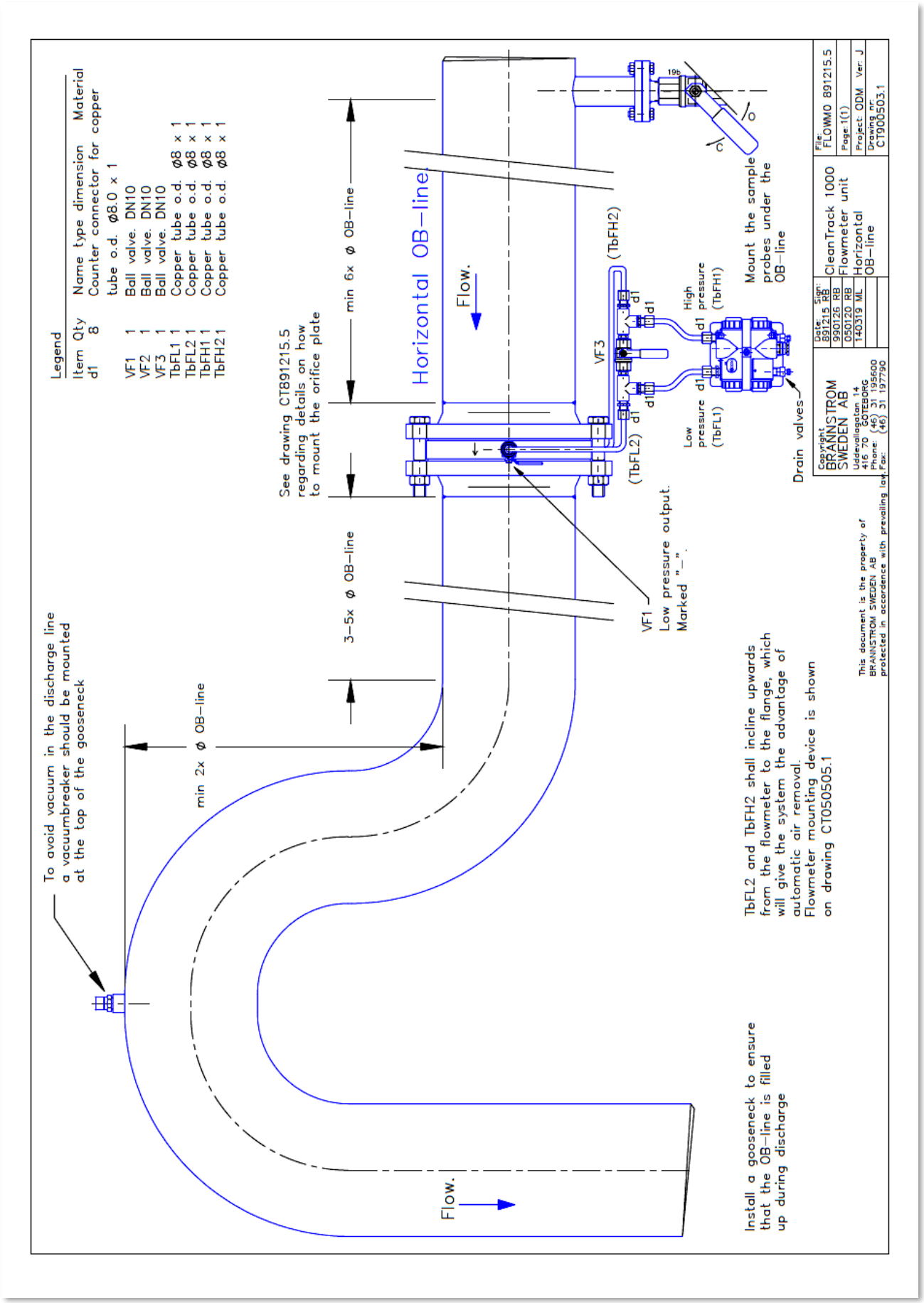


10.12. Flow meter

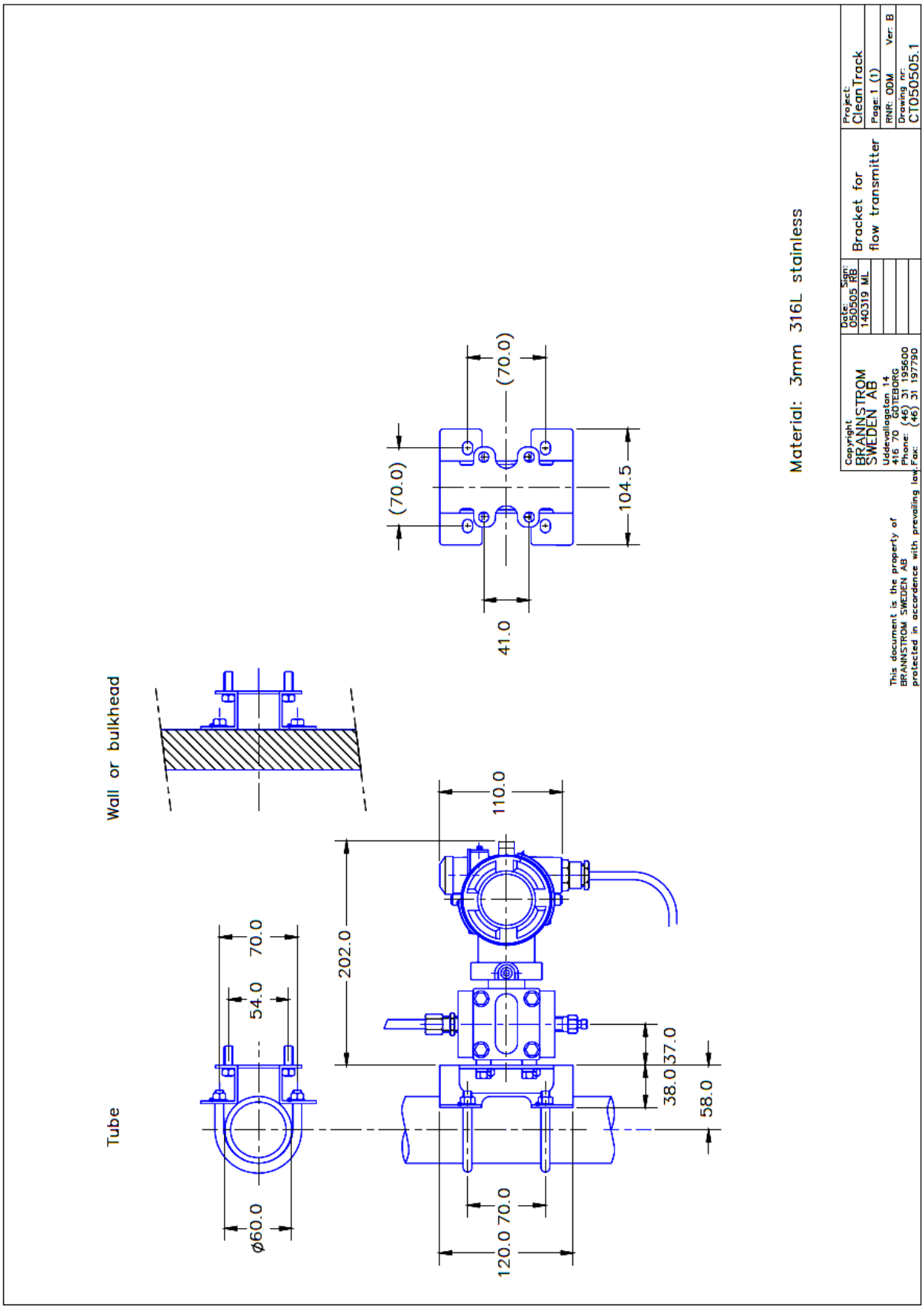
Drawing: CT891215.5, CleanTrack Flow meter unit, Vertical.



Drawing: CT900503.1, CleanTrack Flow meter unit, Horizontal.



Drawing: CT050505.1, CleanTrack Flow transmitter bracket.



11. Approval Certificates

11.1. Certificate: MED-D

Europäisch notifizierte Stelle
Kennnummer 0736
European Notified Body
Identification Number 0736

DGUV Test
Prüf- und Zertifizierungsstelle
BG Verkehr
Dienststelle Schiffssicherheit

Qualitätssicherungssystem-Zertifikat
Quality Assurance System Certificate

Zertifikat-Nr. / ***Certificate No.*** **SEE21044**

Hiermit wird bestätigt; dass das Qualitätssicherungssystem des Herstellers:
We hereby confirm that the quality assurance system of the manufacturer:

Hersteller (Antragsteller) / *Manufacturer (Applicant)*	**Brannstrom Sweden AB**
Adresse / *Address*	**Uddevallagatan 14** **SE - 416 70 Gothenburg**
Gemäß der: / *As per:*	**Richtlinie 2014/90/EU (Schiffsausrüstungsrichtlinie)** ***Directive 2014/90/EU (Marine Equipment Directive)***
in Übereinstimmung ist mit: / *is in conformity with:*	**Modul** / ***Module*** **D**

Liste der zugelassenen Ausrüstungsgegenstände siehe Anlage.
Approved products are listed in the annex.

Produktionsstätten: / *Production Sites:* Gothenburg.

Dieses Zertifikat bleibt gültig, solange es nicht widerrufen wird, zurückgenommen wird oder abgelaufen ist.
This certificate remains valid unless cancelled, expired or revoked.
On this certificate the German text shall prevail.

In pursuance of the EU/USCG Mutual Recognition Agreement, signed February 27th 2004, and in accordance with the Decision No. 1/2018 of February 18th 2019, the manufacturer is permitted to affix under our authorization the U.S. Coast Guard approval number on the relevant equipment as assigned by us on the EC type approval certificate (module B) or the annex thereto.

Ausstellungsdatum / ***Date of issue*** **20.10.2021**
Ablaufdatum / ***Expiry date*** **04.10.2024**

Unterschrift (Kolberg) / ***Signature***

Note 1: Dieses Zertifikat wird ungültig, wenn der Hersteller Änderungen oder Modifikationen jeglicher Art am zugelassenen Qualitätssicherungssystem durchgeführt hat, die nicht der benannten Stelle gemeldet und mit ihr abgestimmt wurden, sowie die EG-Baumusterprüfbescheinigung widerrufen oder entzogen wurde.
This certificate loses its validity if the manufacturer makes any changes or modifications to the approved quality assurance system, which have not been notified to and agreed with the notified body named on this certificate and/or after expiry, withdrawal or revocation of the EC TYPE EXAMINATION CERTIFICATE (MODULE B).

XXXX / YYYY

Note 2: Diese Bescheinigung ermächtigt den Hersteller oder seinen Vertreter innerhalb der EU, im Zusammenhang mit der EG-Baumusterprüfbescheinigung (Modul B), das vorgeschriebene Konformitätskennzeichen (Steuerrad) an den im Anhang genannten Produkten anzubringen.
This certificate authorizes the manufacturer or his authorized representative established within the Community in conjunction with the EC TYPE EXAMINATION CERTIFICATE (MODULE B) of the equipment listed in the annex to affix the "Mark of Conformity" (wheelmark).

Note 3: Beispiel: "Steuerrad" Format
XXXX Nummer der benannten Stelle, die die Qualitätssicherung beim Hersteller überwacht
YYYY Das Jahr, in dem das Konformitätskennzeichen angebracht wird.
Example for "Wheelmark" Format
XXXX Number of the Notified Body responsible for quality surveillance module
YYYY The year in which the mark is affixed.

Postal address:
BG Verkehr
Dienststelle Schiffssicherheit
Brandstwiete 1
D-20457 Hamburg

ZF-A-ED-01-03

Tel: +49 40 3 61 37 - 0
Fax: +49 40 3 61 37 2 04
Internet: www.deutsche-flagge.de

BG Verkehr,
Dienststelle Schiffssicherheit,
Prüf- und Zertifizierungsstelle

BG Verkehr
Dienststelle Schiffssicherheit
Prüf- und Zertifizierungsstelle
im DGUV Test
Europäisch notifizierte Stelle
Kenn-Nummer 0736

2. Anlage zur QS - Zertifikats Nr.: 21044

Folgende Produkte unterliegen dem Qualitätssicherungssystem:

Seite 1 von 1

Zulassungs-Nr.:	Zul.-Stelle	-Handelsname -United States Coast Guard Approval Number (USCG)	Ablauf - Datum	Bereichs-Nr.:
-				
MEDB00006K4	0575	"CleanTrack 1000 B"	26.03.2025	MED/2.5
MEDB00006MV	0575	BilgMon 488	29.04.2025	MED/2.3

Der Hersteller erfüllt die EU-Direktive 2014/90/EU für Schiffsausrüstung und darf daher das Konformitätskennzeichen (Steuerrad) mit der Nummer der BG Verkehr (0736) und dem Herstellungsjahr verwenden.

Beispiel: 0736/JJJJ (Produktionsjahr)

Der Hersteller hat für jedes Produkt eine Konformitätserklärung mit der zugehörigen Referenz zur EG-Baumusterprüfbescheinigung und dessen QS-Zertifikat auszustellen.

Hamburg, 20.10.2021

.....

(Kolberg)

BG Verkehr, Dienststelle Schiffssicherheit
Tel. (040) 36 137- 0
Fax (040) 36 137-204
Brandstwiete 1
20457 Hamburg

11.2. Type Approval, DNV-GL

DNV·GL

Certificate No:
MEDB00006K4

EC-TYPE EXAMINATION CERTIFICATE (MODULE B)

Application of: Directive 2014/90/EU of 23 July 2014 on marine equipment (MED), issued as "Forskrift om Skipsutstyr" by the Norwegian Maritime Authority. This Certificate is issued by DNV GL AS under the authority of the Government of Norway.

This is to certify:

That the Oil discharge monitoring and control system for an oil tanker

with type designation(s)
Oil Discharge and Control System (ODME), Type "CleanTrack 1000 B"

Issued to
Brannstrom Sweden AB
GOTHENBURG, Sweden

is found to comply with the requirements in the following Regulations/Standards:
Regulation **(EU) 2019/1397,**
item No. MED/2.5. Marpol 73/78 as amended, Annex I Regulation 31, IMO Res. MEPC.108(49) as amended by MEPC.240(65) and IMO MEPC.1/Circ.858

Further details of the equipment and conditions for certification are given overleaf.

This Certificate is valid until **2025-03-26**.
Issued at **Høvik** on **2020-03-27**

DNV GL local station:
Sweden CMC

Approval Engineer:
Erik Istad

Notified Body
No.: **0575**

for **DNV GL AS**
Digitally Signed By: Torill Grimstad Osberg
Location: DNV GL Høvik, Norway
on behalf of

Roald Vårheim
Head of Notified Body

The mark of conformity may only be affixed to the above type approved equipment and a Manufacturer's Declaration of Conformity issued when the production-surveillance module (D, E or F) of Annex B of the MED is fully complied with and controlled by a written inspection agreement with a Notified Body. The product liability rests with the manufacturer or his representative in accordance with Directive 2014/90/EU.
This certificate is valid for equipment, which is conform to the approved type. The manufacturer shall inform DNV GL AS of any changes to the approved equipment. This certificate remains valid unless suspended, withdrawn, recalled or cancelled.
Should the specified regulations or standards be amended during the validity of this certificate, the product is to be re-approved before being placed on board a vessel to which the amended regulations or standards apply.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV GL AS, its parent companies and subsidiaries as well as their officers, directors and employees ("DNV GL") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.

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Product description

The CleanTrack 1000 B is intended for installation onboard oil tankers for oil contaminated water monitoring/ alarm - max. 30 litres of oil per nautical mile at discharge overboard (ODME).
The oil content meter is tested and approved for crude oils, "black" and "white" products, as well as blends of petroleum oil and bio-fuels as given below.
The system consists of an analyser unit and a sample pump installed in pump room or on deck (hazardous area), a converting unit intended for installation in engine room, and a computer unit intended for installation in cargo control room.

Application/Limitation

Arrangement drawing and certificate for intrinsically safe equipment (equivalent to EEx ia IIC T4) is to be submitted for each installation. Inspection of intrinsically safety is to be carried out upon installation on board.

The oil content meter is tested and approved for crude oils, "black" and "white" products as per IMO Resolution MEPC.108(49).

The oil content meter is also tested and approved for the blends of petroleum oil* and bio-fuels as given in IMO MEPC.240(65) and MEPC.1/Circ.761 and Annex 11 of MEPC.2/Circ.22/Corr.1 to meet the requirements for testing bio-fuel blends containing 99% and 75% or more of petroleum oil.

*Petroleum oil includes Energy rich fuel as per MEPC.1/Circ.879

ODME CLEANTRACK 1000B:
The oil content meter is tested and approved for crude oils, "black" and "white" products as per IMO Resolution MEPC.108(49), and the blends of petroleum oil* and bio-fuels as given in IMO MEPC.240(65) and MEPC.1/Circ.761 and Annex 11 of MEPC.2/Circ.23 to meet the requirements for testing bio-fuel blends containing 99% and 75% or more of petroleum oil.

Tested and approved for the following blends of 99%-75% petroleum and 1%-25% bio-fuel:

- Alkanes (C4-C12), linear, branched and cyclic
- Alkanes (C5-C7), linear and branched
- ~~Alkanes (C9-C24), linear, branced and cyclic with a flashpoint ≤ 60°C~~
- Alkanes (C9-C24), linear, branched and cyclic with a flashpoint > 60°C
- Alkanes (C10-C17), linear and branched
- Alkanes (C10-C26), linear and branched with a flashpoint > 60°C
- Alkanes (C10-C26), linear and branched with a flashpoint ≤ 60°C
- Ethyl alcohol
- Fatty Acid Methyl Esters (FAME)
- Tert-Amyl Ethyl Ether
- Vegetable oils

*Petroleum oil includes Energy rich fuel as per MEPC.1/Circ.879

Job Id: **344.1-002591-4**
Certificate No: **MEDB00006K4**

Type Examination documentation

Drw. No.	*Date/ Rev.*	*Title;*
CTB10001	160704/ E	Computer unit II(3 shts.)
CTB10001p	160704/ E	Computer unit - Printer version (3 shts.)
CTB10030	130123/ C	Computer unit - Mounting
CTB10020	110701/ A	Measuring cell (3 shts.)
P3711036	150629/ C	Measuring cell – free Mounting
CTB10021	180316/ C	Connection Box (2 shts.)
CTB10003	181219/ D	Converting unit (4 shts.)
CTB110627.1el	180705/ E	Converting unit - Electric sample pump motor – Internal cable diagram
CTB110627.1 elext	190111/C	Converting unit – Electric sample pump motor, internal cable diagram with inverter.
CTB110627.1pn	130426/ B	Converting unit - Pneumatic sample pump motor – Internal cable diagram
CTB110627.1pnz	170829/ B	Converting unit - Manually controlled pneum. sample pump motor - Int. cable diagram
CTB10012	110525/ A	Analysing unit - Electric sample pump type (5 shts.)
CTB10015	180307/ D	Analysing unit – Skid electrical Ex motor sample pump type (4 shts.)
CTB10010	160202/ F	Analysing unit – Air motor sample pump type (5 shts.)
CTB110701.1	110701/ A	Sample probes - Installation arrangements
CTB891216.1	110701/ K	Sample probes - Installation arrangements
CTB10601	160701/ C	Partnames - Partnames of typical arrangement
CTB10914	170917/ A	General arrangement - Electric sample pump system with fresh water
CTB10917	160630/ B	General arrangement – Skid electric sample pump system with fresh water
CTB10927	170921/ A	General arrangement – Skid electric sample pump system with indicated fresh water valve
CTB10918	071013/ A	General arrangement – Exd Electric sample pump system with fresh water
CTB10905	170919/ D	General arrangement - Bulkhead penetrating sample pump system
CTB10911	170919/ C	General arrangement – Controlled Pneumatic sample pump system with fresh water
CTB10921	170919/ B	Controlled Pneumatic sample pump system with indicated fresh water valve
CTB10902	170619/ C	General arrangement - Manual pneumatic sample pump system
CTB10903	171919/ D	General arrangement - Pilot controlled pneumatic sample pump system
CTB110204.1el	180827/ N	Cable diagram - Electric sample pump system
CTB110204.1pn	180327/ G	Cable diagram - Pneumatic sample pump system
CTB110204.1bh	180827/ I	Bulkhead sample pump system cable diagram
CT891211.1	041004/ H	Sample pump unit - Bulkhead mounted type model P06D
CT041029.1	060904/ C	Sample pump unit - Bulkhead mounted type model 32MED22
CS-32MED001	060307/ 1	Pump model 32MED22
P3715089	180207/ C	Pump model SPP-100
P3714073	170830/ C	Section view SPP-100
RD12.11.408	090211	Pump model Y-2951
B-CTS 63E		Pump model T63
4.93.450.01	110505	Pump model T61
CS-NPD13-01		Pump model NPD

Tests carried out

Tested in accordance with the requirements of the specification contained in Part 1 of the Annex to the Guidelines and Specification contained in IMO Resolution MEPC.108(49), and witnessed by DNV Gothenburg, May 2011.

DNV Technical Report No.2011-3155, dated 2011-03-25, Environmental testing of Converting and Analysing Units, CleanTrack 1000 B.

Test records from testing with 5 different blends of bio-fuel and 75% (by volume) diesel/gas oil according to IMO MEPC.1/Circ.761, signed and stamped by DNV Gothenburg, 2011-10-14.

Saybolt Test records, No. 116_30029/14 dated 2014-01-02, from testing with 5 different blends of bio-fuel and 75%/99% (by volume) diesel/gas oil according to IMO MEPC.240(65) and Annex 11 of MEPC.2/Circ.23, signed and stamped by DNV GL Gothenburg, 2014-02-06

SGS Test records, No. 117_4147712 dated 2017-05-02, from testing with 5 different blends of bio-fuel and 75%/99% (by volume) diesel/gas oil according to IMO MEPC.240(65) and Annex 11 of MEPC.2/Circ.23, signed and stamped by DNV GL Gothenburg, 2017-04-26.

PAConsult Test Report No. 18-9981 Oil Discharge Monitor Cleantrack 1000B, dated 2018-03-01 and Test Report "Fluctuation in power supply" testing of Oil discharge Monitor Cleantrack 1000B Computer Unit, signed and stamped by DNV GL Gothenburg, dated 2018-02-20

Marking of product

For traceability to this EC Type-Examination, each unit to be marked with;
- Manufacturer's name and trade mark
- Type designation
- Serial No.
- Mark of Conformity

Mark of Conformity

The manufacturer is allowed to affix the Mark of Conformity according to Article 11 in the Council Directive 96/98/EC on Marine Equipment and shall issue a Declaration of Conformity, only when the module D or E or F of Annex B in the same directive is fully complied with.

Module D: The quality system for production and testing shall be approved by the Notified Body.

Module E: The quality system for inspection and testing shall be approved by the Notified Body.

Module F: Compliance of the products to type as described in this EC Type-Examination Certificate must be verified by the Notified Body who also shall issue a Certificate of Conformity.

11.3. Type Approval, Germany

TYPENPRÜFUNGSZEUGNIS
für Ölgehaltsmessgeräte

zur Überwachung des Einleitens von mit Öl verunreinigtem Wasser aus dem Ladetankbereich von Öltankschiffen

Certificate of Type Approval for Oil Content Meters intended for monitoring the discharge of oil contaminated water from the cargo tank areas of oil tankers

Ausgestellt im Namen der Regierung der **BUNDESREPUBLIK DEUTSCHLAND** durch die **BERUFSGENOSSENSCHAFT VERKEHRSWIRTSCHAFT POST-LOGISTIK TELEKOMMUNIKATION**

*Issued under the authority of the **FEDERAL REPUBLIC OF GERMANY** by **BERUFSGENOSSENSCHAFT VERKEHRSWIRTSCHAFT POST-LOGISTIK TELEKOMMUNIKATION***

Hiermit wird bescheinigt, dass das Ölgehaltsmessgerät, das die nachstehend aufgeführten Anlageteile umfasst, einer Prüfung unterzogen und gemäß den Anforderungen der technischen Beschreibung, enthalten in Teil 1 der Anlage zu den Richtlinien und der technischen Beschreibung der IMO-Entschließung MEPC.108(49), MEPC.240(65), MEPC.1/Zirk.761 and MEPC.Zirk.858 erprobt wurde.
This is to certify that the oil content meter, comprising the equipment listed below, has been examined and tested in accordance with the requirements of the specifications contained in part 1 of the annex to the Guidelines and Specifications contained in IMO resolution MEPC.108.(49), MEPC.240(65), MEPC.1/Circ.761 and MEPC.1/Circ.858.

Dieses Zeugnis ist nur für nachstehendes Ölgehaltsmessgerät gültig.
This certificate is valid only for an oil content meter referred to below.

Anlage geliefert durch: **Brannstrom Sweden AB, Uddevallagatan 14, 41670 Gothenburg, Sweden**
Oil content meter supplied by:

Typbezeichnung: **CLEANTRACK 1000 B**
under type and model designation and incorporating:

Die Analyse-Einheit des Ölgehaltsmessgerätes wurde hergestellt durch: Brannstrom Sweden AB
Oil content meter analysing unit manufactured by:

Zusammenstellungszeichnung Nr.: CTB00002 **Datum:** 17.11.2011 & 18.02.2020
to specification/assembly drawing No.: *date:*

Der elektronische Teil des Ölgehaltsmessgerätes wurde hergestellt durch: Brannstrom Sweden AB
Electronic section of oil content meter manufactured by:

Zusammenstellungszeichnung Nr.: CTB00001 **Datum:** 17.11.2011 & 18.02.2020
to specification/assembly drawing No.: *date:*

Versorgungspumpe hergestellt durch: Matre (Type P06D) or a pump with similar speed-delivery characteristic curve as the above mentioned.
Sample feed pump manufactured by:

Zusammenstellungszeichnung Nr.: CTB00003 **Datum:** 17.11.2011 & 18.02.2020
to specification/assembly drawing No.: *date:*

Probenaufbereitungseinheit hergestellt durch: -
Sample conditioning unit manufactured by:

Zusammenstellungszeichnung Nr.: - **Datum:** -
to specification/assembly drawing No.: *date:*

Das Ölgehaltsmessgerät ist für folgende Verwendung geeignet:
The oil content meter is acceptable for the following applications:.

☒ **Rohöle**
Crude oils

☒ **„Schwarze" Produkte**
„Black" products

☒ **„Helle" Produkte**
„White" products

☒ **Einzelne Gemische von Bioölen die 75 Prozent oder mehr Erdöl enthalten, andere Erzeugnisse oder Verwendungen wie nachstehend.**
Individual bio fuel blends containing 75 per cent or more of petroleum oil, other products or applications, listed below.

Bio-fuel blends of 75% Diesel/gas oil and 25% FAME and Vegetable oil, by volume. Bio-fuel blends of 75% Gasoline and 25% Ethyl alcohol, by volume. Bio-fuel blends of 75% Diesel/gas oil and 25% Alkanes (C10 - C26), linear and branched with a flashpoint >60°C and ≤60°C, by volume, acc. to MEPC.1/Circ.761.
Bio-fuel blends of 99% Diesel/gas oil and 1% FAME and Vegetable oil, by volume. Bio-fuel blends of 99% Gasoline and 1% Ethyl alcohol, by volume. Bio-fuel blends of 99% Diesel/gas oil and 1% Alkanes (C10 - C26), linear and branched with a flashpoint >60°C and ≤60°C, by volume, acc. to MEPC.240(65).

Zulassungs-Nr.: **322010-00**
Certificate-No.:

Bio-fuel blends of 99% Petroleum Oil and 1% Alkanes(C9-C24) linear, branched and cyclic with a flashpoint>60°C
Bio-fuel blends of 75% Petroleum Oil and 25% Alkanes(C9-C24) linear, branched and cyclic with a flashpoint>60°C
Bio-fuel blends of 99% Petroleum Oil and 1% Alkanes(C10-C17) linear and branched
Bio-fuel blends of 75% Petroleum Oil and 25% Alkanes(C10-C17) linear and branched
Bio-fuel blends of 99% Petroleum Oil and 1% Alkanes(C4-C12) linear, branched and cyclic
Bio-fuel blends of 75% Petroleum Oil and 25% Alkanes(C4-C12) linear, branched and cyclic
Bio-fuel blends of 99% Petroleum Oil and 1% Alkanes(C5-C7) linear and branched
Bio-fuel blends of 75% Petroleum Oil and 25% Alkanes(C5-C7) linear and branched
Bio-fuel blends of 99% Petroleum Oil and 1% Tert-Amyl ethyl ether
Bio-fuel blends of 75% Petroleum Oil and 25% Tert-Amyl ethyl ether

Eine Kopie dieses Zeugnisses muss jederzeit auf jedem Schiff mitgeführt werden, das mit dieser Anlage ausgerüstet ist.
A copy of this certificate have to be carried aboard a ship fitted with this equipment at all times.

Dieses Typenzulassungszeugnis bleibt über das nachstehende Datum hinaus in Kraft, sofern kein Widerruf erfolgt. Ein Widerruf für auf einem Schiff eingebaute Einrichtungen kann z.B. erfolgen, wenn diese nicht gefahren und/oder nicht gewartet und/oder nicht funktionsbereit sind und/oder nicht innerhalb einer angemessenen Frist an zukünftige Bestimmungen angepasst werden können.
This certificate of type approval is in force beyond the below mentioned date unless it is revoked.
A revocation of the equipment installed aboard the ship can follow, but is not limited to, if the equipment is not maintained and/or is not in good working order and/or the equipment can not be modified within an appropriate time frame, due to future regulatory standards.

Daten und Ergebnisse der Erprobungen siehe Anhang.
Test data and results attached as appendix.

Dieses Typenzulassungszeugnis ist gültig bis: **28.02.2025**
This certificate of type approval is valid until:

Ausgestellt in Hamburg am: 01.03.2020
Issued at Hamburg on:

BG VERKEHR 29

(Siegel)
(Seal)

BERUFSGENOSSENSCHAFT FÜR TRANSPORT UND VERKEHRSWIRTSCHAFT - DIENSTSTELLE SCHIFFSSICHERHEIT -

(HELLMANN)

Unterschrift
Signature

Das Ölgehaltsmessgerät, Serien-Nr.: ..... **entspricht dem geprüften Typ.**
The oil content meter serial No.: *complies with the tested type.*

Ort *Place*	**Datum** *date*	**Firmen-stempel** *Company stamp*	**Unterschrift** *Signature*

11.4. IMO Certificate, CCS

中 国 船 级 社
CHINA CLASSIFICATION SOCIETY

格式
Form CP279

编号
No. **GB22PTB00016_02**

油 份 计 型 式 认 可 证 书
用于油轮货油舱污油水排放监控

CERTIFICATE OF TYPE APPROVAL FOR OIL CONTENT METERS
INTENDED FOR MONITORING THE DISCHARGE OF OIL CONTAMINATED WATER FROM THE CARGO TANK AREAS OF OIL TANKERS

兹证明表内所列设备的油份计已按国际海事组织经MEPC.240(65)决议修订的MEPC.108(49)所包含的指南和技术条件附录第1部分的技术要求进行了检查和试验。本证书仅对下述油份计有效。

This is to certify that the oil content meter , comprising the equipment listed below, has been examined and tested in accordance with the requirements of the specification contained in part 1of the Annex to the Guidelines and Specifications contained in IMO resolution MEPC.108(49) as amended by MEPC.240(65). This certificate is valid only for an oil content meter referred to below.

油份计由 **Brannstrom Sweden AB** 提供，

Oil content meter supplied by _____

式样和型号名称 **CleanTrack 1000B** 并合并：

under type and model designation **CleanTrack 1000B**

以及：

and incorporating:

油份计分析设备由 **Brannstrom Sweden AB** 制造，

Oil content meter analysing unit manufactured by **Brannstrom Sweden AB**

规格/装配图号 **CTB00002** 日期 **2020-2-18**

to specification/assembly drawing No. **CTB00002** Date **2020-2-18**

油份计电子部分由 **Brannstrom Sweden AB** 制造，

Electronic section of oil content meter manufactured by **Brannstrom Sweden AB**

规格/装配图号 **CTB00001** 日期 **2020-2-18**

to specification/assembly drawing No. **CTB00001** Date **2020-2-18**

*样品给水泵系由 **Matre(Type P06D) or a pump with similar speed-delivery characteristics** 制造，

*Sample feed pump manufactured by **Matre(Type P06D) or a pump with similar speed-delivery characteristics**

规格/装配图号 **CTB00003** 日期 **2020-2-18**

to specification/assembly drawing No. **CTB00003** Date **2020-2-18**

*样品调节装置由 _____ 制造，

*Sample conditioning unit manufactured by _____

规格/装配图号 _____ 日期 _____

to specification/assembly drawing No. _____ Date _____

油份计接受下列物质：

The oil content meter is acceptable for the following applications:

编号
No. **GB22PTB00016_02**

*原油
*Crude oils
*"黑色"产品
*"Black" products
*"白色"产品
*"White" products
*下列石油含量为75%或以上的各生物燃料混合物、其他产品或用途
*individual biofuel blends containing 75 per cent or more of petroleum oil,other products,or applications,listed below

设有本设备的船上应始终备有一份证书副本。
A copy of this certificate should be carried aboard a vessel fitted with this equipment at all times.

试验数据及结果见附录
Test data and results attached as appendix.

本证书由原证书（No. **GB18T00008** ）换新并替代原证书。
This certificate is renewed from and supersedes the previous Certificate No. **GB18T00008**

主管机关印章
Official stamp

签字
Signed (Yu Xiaoping)

主管机关 中国船级社
Administration of China Classification Society

日期
Dated **2023年04月21日**

*视情况可删去
*Delete as appropriate.

UTN:P022-79577004

11.5. Type Approval, CCS

中国船级社
CHINA CLASSIFICATION SOCIETY

证书编号/Certificate No.
GB22PTB00016_01

型式认可证书
CERTIFICATE OF TYPE APPROVAL

兹证明本证书所述制造厂具备按照下列标准的要求生产本证书所列产品的能力和条件。
This is to certify that the manufacturer stated in the certificate meets the requirements of the standards listed below and is available with the ability and conditions to produce the products described in the certificate.

制造厂/Manufacturer

Brannstrom Sweden AB

地址/Address

Uddevallagatan 14, 416 70 Gothenburg Sweden

产品名称/Product

排油监控系统
Oil Discharge Monitoring and Control System

认可标准/Approval Standard

1. 国际海事组织《73/78 防污公约》附则I
Annex I of IMO MARPOL 73/78
2. MEPC. 108（49）决议《修订的油船排油监控系统指南和技术条件》
RESOLUTION MEPC.108(49)"REVISED GUIDELINES AND SPECIFICATES FOR OIL DISCHARGE MONITORING AND CONTROL SYSTEMS FOR PIL TANKERS
3. 国际海事组织环保会决议 MEPC. 240(65)《经修订的油船排油监控系统指南和技术条件（环保会MEPC. 108(49)决议）2013年修正案》
IMO Resolution MEPC.240(65) 2013 Amendments to the Revised Guidelines and Specifications for Oil Discharge Monitoring and Control Systems for Oil Tankers (Resolution MEPC.108(49))

用于/Intended for

船舶与海上设施/Ships and Offshore Installations

产品明细/Product Description

排油监控系统/Oil Discharge Monitoring and Control System（M0001）

名称/Name	属性（值）/Value	单位/Unit
型号/Type	ODMCS-system, Clean Track 1000 B	
电源/Power Source	380/480 VAC 3 phase 50/60 Hz 110/220 VAC 1 phase 50/60 Hz	
测量范围/Measure Range	0-1000 ppm	
测量精度/Measure Accuracy	Acc. to MEPC.108(49).	

证书有效期至/This Certificate is valid until **2026年06月21日/ Jun. 21,2026**

发证机构/Issued by 中国船级社哥德堡办事处 CCS Gothenburg Office

签发日期/Date 2023年04月21日 Apr. 21,2023

本证书根据中国船级社规范和相关规定签发。所有证书页为一个整体，必须同时使用。纸质证书每页均须由本社盖章方为有效，电子证书含数字签名方为有效，本证书复印件无效。任何单位和个人均不应摘录或节选本证书的部分内容。有关方对所持证书的真实性有疑问时，可以向我社检验机构咨询。
This Certificate is issued pursuant to the Rules of the Society and related regulation. All pages of the certificate are taken as a whole and are used simultaneously. No paper certificate page is valid without bearing the stamp of the Society, no electronic certificates is valid without the digital signature, and no copied form of the certificate is regarded as valid. Any part of the certificate is not to be extracted or abridged by any unit or individual in any form. Related parties who are doubted about the authenticity of the certificate may inquire of the Society or its offices.

Form No: T01. 联系方式/Contact Us，见本社官方网站/See official web site of the Society（http://www.ccs.org.cn）

UTN:P022-04656985

批准的图纸/Approved Drawings

图纸批准号/ Drawings Approval No.： NP22PPP05229

产品认可试验报告/ Approval Test Report

试验报告编号/ Test Report No.： 2011-3155
试验报告日期/ Test Report Date： 2011-03-25
试验单位/ Laboratory: Det Norske Veritas
试验单位地址/ Test Address: Veritasveien 1,N-1322 Hovik,Norway

试验报告编号/ Test Report No.： Test Reports acc. to IMO MEPC.1/Circ.761
试验报告日期/ Test Report Date： 2011-10-14
试验单位/ Laboratory: Brannstrom Sweden AB
试验单位地址/ Test Address: Uddevallagatan 14, 41670 Gothenburg,Sweden

试验报告编号/ Test Report No.： Saybolt Test records, No. 116_30029/14
试验报告日期/ Test Report Date： 2014-02-06
试验单位/ Laboratory: Saybolt Sweden AB
试验单位地址/ Test Address: Smörjoljegatan 3, 418 34 Göteborg

试验报告编号/ Test Report No.： SGS Test records, No. 117_4147712
试验报告日期/ Test Report Date： 2017-07-25
试验单位/ Laboratory: SGS INSTITUT FRESENIUS GmbH
试验单位地址/ Test Address: Postfach1261 65220 Taunusstein

试验报告编号/ Test Report No.： Test Record_5xBioFuels_20170426
试验报告日期/ Test Report Date： 2017-04-26
试验单位/ Laboratory: Brannstrom Sweden AB
试验单位地址/ Test Address: Uddevallagatan 14, 41670 Gothenburg,Sweden

试验报告编号/ Test Report No.： PAConsult Test Report No. 18-9981
试验报告日期/ Test Report Date： 2018-03-01
试验单位/ Laboratory: PAConsult GmbH
试验单位地址/ Test Address: Birkenau 3 • D-22087 Hamburg

试验报告编号/ Test Report No.： Cleantrack_HighTemperatureTest_20200427
试验报告日期/ Test Report Date： 2020-04-27
试验单位/ Laboratory: Brannstrom Sweden AB
试验单位地址/ Test Address: Uddevallagatan 14, 416 70 Gothenburg Sweden

试验报告编号/ Test Report No.： Cleantrack_LowTemperatureTest_20200506
试验报告日期/ Test Report Date： 2020-05-06
试验单位/ Laboratory: Brannstrom Sweden AB
试验单位地址/ Test Address: Uddevallagatan 14, 416 70 Gothenburg Sweden

试验报告编号/ Test Report No.： Cleantrack_VoltageFluctuationTest_20200427
试验报告日期/ Test Report Date： 2020-04-27
试验单位/ Laboratory: Jan Linders EMC laboratorium
试验单位地址/ Test Address: Bror Nilssons gata 4, 41755 Gothenburg, Sweden

认可后的产品检验方式/ Method of Product Inspection after Approval

按规范认可后应进行产品检验的产品/The product should be inspected in term of the rules：
认可后的产品检验应由本社验船师根据本社规范规定按批准的产品检验计划进行检验，经检验合格后由本社颁发船用产品证书。
After approval, product inspection should be carried out by the Surveyor of the Society in accordance with the approved product inspection scheme, and the Marine Product Certificate will be issued by the Society upon satisfactory inspection.

认可保持条件/ Maintenance Requirements of Approval

1.型式认可后，如果产品及其重要零部件的设计、所用材料或制造方法有所改变，且影响到产品的主要特性、特征；或产品的性能指标有所更改，且超过认可的范围，则有关图纸和文件应经检验机构审批。并在检验机构认为必要时，经本社检验人员见证有关试验和进行检查，其结果应能证实仍符合认可条件。

After type approval, if there are changes to the design, materials used or manufacturing method of the product and important components and such changes affect major characteristics and properties of the product, or property indexes of the product are changed and exceed the scope of approval, related drawings and documents are to be examined and approved by the concerned survey office. Where deemed necessary by the survey office, the surveyor to the Society will go to witness relevant tests and conduct inspection and the results should be able to demonstrate compliance with the approval conditions.

2.工厂的质量管理体系应保持有效运行，并且与认可时一致。如果质量管理体系发生改变，应经原体系认证机构审核并报本社批准。

The quality management system of the factory shall be ensure effective operation, and shall be the same as the situation of approval. If there are any changes to the quality management system, auditing of the original certification organization for quality management system and the society's approval shall be obtained.

3.认可证书有效期内，如果出现可能导致本社取消认可的情况，工厂应及时采取有效的纠正措施。

Within the validity of the approval certificate, if cases occur that may cause the Society to withdraw the approval, the manufacturer should take corrective actions in a prompt and effective manner.

4.在认可证书有效期内，本社检验人员可在未经事先通知的情况下对工厂的产品制造过程进行审核，以验证产品的生产是否符合业经本社批准的图纸和文件。工厂应予以配合。

Within the validity of the approval certificate, the surveyor to the Society may pay unannounced audit to the manufacturing process of the product in order to confirm whether it is in compliance with the drawings and documents approved by the Society. The factory should provide an active cooperation and necessary for the surveyor.

5.如果属于获得型式认可B 模式证书，且无需颁发船用产品证书/等效证明文件的情况，证书获得者应接受本社每年一次的定期审核，定期审核日为认可证书期满之日对应的每一周年日，检查工作应在周年日的前后三个月内进行。

If belong to the situation of the product has type approval mode B certificate, and marine product certificate/equivalent document is not necessary, those who have obtained the certificate should be subject to periodical audit every year. The date of periodical audit shall be each anniversary date which corresponds to the date of expiry of the relevant certificate and the periodical audit shall be done within a time span of three months before and after the annual surveillance date.

备注/Remarks

1. 本社已审核了产品厂无石棉声明，但本社的审核不免除产品厂按照合同关系向订货方保证产品无石棉的责任。
The declaration of asbestos-free submitted by manufacturer has been reviewed by the Society. However, liability of the manufacturer to guarantee the products are asbestos-free to purchaser under contract will not be exempted.

2. 本证书由原型式认可证书（No. GB18T00007）换新并替代原证书。
This Certificate is renewed from and supersedes the previous Type Approval Certificate No. GB18T00007.

3. Certificate of Type Approval (No.GB22PTB00016_02)for Oil Content Meters is attached to this Type Approval Certificate and a copy of that Certificate should be carried aboard a vessel fitted with this equipment at all times.

4. The system mainly consists of the following components:
-Computer unit
-Converting unit
-Analysising unit
-Sample feed pump unit

5. Optional components included in the ODMCS-system with type CleanTrack 1000B:
1) Flow meter;
2) Sample probes including valves and inlet filter;
3) Overboard valve and slop tank valve;
4) Pneumatic control box for overboard and slop tank valves.

中国船级社哥德堡办事处
CCS Gothenburg Office

11.6. Type Approval, NK

NIPPON KAIJI KYOKAI

Certificate

Certificate No.
TA23120E(R)

OF

TYPE APPROVAL

Item	: Oil Discharge Monitoring and Control System for oil tankers
Product name	: CleanTrack 1000 B
Product descriptions	: Intended for installation onboard oil tankers for ballast water monitoring control and alarm of contents of oil (or bio-fuel blends) at discharge overboard.
Manufacturer	: BRANNSTROM SWEDEN AB Uddevallagatan 14, 416 70 Göteborg, Sweden
Documentation	: See Annex.
Limitations	: See Annex.

THIS IS TO CERTIFY that the above type has been approved by Nippon Kaiji Kyokai with approval No. N-1108 and that products of the above type will be accepted for use on ships classed with the Society as complying with the relevant requirements of the Society's *Rules for Marine Pollution Prevention Systems*, the *MARPOL 73/78, as amended, Annex I, Regulation 31, IMO Resolution MEPC.240(65) and IMO MEPC.1/Circ.761/Rev.1* subject to approval of the flag Administration and conditional upon that product verification be carried out by the Society.

This certificate is valid from 17 August 2022 until 16 August 2027.
Issued at Tokyo on 23 January 2023.

NIPPON KAIJI KYOKAI

Y. Takao
General Manager
Material and Equipment Department

11.7. Type Approval, RMRS

РОССИЙСКИЙ МОРСКОЙ РЕГИСТР СУДОХОДСТВА
RUSSIAN MARITIME REGISTER OF SHIPPING

2.4.16.1

СВИДЕТЕЛЬСТВО О ТИПОВОМ ОДОБРЕНИИ ПРИБОРОВ ДЛЯ ИЗМЕРЕНИЯ СОДЕРЖАНИЯ НЕФТИ, ПРЕДНАЗНАЧЕННЫХ ДЛЯ КОНТРОЛЯ ЗА СБРОСОМ ЗАГРЯЗНЕННЫХ НЕФТЬЮ ВОД ИЗ РАЙОНА ГРУЗОВЫХ ТАНКОВ НЕФТЯНЫХ ТАНКЕРОВ

CERTIFICATE OF TYPE APPROVAL FOR OIL CONTENT METERS INTENDED FOR MONITORING THE DISCHARGE OF OIL-CONTAMINATED WATER FROM THE CARGO TANK AREAS OF OIL TANKERS

Настоящим удостоверяется, что прибор для измерения содержания нефти, включающий перечисленное ниже оборудование, проверен и испытан в соответствии с требованиями части 1 Приложения к Руководству и техническим требованиям, содержащимся в резолюции ИМО МЕРС.108(49). Настоящее Свидетельство действительно только для прибора, указанного ниже.

This is to certify that the oil content meter, comprising the equipment listed below, has been examined and tested in accordance with the requirements of the Specifications contained in Part 1 of the Annex to the Guidelines and Specifications contained in IMO resolution MEPC.108(49). This Certificate is valid only for an oil content meter referred to below.

Прибор для измерения содержания нефти типа и модели / Oil content meter under type and model designation: ***CLEANTRACK 1000 B***

поставляется / supplied by: ***Brannstrom Sweden AB, Uddevallagatan 14, 41670 Gothenburg, Sweden***

и включает: / and incorporating:

анализатор содержания нефти, изготовленный / oil content meter analysing unit manufactured by: ***Brannstrom Sweden AB***

по ~~техническим условиям~~/сборочному чертежу № / to ~~specification~~/assembly drawing No.: ***CTB00002***

дата / date: ***17.11.2011***

электронную секцию, изготовленную / electronic section of oil content meter manufactured by: ***Brannstrom Sweden AB***

по ~~техническим условиям~~/сборочному чертежу № / to ~~specification~~/assembly drawing No.: ***CTB00001***

дата / date: ***17.11.2011***

* пробоотборный насос, изготовленный / * sample feed pump manufactured by: ***Matre (Type P06D) or a pump with similar speed/delivery characteristics***

по техническим условиям/сборочному чертежу № / to specification/assembly drawing No.: ***CTB00003***

дата / date: ***17.11.2011***

* пробоотборное устройство, изготовленное / * sample conditioning unit manufactured by: --

по техническим условиям/сборочному чертежу № / to specification/assembly drawing No.: --

дата / date: --

*Ненужное зачеркнуть.
Delete as appropriate.

Прибор для измерения содержания нефти предназначен для:
The oil content meter is acceptable for the following applications:

*сырых нефтей,
*crude oils,

*темных нефтепродуктов,
*"black" products,

*светлых нефтепродуктов,
*"white" products,

*нефтеподобных вредных жидких веществ, других продуктов или веществ, перечисленных ниже:
*oil-like noxious liquid substances, other products, or applications, listed below:

Bio-fuel blends of 75% Diesel/Gas oil and 25% FAME and Vegitable oil, by volume.
Bio-fuel blends of 75% Gasoline and 25% Ethyl alcohol, by volume.
Bio-fuel blends of 75% Diesel/Gas oil and 25% Alcanes (C10-C26), linear and branched with flash point >60°C and ≤ 60°C, by volume, acc. to MEPC.1/Circ.761.

Копия настоящего Свидетельства должна постоянно находиться на борту судна, оснащенного данным оборудованием.
A copy of this Certificate should be carried aboard a ship fitted with this equipment at all times.

Условия и результаты испытаний приведены в Дополнении.
Test data and results attached as Appendix.

Выдано в
Issued at *Gothenburg, Sweden*
(место выдачи Свидетельства / place of issue of Certificate)

27.04.2012
(дата выдачи / date of issue)

Российский морской регистр судоходства
Russian Maritime Register of Shipping

(подпись уполномоченного лица, выдавшего Свидетельство / signature of authorized official issuing the Certificate)

№ *12.10054.262*

Печать или штамп организации, выдавшей Свидетельство
Seal or stamp of the issuing authority, as appropriate

РОССИЙСКИЙ МОРСКОЙ РЕГИСТР СУДОХОДСТВА
РС
Швеция

*Ненужное зачеркнуть.
Delete as appropriate.

12. ATEX Certificates and Instructions

12.1. Declaration of Conformity

BRANNSTROM SWEDEN AB

EUROPEAN COMMUNITIES DECLARATION OF CONFORMITY
issued in accordance with the
MARINE EQUIPMENT DIRECTIVE (MED) 2014/90/EU

This is to certify that in compliance with the Council Directive 2014/90/EU of 23 July 2014 on marine equipment, the company:

Brannstrom Sweden AB
Uddevallagatan 14
416 70 Göteborg
SWEDEN

declares that the following products are conforming to types as described in the EC-Type Examination Certificates from the Notified Body BG Verkehr (Ship Safety division) (EU Registration No. 0736).

Module D, Quality Certificate No. SEE 21044 valid until 04.10.2024

Product type: Oil Discharge Monitoring and Control System for Oil Tankers CleanTrack 1000B
Module B: EC Type-Examination Certificate No. 322010-00 valid until 28 February 2025
Module B: EC Type-Examination Certificate No. MEDB00006K4 valid until 26 March 2025
MED Annex Item No & Item designation: MED/2.5 Oil Discharge Monitoring and Control System for Oil Tankers

Standards applicable: IMO Res. MEPC.108 (49) as amended by MEPC.240(65) and IMO MEPC.1/Circ.858.

The mark of conformity is affixed to the label of the packed material(s) including the Identification Number of the Notified Body:

Notified Body No/Production year

0736 / 2022

A technical construction file for this equipment is retained at the following address:

Brannstrom Sweden AB
Uddevallagatan 14
416 70 Göteborg
SWEDEN

Signed:

Date: 09.12.2022
Name: Niklas Brännström
Position: QA-Manager

BRANNSTROM SWEDEN AB

Uddevallagatan 14
416 70 Göteborg
Tel: +46 31 195600
info@brannstrom.se | www.brannstrom.se

BRANNSTROM SWEDEN AB

12.2. Declaration of Conformity, Measuring Cell

EU DECLARATION OF CONFORMITY
CTB120207.1 rev E

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Product name:	Fluid analyzer
Product type:	Measuring Cell type CTB11
Product Description:	See EU Type Examination

is in conformity with the European directive 2014/34/EU (ATEX) concerning equipment and protective systems intended for the use in potentially explosive atmospheres.

Protection of Degree: ⟨Ex⟩ II 1 G Ex ia IIC T4 Ga

The following harmonised standards have been applied:
ATEX Standards

EN IEC 60079-0: 2018	Explosive atmospheres - Part 0: Equipment - General requirements
EN 60079-11: 2012	Explosive atmospheres – Part 11: Equipment protection by intrinsic safety "i"
EN 60079-26: 2015	Explosive atmospheres – Part 26: Equipment with equipment protection level (EPL) Ga

Product Quality Assurance Notification:

Notified Body	DNV Product Assurance AS Veritasveien 1, 1363 HOVIK, Norway
Notified Body No.	2460
Role:	Issue of Quality Assurance Notification, QAN
Certificate No.	DNV 22ATEX44847Q

And therefore complies with the relevant essential requirements of those directives and those of the following ATEX Notified body.

The following Notified Body has been involved in the conformity assessment process:

Notified Body	Element Materials Technology Rotterdam B.V. Zekeringstraat 33, 1014 B.V., Amsterdam, Netherlands.
Notified Body No.	2812
Role:	Issue of ATEX EC Type Examination certificate
Certificate No.	TRAC12ATEX0028X

Uddevallagatan 14
416 70 Göteborg
Tel: +46 31 195600
info@brannstrom.se | www.brannstrom.se
BRANNSTROM SWEDEN AB

Special Conditions of Safe Use:

1. The measuring cell has to be installed against a bulkhead or a wall in a console made out of stainless or painted mild steel according to the figure provided in the instruction manual or if necessary to be built in an enclosure.
2. The enclosure of the measuring cell must be earthed to avoid electrostatic discharges.
3. The connection cable capacitance shall not exceed 0.5µF and the cable inductance shall not exceed 0.70mH.

Göteborg, 2022-09-26

Roland Brännström
CEO

Uddevallagatan 14
416 70 Göteborg
Tel: +46 31 195600
info@brannstrom.se | www.brannstrom.se

BRANNSTROM SWEDEN AB

12.3. Declaration of Conformity, Zener Barrier

EU DECLARATION OF CONFORMITY
ZB120207.1 rev E

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Product name:	Zener Barrier
Product type:	Oil Monitor interface type Z11
Product Description:	See EU Type Examination

is in conformity with the European directive 2014/34/EU (ATEX) concerning equipment and protective systems intended for the use in potentially explosive atmospheres.

Protection of Degree: ⟨Ex⟩ II (1) G [Ex ia] IIC

The following harmonised standards have been applied:

EN IEC 60079-0: 2018	Explosive atmospheres - Part 0: Equipment - General requirements
EN 60079-11: 2012	Explosive atmospheres – Part 11: Equipment protection by intrinsic safety "i"
EN 60079-26: 2015	Explosive atmospheres – Part 26: Equipment with equipment protection level (EPL) Ga

Product Quality Assurance Notification:

Notified Body	DNV Product Assurance AS Veritasveien 1, 1363 HOVIK, Norway
Notified Body No.	2460
Role:	Issue of Quality Assurance Notification, QAN
Certificate No.	DNV 22ATEX44847Q

And therefore complies with the relevant essential requirements of those directives and those of the following ATEX Notified body.

The following Notified Body has been involved in the conformity assessment process:

Notified Body	Element Materials Technology Rotterdam B.V Zekeringstraat 33, 1014 B.V., Amsterdam, Netherlands.
Notified Body No.	2812
Role:	Issue of ATEX EC Type Examination certificate
Certificate No.	TRAC12ATEX0027X

Uddevallagatan 14
416 70 Göteborg
Tel: +46 31 195600
info@brannstrom.se | www.brannstrom.se
BRANNSTROM SWEDEN AB

Special Conditions of Safe Use:

1. The Z11 apparatus shall be placed only in a minimum IP54 approved enclosure if placed in outdoor environment and a minimum of IP20 if placed in a clean and dry environment for example indoors and office environments.
2. The reduced values of Co=80nF and Lo=1.4mH shall be applicable when the external circuitry connected to output circuits F1, F2 and P contains combinations of lumped capacitance and inductance.
3. Full value of the capacitance (Co) permitted and only 50% of the inductance (Lo) value shall be permitted if the external circuit at the MC output contains combinations of lumped capacitance and inductance greater than 1% of the permitted values of Co or Lo.

Göteborg, 2022-09-26

Roland Brännström
CEO

Uddevallagatan 14
416 70 Göteborg
Tel: +46 31 195600
info@brannstrom.se | www.brannstrom.se

BRANNSTROM SWEDEN AB

12.4. ATEX Certificate Zener Barrier PCB

element

1 CONFORMITÉ EUROPÉENE

EU - TYPE EXAMINATION CERTIFICATE

2 **Product or Protective System Intended for use in Potentially Explosive Atmospheres Directive 2014/34/EU – Annex III**

3	EU - Type Examination Certificate No.:	**TRAC12ATEX0027X (incorporating variation V1)**
4	Product:	**Zener Barrier Oil Monitor Interface, Type Z11**
5	Manufacturer:	**BRANNSTROM SWEDEN AB**
6	Address:	**Uddevallagatan 14, SE-416, 70 Göteborg, Sweden**

7 This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8 Element Materials Technology, Notified Body number 2812, in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in the confidential reports

TRA-009181-33-00A.

9 Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN IEC 60079-0:2018 **EN 60079-11:2012** **EN 60079-26:2015**

Except in respect of those requirements listed at section 18 of the schedule.

10 If the sign "X" is placed after the certificate number, it indicates that the product is subject to specific conditions of use specified in the schedule to this certificate.

11 This EU - TYPE EXAMINATION CERTIFICATE relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

12 The marking of this product shall include the following:

Ex II (1) G [Ex ia] IIC **T_{amb} -20°C to +60°C**

This certificate and its schedules may only be reproduced in its entirety and without change. This certificate is issued in accordance with the Element Materials Technology Ex Certification Scheme.

S.P. Winsor

S P Winsor, Certification Manager

Issue date: 2022-10-03

PRODUCTS RvA C 654

Element Materials Technology Rotterdam BV
Zekeringstraat 33, 1014 BV, Amsterdam, Netherlands
Netherlands. Registered Office: PO Box 6854, 4802 HW, Breda, Netherlands
Company Reg. No. 24170257

13 SCHEDULE TO EU - TYPE EXAMINATION CERTIFICATE

14 CERTIFICATE NUMBER TRAC12ATEX0027X (incorporating variation V1)

15 Description of Product

The CleanTrack ODMCS [Oil Discharge Monitoring and Control System] is a monitoring system for the control of discharged ballast water from tankers and chemical tankers. The product which is an intrinsically safe associated electrical apparatus is a zener barrier which forms a part of this Oil Discharge Equipment system and is used only in a non-hazardous area.

The zener barrier which is called Z11 by its product name has five outputs which are connected to other circuits in the hazardous area and they are divided into three groups which are all energy limited by this zener barrier.

Group I – O/P circuits F2, F1 and P

Group II – O/P circuit D

Group III – O/P circuit MC

Z11 is intended to be supplied by 24VAC in the safe area (Functionally). However for assessment purposes Um shall be considered to be 250VAC/VDC.

Table of entity parameters					
Parameter	Circuit F2	Circuit F1	Circuit P	Circuit D	Circuit MC
*Co	*90nF/80 nF	*90nF/80 nF	*90nF/80 nF	2.5µF	2.5µF
*Lo	*3mH/1.4 mH	*3mH/1.4 mH	*3mH/1.4 mH	3mH	*0.9mH
Uo	26V	26V	26V	8.41V	8.41V
Io	81mA	81mA	81mA	59.6mA	193.1mA
Po	0.53W	0.53W	0.53W	0.187W	0.41W

16 Test Report No. (as added for this issue of the certificate): N/A

17 Specific Conditions of Use

1. The Z11 apparatus shall be housed only in a minimum IP54 approved enclosure if placed in outdoor environment and a minimum of IP20 if placed in a clean and dry environment for example indoors and office environments.
2. The reduced values of Co=80nF and Lo=1.4mH shall be applicable when the external circuitry connected to output circuits F1, F2 and P contains combinations of lumped capacitance and inductance.
3. Full value of the capacitance (Co) permitted and only 50% of the inductance (Lo) value shall be permitted if the external circuit at the MC output contains combinations of lumped capacitance and inductance greater than 1% of the permitted values of Co or Lo.

Attention is drawn to the operating and installation instructions which may contain useful information in relation to conditions of use.

18 Essential Health and Safety Requirements (Directive Annex II)

Element Materials Technology has conducted a gap analysis between the standards applied within the reports listed under section 8 and the latest versions of the corresponding harmonised standards (as listed in section 9). This analysis has confirmed continued compliance with the Essential Health and Safety Requirements. The analysis is detailed in report: TRA-055262-32-00A.

In addition to the Essential Health and Safety Requirements covered by the standards listed at item 9, all other requirements are demonstrated in the relevant reports.

19 Drawings and Documents

The list of controlled technical documentation is given in Appendix A to this schedule.

20 Routine Tests

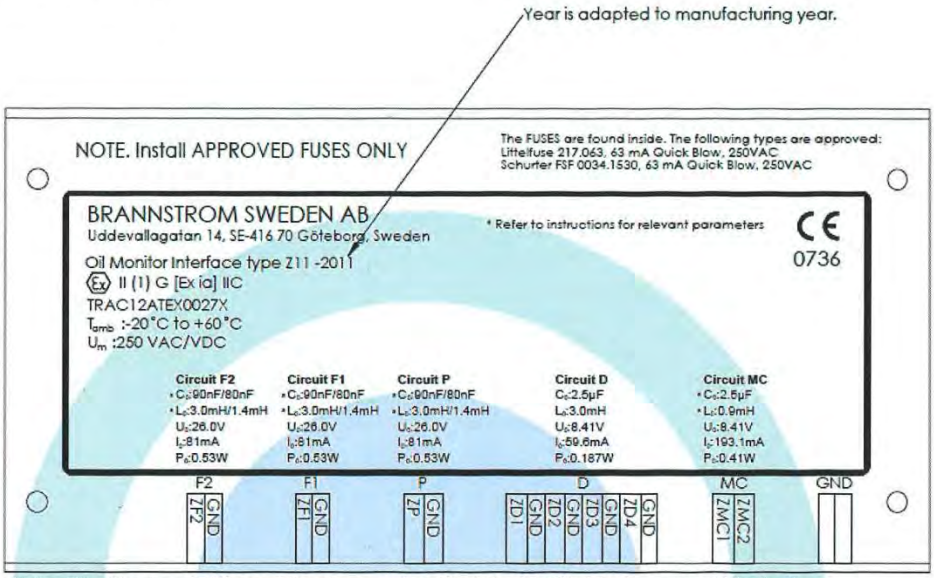
1. The transformer in this apparatus shall be subjected to a minimum of 600 V for a minimum of 1 second as part of routine testing. There shall no breakdown of insulation between windings or between any winding and the core or the screen.
2. Routine testing shall be done on each barrier to check correct operation of each barrier component and the resistance of the fuses.

21 Specific Conditions for Manufacture

None.

22 Photographs

23 Details of Markings



Note: The Number 0736 must be changed to reflect the Notified body responsible for the quality assurance.

24 Certificate History

Original certificate	2012-08-10	First issue.
Variation V1	2022-10-03	This certificate was originally issued by Notified Body number 0891 under Directive 2014/34/EU. The technical file has been transferred to Element Notified Body number 2812 with a gap analysis to updated standards

This certificate is a consolidated certificate and reflects the latest status of the certification, including all variations and amendments.

25 Notes to CE markin

In respect of CE Marking, Element Materials Technology accepts no responsibility for the compliance of the product against all applicable Directives in all applications.

26 Notes to this certificate

Element Materials Technology certification reference: ERO035075P41, (GU-BRNQ-0001)

Throughout this certificate, the date format yyyy-mm-dd (year-month-day) is used.

Notified Body number 2812 is the designation for Element Materials Technology Rotterdam BV.

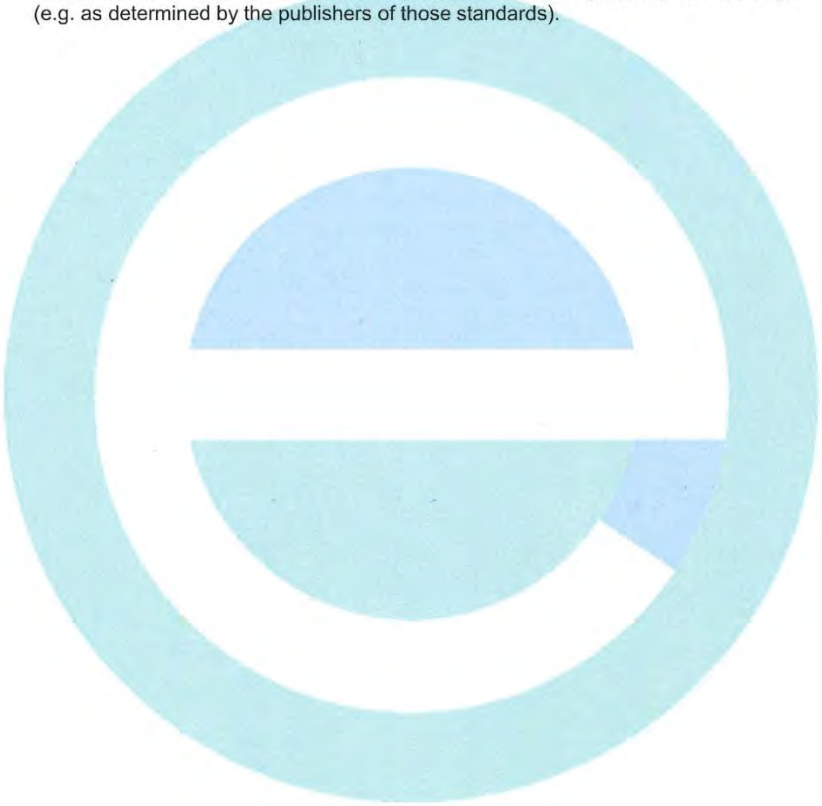
In accordance with Article 41 of Directive 2014/34/EU, EC-Type Examination Certificates referring to 94/9/EC that were in existence prior to the date of application of 2014/34/EU (20 April 2016) may be referenced as if they were issued in accordance with Directive 2014/34/EU. Variation certificates to such EC-Type Examination Certificates, and new issues of such certificates, may continue to bear the original certificate number issued prior to 20 April 2016.

27 Conditions for the validity of this certificate

This certificate remains valid for so long as:

(i) The equipment listed in section 4 is manufactured in accordance with the documents listed in Appendix A of this certificate.

(ii) The standards listed in section 9 of this certificate continue to satisfy the Essential Health and Safety Requirements of Annex II of Directive 2014/34/EU and the generally acknowledged state of the art (e.g. as determined by the publishers of those standards).



SCHEDULE TO EU - TYPE EXAMINATION CERTIFICATE

CERTIFICATE NUMBER TRAC12ATEX0027X (incorporating variation V1)

APPENDIX A - TECHNICAL DOCUMENTS

Title:	Drawing No.:	Rev. Level:	Date:
Z11 Oil Monitor interface (Schematics) (12 Pages)	ZB11201	C+	2012-07-26
Z11 Oil Monitor interface (Layout) (13 Pages)	ZB11202	C+	2012-06-27
Z11 COMPONENT LIST (16 Pages)	Z11120612.1	A	2012-06-27
Zenerbarrier Assembly, Parts (2 Pages)	CTB10034	A+	2011-12-06
ZB kapsling lock (2 Pages)	P3711047	C	2022-09-30
ZB kapsling bas (1 Page)	P3711048A	A+	2011-12-05
Z11, ZBNT TR2, Transformer (1 Page)	ZB111103.1	B+	2012-02-29
INSTRUCTIONS – Oil Monitor interface type Z11 (5 Pages)	ZB111205.1	B+	2012-07-03
ATEX TEST INSTRUCTIONS – Oil Monitor interface type Z11 (1 Page)	ZB120110.1	A+	2012-07-02
Z11 Oil Monitor interface capacitor (4 Pages)	ZB11202CAP	A+	2012-06-26
PCB Stackup (1 Page)	P3712052	A	2012-05-28

12.5. ATEX Certificate Measuring Cell

element

1 CONFORMITÉ EUROPÉENE

EU - TYPE EXAMINATION CERTIFICATE

2 **Product or Protective System Intended for use in Potentially Explosive Atmospheres Directive 2014/34/EU – Annex III**

3	EU - Type Examination Certificate No.:	**TRAC12ATEX0028X (incorporating variation V1)**
4	Product:	**Fluid Analyser / Measuring Cell, Type CTB11**
5	Manufacturer:	**BRANNSTROM SWEDEN AB**
6	Address:	**Uddevallagatan 14, SE-416, 70 Göteborg, Sweden**

7 This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8 Element Materials Technology, Notified Body number 2812, in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in the confidential report **TRA-009185-33-00A.**

9 Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN IEC 60079-0:2018 **EN IEC 60079-11:2012** **EN IEC 60079-26:2015**

Except in respect of those requirements listed at section 18 of the schedule.

10 If the sign "X" is placed after the certificate number, it indicates that the product is subject to specific conditions of use specified in the schedule to this certificate.

11 This EU - TYPE EXAMINATION CERTIFICATE relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

12 The marking of this product shall include the following:

Ex II 1 G Ex ia IIC T4 Ga **T_{amb} -40°C to +60°C**

This certificate and its schedules may only be reproduced in its entirety and without change. This certificate is issued in accordance with the Element Materials Technology Ex Certification Scheme.

S.P. Winsor

S P Winsor, Certification Manager

Issue date: 2022-09-30

Page 1 of 5

CSF355-NL 5.0

Element Materials Technology Rotterdam BV
Zekeringstraat 33, 1014 BV, Amsterdam, Netherlands
Registered in the Netherlands. Registered Office: PO Box 6854, 4802 HW, Breda, Netherlands
Company Reg. No. 24170257

13 SCHEDULE TO EU - TYPE EXAMINATION CERTIFICATE

14 CERTIFICATE NUMBER TRAC12ATEX0028X (incorporating variation V1)

15 Description of Product

The CleanTrack ODMCS [Oil Discharge Monitoring and Control System] is a monitoring system for the control of discharged ballast water from tankers and chemical tankers.

The measuring cell is a stationary device made out of aluminium body. It is electrically connected to a connection box that is power fed by an intrinsically safe and ATEX approved zener barrier Z11.

Table of entity parameters	
Parameter	Channel 1
Li	0.165 mH
Ci	2 µF
Ui	8.41 V
Pi	0.41 W
Ii	193.1 mA

16 Test Report No. (as added for this issue of the certificate): N/A

17 Specific Conditions of Use

1. The measuring cell has to be installed against a bulkhead or a wall in a console made out of stainless or painted mild steel according to the figure provided in the instruction manual or if necessary to be built in an enclosure.
2. The enclosure of the measuring cell must be earthed to avoid electrostatic discharges.
3. The connection cable capacitance shall not exceed 0.5µF and the cable inductance shall not exceed 0.70mH.

Attention is drawn to the operating and installation instructions which may contain useful information in relation to conditions of use.

18 Essential Health and Safety Requirements (Directive Annex II)

Element Materials Technology has conducted a gap analysis between the standards applied within the reports listed under section 8 and the latest versions of the corresponding harmonised standards (as listed in section 9). This analysis has confirmed continued compliance with the Essential Health and Safety Requirements. The analysis is detailed in report: TRA-055262-32-01A.

In addition to the Essential Health and Safety Requirements covered by the standards listed at item 9, all other requirements are demonstrated in the relevant reports.

19 Drawings and Documents

The list of controlled technical documentation is given in Appendix A to this schedule.

20 Routine Tests

1. The transformer in the apparatus shall be subjected to a minimum of 600 V for a minimum of 1 second as part of routine testing. There shall be no breakdown of insulation between windings or between any winding and the core or screen.

21 Specific Conditions for Manufacture

None.

22 Photographs

CTB11 top view

CTB11 side view

23 Details of Markings

24 Certificate History

Original certificate	2012-08-10	First issue.
Variation V1	2022-09-30	This certificate was originally issued by Notified Body number 0891 under Directive 2014/34/EU. The technical file has been transferred to Element Notified Body number 2812 with a gap analysis to updated standards

This certificate is a consolidated certificate and reflects the latest status of the certification, including all variations and amendments.

25 Notes to CE marking

In respect of CE Marking, Element Materials Technology accepts no responsibility for the compliance of the product against all applicable Directives in all applications.

26 Notes to this certificate

Element Materials Technology certification reference: ERO035075P42 (GU-BRNQ-0002).

Throughout this certificate, the date format yyyy-mm-dd (year-month-day) is used.

Notified Body number 2812 is the designation for Element Materials Technology Rotterdam BV.

In accordance with Article 41 of Directive 2014/34/EU, EC-Type Examination Certificates referring to 94/9/EC that were in existence prior to the date of application of 2014/34/EU (20 April 2016) may be referenced as if they were issued in accordance with Directive 2014/34/EU. Variation certificates to such EC-Type Examination Certificates, and new issues of such certificates, may continue to bear the original certificate number issued prior to 20 April 2016.

27 Conditions for the validity of this certificate

This certificate remains valid for so long as:

(i) The equipment listed in section 4 is manufactured in accordance with the documents listed in Appendix A of this certificate.

(ii) The standards listed in section 9 of this certificate continue to satisfy the Essential Health and Safety Requirements of Annex II of Directive 2014/34/EU and the generally acknowledged state of the art (e.g. as determined by the publishers of those standards).

SCHEDULE TO EU - TYPE EXAMINATION CERTIFICATE

CERTIFICATE NUMBER TRAC12ATEX0028X (incorporating variation V1)

APPENDIX A - TECHNICAL DOCUMENTS

Title:	Drawing No.:	Rev. Level:	Date:
CTB11 Measuring cell (Schematics) (12 Pages)	CTB11201	D+	2012-02-08
CTB11 Measuring cell (Layout) (10 Pages)	CTB11202	D+	2012-06-27
CTB11 Measuring cell component list (9 Pages)	CTB11203	A	2012-06-15
CTB11 Measuring cell display (Schematic) (1 Page)	CTB11211	D+	2011-12-19
CTB11 Measuring cell display (Layout) (5 Pages)	CTB11212	D+	2011-12-21
CTB11 Measuring cell key (2 Pages)	CTB11222	A+	2011-12-22
CT1000B, Sensor Assembly, Parts (3 Pages)	CTB10033	A+	2011-11-11
Sensor internals (2 Pages)	CTB10035	A+	2011-12-16
Sensor House (3 Pages)	P3710007	A+	2010-05-06
MC etk Ex (Marking label) (1 Page)	P3711050	C	2022-09-30
CTB11, Cleanmon Tr2 Transformer (1 Page)	+CTB111103.1	B+	2012-03-05
INSTRUCTIONS Measuring cell type CTB11 (3 Pages)	CTB111214.1	B+	2011-07-03
ATEX TEST INSTRUCTIONS Measuring cell type CTB11 (1 Page)	CTB120110.1	A+	2012-06-29
PCB Stackup (1 Page)	P3712052	A	2012-05-28

12.6. Pressure transmitter, Danfoss

12.6.1. Declaration of Conformity, Danfoss

ENGINEERING TOMORROW

Danfoss A/S
6430 Nordborg
Denmark
CVR nr.: 20 16 57 15

Telephone: +45 7488 2222
Fax: +45 7449 0949

EU DECLARATION OF CONFORMITY

Danfoss A/S

Industrial Automation

declares under our sole responsibility that the

Product category: Pressure Transmitter

Type designation(s): MBS 4201, MBS 4251, MBS 4701 and MBS 4751

Covered by this declaration is in conformity with the following directive(s), standard(s) or other normative document(s), provided that the product is used in accordance with our instructions.

EMC Directive 2014/30/EU

- EN61000-6-2:2005 Generic standards – Immunity standard for industrial environments
- EN61000-6-3:2007/A1:2011 Generic standards – Emission standard for residential, commercial and light industrial environments.

RoHS Directive 2011/65/EU and 2015/863/EU

- EN 50581:2012 Technical documentation for the assessment of electrical and electronics products with respect to the restriction of hazardous substances

ATEX Directive 2014/34/EU

Equipment and protective systems intended for use in potentially explosive atmospheres

• EN 60079-0 : 2012 +A11 : 2013	Equipment- general requirements
• EN 60079-11: 2012	Equipment - protection by intrinsic safety "i"
• EN 60079-26: 2015	Equipment - protection level (EPL) Ga

MBS 4201 / MBS 4251
CE 0539 Ex II 1G
Ex iA IIC T6...T4 Ga

MBS 4701 / MBS 4751
CE 0539 Ex II 1G
Ex iA IIC T4 Ga

EC-type Examination: DEMKO 01 ATEX 127938X

UL-DEMKO Notified Body no: 0539

Date: 2019.08.21 Place of issue:	Issued by	Date: 2019.08.21 Place of Issue:	Approved by
6430 Nordborg Denmark	**Signature:** **Name:** John Hansen **Title:** Product Manager	6430 Nordborg Denmark	**Signature:** **Name:** Christian Dall Larsen **Title:** Senior Director, Product Mgmt.

Danfoss only vouches for the correctness of the English version of this declaration. In the event of the declaration being translated into any other language, the translator concerned shall be liable for the correctness of the translation

ID No: 060R3142 **Revision No:** 07
This doc. is managed by 500B0577

Page 1 of 1

12.6.2. ATEX Certificate, Danfoss

[1] # EU-TYPE EXAMINATION CERTIFICATE

[2] **Equipment or Protective System intended for use in Potentially Explosive Atmospheres Directive 2014/34/EU**

[3] EU-Type Examination Certificate Number: **DEMKO 01 ATEX 127938X** Rev. 5

[4] Product: **Pressure Transmitters, Type MBS42x1/MBS47x1**

[5] Manufacturer: **Danfoss A/S**

[6] Address: **Bldg. E14-S1A, Nordborgvej 81, 6430 Nordborg, Denmark**

[7] This product and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to

[8] UL International Demko A/S, notified body number 0539 in accordance with Article 17 of the Council Directive 2014/34/EU of 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.
The examination and test results are recorded in confidential report no. **4789046177.1.1**

[9] Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 60079-0:2012+A11:2013 **EN 60079-11:2012** **EN 60079-26:2015**

[10] If the sign "X" is placed after the certificate number, it indicates that the product is subject to special conditions for safe use specified in the schedule to this certificate.

[11] This EU-Type Examination Certificate relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by the certificate.

[12] The marking of the product shall include the following:

II 1 G Ex ia IIC T4 Ga

II 1 G Ex ia IIC T6...T4 Ga

Certification Manager
Jan-Erik Storgaard

This is to certify that the sample(s) of the Product described herein ("Certified Product") has been investigated and found in compliance with the Standard(s) indicated on this Certificate, in accordance with the ATEX Product Certification Program Requirements. This certificate and test results obtained apply only to the product sample(s) submitted by the Manufacturer. UL did not select the sample(s) or determine whether the sample(s) provided were representative of other manufactured product. UL has not established Follow-Up Service or other surveillance of the product. The Manufacturer is solely and fully responsible for conformity of all product to all applicable Standards, specifications, requirements or Directives. The test results may not be used, in whole or in part, in any other document without UL's prior written approval.

Date of issue: 2001-01-31
Re-issued: 2019-07-31

Notified Body UL International Demko A/S, Borupvang 5A, 2750 Ballerup, Denmark
Tel. +45 44 85 65 65, info.dk@ul.com, www.ul.com

This certificate may only be reproduced in its entirety and without any change, schedule included.

[13]

[14]

Schedule
EU-TYPE EXAMINATION CERTIFICATE No.
DEMKO 01 ATEX 127938X Rev. 5

[15] Description of Product

The pressure transmitter consists of a cylindrical electronic case of stainless steel, which contains the pressure sensor and circuit board with the electronic components. The circuit board is embedded in casting compound. The transmitter converts the measured pressure into a current loop signal 4-20mA. The pressure connection is available in different shape and size. The connection to the transmitter can be through a plug or with a fixed cable.

Nomenclature

The complete product nomenclature is:

MBS4	A	B	1	–	CC	D	E	–	FF	GGGG	–	H
I	II	III			IV	V	VI		VII	VIII		IX

Nomenclature Identifier	Description	
I	Model Identifier	
II	2 (fixed scaling) or 7 (user adjustable scaling)	
III	0 (no cavitation filter) or 5 (integral cavitation filter)	
IV	2 digit code signifying measuring range from 0-1 bar to 0-600 bar (below 600 bar considered not relevant to certification).	
V	1 digit code signifying relative or absolute pressure measurement (considered not relevant to certification).	
VI	1 (signifies a 4 – 20 mA output signal).	
VII	2 digit code signifying electrical connection:	A0 (No Plug EN 175301-803-A) A1 (Plug PG9 EN 175301-803-A) A6 (Plug PG11 EN 175301-803-A) G9 (Plug Bayonet A1-3.2- ISO 15170-Sn)* DB (Cable Screened 2m Blue PVC)* DC (Cable Screened 5m Blue PVC)* J1 (Cable Screened 7m Blue PVC)* DF (Cable Screened 12m Black ETFE Marine approved)* DH (Cable Screened 6m Black ETFE Marine approved)* *Only MBS 4201 and MBS 4251
VIII	4 digit code signifying the pressure connection options (considered not relevant to certification)	
IX	1 digit code signifying gasket:	0 (No Gasket) 1 (Gasket Viton -20 °C – 125 °C) 2 (Gasket NBR -40 °C – 85 °C) 3 (O-Ring Viton -20 °C – 125 °C) 4 (O-Ring NBR -40 °C – 125 °C)

All types consist of a piezo-resistive sensing element and electronics housed in a stainless steel housing. The sensing element is sealed in such a way that measured process pressures do not influence the electronics. The electronics consists of a common 'Bottom PCB', a common 'Hybrid PCB' and 1 of 3 different filter PCB.

The sensing element is soldered directly to the Bottom PCB, which in turn is soldered to the Hybrid PCB. Bottom and Hybrid PCBs are encapsulated.

Pins for wired connections from the Bottom PCB emerge from the encapsulated portion of the transmitter and connect to the Filter PCB which is not encapsulated.

Fixed cable types have the external cable soldered directly to the Filter PCB. Pins for connector types (fixed scaling) solder directly to the Filter PCB. Adjustable scaling sensor types have a different design of end enclosure part allowing access to internal trimming potentiometers and have wired connections between the Filter PCB and external connection pins.

Cable fixing (fixed PVC cable types) and mechanisms for external connections are moulded plastic parts. Cable fixing for ETFE cable types is via a bespoke integral, metallic, crimp-type connection with heat shrink applied over the crimp.

Markings are provided by a label fixed to the main body of the sensor.

This certificate may only be reproduced in its entirety and without any change, schedule included.

[13]
[14]

Schedule
EU-TYPE EXAMINATION CERTIFICATE No.
DEMKO 01 ATEX 127938X Rev. 5

Temperature range
The relation between ambient temperature and the assigned temperature class is as follows:

Adjustable Type, MBS47x1-xxxx-Yxxxx-x (Y=A0, A1, A6, G9 are indicative for plug type)

Ambient Temperature	T4	-40 °C to +100 °C
Media Temperature	T4	-40 °C to +125 °C

Plug Type, non-adjustable, MBS42x1-xxxx-Yxxxx-x (Y=A0, A1, A6, G9 are indicative for plug type)

Ambient Temperature	T4	-40 °C to +100 °C
	T5	-40 °C to +75 °C
	T6	-40 °C to +50 °C
Media Temperature	T4	-40 °C to 125 °C
	T5	-40 °C to +95 °C
	T6	-40 °C to +50 °C

Fixed Cable Types, non-adjustable, MBS 42x1-xxxx-Yxxxx-x (Y = DB, DC, J1, DF, DH are indicative cable lengths, max. 12 m)

		DB, DC, J1 PVC cable	DH, DF ETFE cable
Ambient Temperature (fixed installations)	T4	-40 °C to +80 °C	-40 °C to +95 °C
	T5	-40 °C to +75 °C	-40 °C to +75 °C
	T6	-40 °C to +50 °C	-40 °C to +50 °C
Ambient Temperature (cables flexed during installation or operation)	T4	-5 °C to +70 °C	-5 °C to +70 °C
	T5	-5 °C to +70 °C	-5 °C to +70 °C
	T6	-5 °C to +50 °C	-5 °C to +50 °C
Media Temperature	T4	-40 °C to +125 °C	-40 °C to +125 °C
	T5	-40 °C to +95 °C	-40 °C to +95 °C
	T6	-40 °C to +50 °C	-40 °C to +50 °C

Electrical data

Intrinsically safe specifications:

For all types:
U_i : 28 V
I_i : 100 mA
P_i : 0.7 W
L_i : 8 uH
C_i : 50 nF

The fixed cable type models may be provided with either a PVC cable with a maximum cable length of 7 m or an ETFE cable with a maximum cable length of 12 m.

Routine tests
Not applicable

[16] Descriptive Documents
The scheduled drawings are listed in the report no. provided under item no. [8] on page 1 of this EU-Type Examination Certificate.

[17] Specific conditions of use:

- For installations in which both the Ci and Li of the connected apparatus exceeds 1% of the Co and Lo parameters (excluding the cable), then 50% of Co and Lo parameters are applicable and shall not be exceeded.
- Special precautions are necessary to reduce the risk due to electro-static discharge. Refer to the installation/operation instructions.
- The installation shall ensure that the resistance to earth of metallic parts of the equipment enclosure is less than 1 GOhm.
- The equipment does not provide 500 V isolation to earth as required by EN 60079-11, clause 6.3.13.

 This certificate may only be reproduced in its entirety and without any change, schedule included.

[13]
[14]

Schedule
EU-TYPE EXAMINATION CERTIFICATE No.
DEMKO 01 ATEX 127938X Rev. 5

- Installations of the pressure connection across boundary walls requiring Category 1G equipment and a less hazardous area must be gas tight as required by EN 60079-26. Gaskets and seals used at the pressure connection must be suitable for use with the process medium. Refer to the user instructions.

[18] Essential Health and Safety Requirements
The Essential Health and Safety Requirements (EHSRs) are covered by the standards listed at item 9.

Additional information

The trademark Danfoss will be used as the company identifier on the marking label.

The manufacturer shall inform the notified body concerning all modifications to the technical documentation as described in Annex III to Directive 2014/34/EU of the European Parliament and the Council of 26 February 2014.

This certificate may only be reproduced in its entirety and without any change, schedule included.

12.7. Pressure transmitter, Siemens

12.7.1. Declaration of Conformity, Siemens

SIEMENS

EU Declaration of Conformity

EU-Konformitätserklärung *Déclaration UE de conformité*

No./ *Nr./ N°.* A5E38498463A/006

Manufacturer *Hersteller / Fabricant*	Siemens AG
Address *Anschrift / Adresse*	DE-76181 Karlsruhe
Product identification *Produktbezeichnung /Identificateur*	**Pressure transmitter / Druckmeßumformer** **SITRANS P200, SITRANS P210, SITRANS P220** Type / Typ / Type 7MF156a-bcdef-ghjk-Z

This declaration of conformity is issued under the sole responsibility of the manufacturer.
The object of the declaration described above is in conformity with the relevant harmonisation legislation and their amendments of the European Union:

Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller.
Der oben beschriebene Gegenstand der Erklärung erfüllt die einschlägigen Harmonisierungsrechtsvorschriften und deren Ergänzungen der Europäischen Union:

La présente déclaration de conformité est établie sous la seule responsabilité du fabricant.
L'objet de la déclaration décrit ci-dessus est conforme à la législation d'harmonisation de l'Union européenne suivantes de leurs amendements applicables :

EMC – 2014/30/EU

Directive of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to electromagnetic compatibility. (OJ L 96, 29.3.2014)

Richtlinie des Europäischen Parlaments und des Rates zur Harmonisierung der Rechtsvorschriften der Mitgliedstaaten über die elektromagnetische Verträglichkeit. (ABl. L 96 vom 29.3.2014)

Directive du Parlement européen et du Conseil relative à l'harmonisation des législations des États membres concernant la compatibilité électromagnétique. (JO L 96 du 29.3.2014)

ATEX – 2014/34/EU

Directive of the European Parliament and the Council on the harmonisation of the laws of the Member States relating to equipment and protective systems intended for use in potentially explosive atmospheres. (OJ L 96, 29.3.2014)

Richtlinie des Europäischen Parlaments und des Rates zur Harmonisierung der Rechtsvorschriften der Mitgliedstaaten für Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen. (ABl. L 96 vom 29.3.2014)

Directive du Parlement européen et du Conseil relative à l'harmonisation des législations des États membres concernant les appareils et les systèmes de protection destinés à être utilisés en atmosphères explosibles. (JO L 96 du 29.3.2014)

RoHS – 2011/65/EU

Directive of the European Parliament and the Council on the restriction of the use of certain hazardous substances in electrical and electronic equipment. (OJ L 174, 1.7.2011)

Richtlinie des Europäischen Parlaments und des Rates zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräte. (ABl. L 174 vom 1.7.2011)

Directive du Parlement européen et du Conseil relative à la limitation de l'utilisation de certaines substances dangereuses dans les équipements électriques et électroniques. (JO L 174 du 1.7.2011)

This declaration is an attestation of conformity with the indicated Directive(s) but does not imply any guarantee of quality or durability.
The safety instructions of the accompanying product documentation shall be observed.

Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, ist jedoch keine Beschaffenheits- oder Haltbarkeitsgarantie.
Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.

Cette déclaration certifie la conformité aux directives susmentionnées, mais ne constitue pas une garantie de qualité ou de durabilité.
Les consignes de sécurité figurant dans la documentation fournie avec le produit doivent être respectées.

Siemens Aktiengesellschaft: Chairman of the Supervisory Board: Jim Hagemann Snabe; Managing Board: Roland Busch, Chairman, President and Chief Executive Officer; Cedrik Neike, Matthias Rebellius, Ralf P. Thomas, Judith Wiese; Registered offices: Berlin and Munich, Germany; Commercial registries: Berlin-Charlottenburg, HRB 12300, Munich, HRB 6684; WEEE-Reg.-No. DE 23691322

SIEMENS

EU Declaration of Conformity

EU-Konformitätserklärung *Déclaration UE de conformité*

No./ *Nr./ N°.* A5E38498463A/006

Further information about the conformity to this Directive(s) is given in the Annex, which is an integral part of this declaration of conformity.

Weitere Angaben über die Einhaltung dieser Richtlinie(n) enthält der Anhang, der ein integraler Bestandteil dieser Konformitätserklärung ist.

De plus amples informations sur la conformité à cette (ces) directive(s) sont disponibles dans l'annexe, qui fait partie intégrale de la présente déclaration de conformité.

Signed for and on behalf of:
Unterzeichnet für und im Namen von: / Signé par et au nom de:

Siemens Aktiengesellschaft

Karlsruhe, 03.02.2022

Volker Rissland,

Research & Development /
Entwicklung / Recherche & Développement

Signature / *Unterschrift / Signature*

Jürgen Pflaum,

Quality /
Qualität / Qualité

Signature / *Unterschrift / Signature*

This declaration is an attestation of conformity with the indicated Directive(s) but does not imply any guarantee of quality or durability.
The safety instructions of the accompanying product documentation shall be observed.

Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, ist jedoch keine Beschaffenheits- oder Haltbarkeitsgarantie. Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.

Cette déclaration certifie la conformité aux directives susmentionnées, mais ne constitue pas une garantie de qualité ou de durabilité. Les consignes de sécurité figurant dans la documentation fournie avec le produit doivent être respectées.

Siemens Aktiengesellschaft: Chairman of the Supervisory Board: Jim Hagemann Snabe; Managing Board: Roland Busch, Chairman, President and Chief Executive Officer; Cedrik Neike, Matthias Rebellius, Ralf P. Thomas, Judith Wiese; Registered offices: Berlin and Munich, Germany; Commercial registries: Berlin-Charlottenburg, HRB 12300, Munich, HRB 6684; WEEE-Reg.-No. DE 23691322

SIEMENS

Annex A to EU Declaration of Conformity

Anhang A zur EU-Konformitätserklärung *Annexe A de la Déclaration UE de conformité*

No./ *Nr./ N°.* A5E38498463A/006

Product identification *Produktbezeichnung /Identificateur*	**Pressure transmitter / Druckmeßumformer** **SITRANS P200, SITRANS P210, SITRANS P220** **Type / Typ / Type** 7MF156a-bcdef-ghjk-Z

The conformity of the product described above with the provisions of the applied Directive(s) is demonstrated by compliance with the following standards / regulations:

Die Übereinstimmung des bezeichneten Produkts mit den Vorschriften der angewandten Richtlinie(n) wird nachgewiesen durch die Einhaltung folgender Normen/ Vorschriften:

La conformité du produit décrit ci-dessus aux exigences essentielles de la (des) Directive(s) Européenne(s) appliquée(s) est démontrée par le respect des normes / règlements suivants :

Directive *Richtlinie* *Directive*	Standard / Reference number *Norm /* *Referenznummer* *Norme / référence*	Edition *Ausgabedatum* *Edition*	a=	b=	c=	d=	e + f	g=	h=	j=	k=
2014/30/EU	EN 61326-1 *	2013	5,6,7	3,4,5 6,7,9	A,B,C D,E	A,B,C,D E,F,G	00, 01 10, 20 30	1,2,3,4 5,6,7,9	A,B,C,D E,F,G,H J,P,Q,R Y,Z	A,B,C,D Z	1,3
2014/30/EU	EN 61326-2-3 *	2013									
2014/30/EU	EN 55011	2009/A1:2010									
2014/30/EU	EN 61000-6-2	2005									
2014/30/EU	EN 61000-6-3	2007/A1:2011									
2014/34/EU	EN IEC 60079-0	2018		3,4,5 6,9			01	1,2,5,6 9	A,B,C,D E,F,G,H J,P,Q,R Z		
2014/34/EU	EN 60079-11	2012									
2014/34/EU	EN 60079-26	2015									

* all environments included / *beinhaltet alle Umgebungen / dans tout type d'environnement*

Certificates / *Zertifikate / Certificats*

EC-type examination certificate *EG-Baumusterprüfbescheinigung* *Certificat évaluation de type*	Marking *Kennzeichnung* *Marquage*	a=	b=	c=	d=	e + f	g=	h=	j=	k=
SEV 10 ATEX 0146	II 1/2 GD	5,6,7	3,4,5,6 9	A,B,C D,E	A,B,C,D E,F,G	01	1,2,5,6 9	A,B,C,D E,F,G,H J,P,Q,R Z	A,B,C,D Z	1,3

The article/ product number may or may not include additional "Z – order codes" indicating accessories, which are not relevant for Approval/ Certification (e.g. ATEX).

Die Artikel-/ Produktnummer kann zusätzliche "Z-Optionen" enthalten, die Zubehörteile angeben, die für die Zulassung/ Zertifizierung (z.B. ATEX) nicht relevant sind.

Le numéro de l'article/ produit peut contenir des "options Z" supplémentaires indiquant des accessoires qui ne sont pas pertinents pour l'approbation/certification (par ex. ATEX).

Inspection/ Surveillance / *Kontrolle/ Überwachung / Contrôle / Surveillance*

Directive *Richtlinie* *Directive*		Notified Body Product Quality Assurance *Benannte Stelle Qualitätssicherung Produktion* *Organisme notifié*	No.:
2014/34/EU	ATEX	CSA Group Netherlands B.V. – Utrechtseweg 310 (B42), 6812 AR ARNHEM, Netherlands	2813

12.7.2. ATEX Certificate, Siemens

eurofins | E&E

EU-Type Examination Certificate

(1)

(2) Equipment or protective system intended for use in potentially explosive atmospheres **- Directive 2014/34/EU**

(3) Certificate number: **SEV 10 ATEX 0146**

(4) Product: Pressure transmitter, Types: SITRANS P200, type 7MF1565-*, SITRANS P210, type 7MF1566-*, SITRANS P220, type 7MF1567-*

(5) Manufacturer: Siemens AG

(6) Address: Östliche Rheinbrückenstr. 50, 76187 Karlsruhe, Germany

(7) The equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(8) Eurofins, notified body No. 1258, in accordance with article 17 of Directive 2014/34/EU of the European parliament and of the council, dated 26 February 2014, certifies that this product has been found to comply with the essential health and safety requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.
The examination and test results are recorded in confidential report no 21CH-00562.X43

(9) Compliance with the essential health and safety requirements has been assured by compliance with:

EN IEC 60079-0:2018
EN 60079-11:2012
EN 60079-26:2015

Except in respect of those requirements listed at item 18 of the schedule.

(10) If the sign «X» is placed after the certificate number, it indicates that the product is subjected to special conditions for safe use specified in the schedule to this certificate. The sign "U" is placed after the certificate number. It indicates that this certificate must not be mistaken for a certificate intended for an equipment or protective system. This partial certification may be used as a basis for certification of an equipment or protective system.

(11) This EU type examination certificate relates only to design and construction of the specified product. Further requirements of this directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

(12) The marking of the product shall include the following:

II 1/2G Ex ia IIC T4 Ga/Gb
II 1/2D Ex ia IIIC T125 °C Da/Db

Eurofins Electric & Electronic Product Testing AG
Notified Body ATEX

Martin Plüss
Product Certification

www.eurofins.ch Fehraltorf, 2021-12-16 Issue: 3 Page 1 of 2

T8a_V01

eurofins | E&E

(13) # Appendix

(14) **EU-Type Examination Certificate no. SEV 10 ATEX 0146**

(15) **Description of product**

The pressure transmitter is used to measure relative and absolute pressure of gases, liquids and refrigerants (incl. ammonia). The pressure transmitter differ in the pressure measuring cell and the pressure range. For the measuring of the pressure the signal of a pressure measuring cell made of stainless steel or made of ceramic with a membrane is converted into a 4...20 mA output signal by the electronic.
The pressure transmitter can be installed in the partition which separates the area, which requires apparatus of category 1 from the area, which requires apparatus of category 2. The pressure measuring cell may be used only for flammable substances for which the membranes of cells are sufficiently chemically and corrosion resistant.
Effective internal inductance and capacitance for versions with plugs complying with EN 175301-80 A (IP65) or M12x1 (IP67).

Classification of installation and use:	stationary
Ingress protection:	IP65 with connector EN 175301-803A IP67 with connector M12x1
Rated ambient temperature range (°C):	-25 °C ≤ Tamb ≤ +85 °C
Rated medium temperature range (°C):	-30 °C ... +120 °C
Rated ambient temperature range (°C) for Ex Components:	N/A

Ratings:
Connection to certified intrinsically safe resistive circuits with maximum values:

Ui ≤ 30 V
Ii ≤ 100 mA
Pi ≤ 750 mW
Ci = 0 nF
Li = 0 µH

Output:
4 ... 20 mA

(16) **Report number** 21CH-00562.X43

(17) **"Special conditions for safe use" / "Schedule of limitations"**

None

(18) **Essential health and safety requirements**

In addition to the essential health and safety requirements (EHSRs) covered by the standards listed at item 9, the following are considered relevant to this product, and conformity is demonstrated in the report:

Clause **Subject**
None

(19) **Drawings and Documents**

See test report "Manufacturer's Documents"

12.8. Flow meter, Siemens

Translation

EU-Type Examination Certificate Supplement 2

2 **Equipment intended for use in potentially explosive atmospheres Directive 2014/34/EU**

3 EU-Type Examination Certificate Number: **BVS 18 ATEX E 049 X**

4 Product: **Pressure Transmitter Sitrans P*20 type 7MF0**c-*****-*a**-Z+E20**

5 Manufacturer: **Siemens AG**

6 Address: **76181 Karlsruhe, Germany**

7 This supplementary certificate extends EU-Type Examination Certificate No. BVS 18 ATEX E 049 X to apply to products designed and constructed in accordance with the specification set out in the appendix of the said certificate but having any acceptable variations specified in the appendix to this certificate and the documents referred to therein.

8 DEKRA Testing and Certification GmbH, Notified Body number 0158, in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.
The examination and test results are recorded in the confidential Report No. BVS PP 18.2131 EU.

9 The Essential Health and Safety Requirements are assured in consideration of:

EN IEC 60079-0:2018	**General requirements**
EN 60079-1:2014	**Flameproof enclosure "d"**
EN IEC 60079-7:2015 + A1:2018	**Increased Safety "e"**
EN 60079-11:2012	**Intrinsic Safety "i"**
EN 60079-26:2015	**Equipment with equipment protection level (EPL) Ga**
EN 60079-31:2014	**Protection by enclosures "t"**

10 If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Special Conditions for Use specified in the appendix to this certificate.

11 This EU-Type Examination Certificate relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

12 The marking of the product shall include the following:

Ex **See 15.1**

DEKRA Testing and Certification GmbH
Bochum, 2020-11-02

Signed: Jörg-Timm Kilisch

Managing Director

This certificate may only be reproduced in its entirety and without any change.

DEKRA Testing and Certification GmbH, Handwerkstr. 15, 70565 Stuttgart, Germany
Certification body: Dinnendahlstr. 9, 44809 Bochum, Germany
Phone +49.234.3696-400, Fax +49.234.3696-401, e-mail DTC-Certification-body@dekra.com

13 **Appendix**

14 **EU-Type Examination Certificate**

BVS 18 ATEX E 049 X
Supplement 2

15 **Product description**

15.1 **Subject and type**

Pressure Transmitter SITRANS

P320 Type 7MF030c-*****-*a**-Z+E20 P420 Type 7MF040c-*****-*a**-Z+E20 P520 Type 7MF050c-*****-*a**-Z+E20	Relative pressure
P320 Type 7MF031c-*****-*a**-Z+E20 P420 Type 7MF041c-*****-*a**-Z+E20 P520 Type 7MF051c-*****-*a**-Z+E20	Relative pressure based on model range differential pressure
P320 Type 7MF032c-*****-*a**-Z+E20 P420 Type 7MF042c-*****-*a**-Z+E20 P520 Type 7MF052c-*****-*a**-Z+E20	Absolute pressure based on model range relative pressure
P320 Type 7MF033c-*****-*a**-Z+E20 P420 Type 7MF043c-*****-*a**-Z+E20 P520 Type 7MF053c-*****-*a**-Z+E20	Absolute pressure based on model range differential pressure
P320 Type 7MF034c-*****-*a**-Z+E20 P420 Type 7MF044c-*****-*a**-Z+E20 P520 Type 7MF054c-*****-*a**-Z+E20	Differential pressure and flow
P320 Type 7MF035c-*****-*a**-Z+E20 P420 Type 7MF045c-*****-*a**-Z+E20 P520 Type 7MF055c-*****-*a**-Z+E20	Differential pressure and flow
P320 Type 7MF036c-*****-*a**-Z+E20 P420 Type 7MF046c-*****-*a**-Z+E20 P520 Type 7MF056c-*****-*a**-Z+E20	Level

The difference between Sitrans P320, P420 and P520 is only the measurement accuracy. Asterisks are not relevant for explosion protection.

a:

7MF0**c-*****-*B**-Z+E20	II 1/2G Ex ia IIC T4/T6 Ga/Gb II 2G Ex ib IIC T4/T6 Gb II 3G Ex ic IIC T4/T6 Gc (only for c=1,2)
7MF0**c-*****-*C**-Z+E20	II 1/2G Ex ia/db IIC T4/T6 Ga/Gb II 2G Ex db ia IIC T4/T6 Gb
7MF0**c-*****-*D**-Z+E20	II 1/2G Ex ia IIC T4/T6 Ga/Gb II 3G Ex ic IIC T4/T6 Gc (only for c=1,2) II 1/2G Ex ia/db IIC T4/T6 Ga/Gb
7MF0**c-*****-*L**-Z+E20	II 2D Ex tb IIIC T120°C Db II 3D Ex tc IIIC T120°C Dc II 3G Ex ec IIC T4/T6 Gc
7MF0**c-*****-*M**-Z+E20	II 1D Ex ia IIIC T120°C Da II 1/2G Ex ia IIC T4/T6 Ga/Gb II 3G Ex ic IIC T4/T6 Gc (only for c=1,2) II 2D Ex tb IIIC T120°C Db II 3G Ex ec IIC T4/T6 Gc
7MF0**c-*****-*S/T**-Z+E20	II 1/2G Ex ia/db IIC T4/T6 Ga/Gb II 1/2G Ex ia IIC T4/T6 Ga/Gb II 3G Ex ic IIC T4/T6 Gc (only for c=1,2) II 2D Ex tb IIIC T120°C Db II 3G Ex ec IIC T4/T6 Gc

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c:

c = 0	HART communication
c = 1	Profibus (PA) communication
c = 2	Foundation Fieldbus (FF) communication

Z:

Z = A32, A33, A36, A37, A41	Han plugs
Z = A62, A63	M12 plugs - **this option has type of protection "ic"**
Z = L34	M12 Anheuser Busch plug
Z = D70	Over voltage protection up to 6 kV (internal)

Further options for Z are not relevant for the parameters or ex-relevant usage of the device.

15.2 **Description**

The Pressure Transmitter SITRANS P*20 type 7MF0**c-*****-*a**-Z+E23 measures, transforms and visualizes the pressure of gases, vapors and fluids of a connected process.

Types HART (c = 0) of the pressure transmitter consist of

- housing type A5E37496575 acc. to BVS 18 ATEX E 050 U (BVS PP 18.2086 EU) (including measuring cells) resp. IECEx BVS 18.0039U (DE/BVS/18/2087)
- electronic module SSS-P (A5E37053323) acc. to BVS 18 ATEX E 064 U (BVS PP 18.2112 EU) resp. IECE BVS 18.0054U (DE/BVS/18/2113)
- electronic module DSS-S Adv (A5E37777573) acc. to BVS 18 ATEX E 064 U (BVS PP 18.2112 EU) resp. IECEx BVS 18.0052U (DE/BVS/18/2109)
- electronic module TASS-P (A5E35435311) acc. to BVS 18 ATEX E 060 U (BVS PP 18.2103 EU) resp. IECEx BVS 18.0050U (DE/BVS/18/2104)
- electronic module TSS-P (A5E35435362) acc. to BVS 18 ATEX E 061 U (BVS PP 18.2106 EU) resp. IECEx BVS 18.0051U (DE/BVS/18/2107)

Types PA-FF (c = 1 or 2) of the pressure transmitter consist of

- housing type A5E37496575 acc. to BVS 18 ATEX E 050 U (BVS PP 18.2086 EU) (including measuring cells) resp. IECEx BVS 18.0039U (DE/BVS/18/2087)
- electronic module SSS-P (A5E37053323) acc. to BVS 18 ATEX E 064 U (BVS PP 18.2112 EU) resp. IECEx BVS 18.0054U (DE/BVS/18/2113)
- electronic module DSS-S Adv (A5E37777573) acc. to BVS 18 ATEX E 064 U (BVS PP 18.2112 EU) resp. IECEx BVS 18.0052U (DE/BVS/18/2109)
- electronic module TASS-P-PA-FF (A5E44557699) acc. to BVS 20 ATEX E 046 U (BVS PP 20.2063 EU) resp. IECEx BVS 20.0036U (DE/BVS/20/2062)
- electronic module TSS-P-P-PA-FF (A5E31945956) acc. to BVS 20 ATEX E 053 U (BVS PP 20.2082 EU) resp. IECEx BVS 20.0046U (DE/BVS/20/2083)
-

The type of protection of the pressure transmitter depends on the supply and type listed above.

Reason of supplement

- Types added (P520, PA-FF)
- Connector variations added type M12 (A62, A63) and M12 Anheuser Busch plug (L34)
- Material of type label changed

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15.3 **Parameters**

15.3.1 **Electrical Parameter type HART (c = 0)**

15.3.1.1 **For use as intrinsically safe component:**
connect to an intrinsically safe circuit; level of protection "ia", "ib"

15.3.1.1.1 **Supply circuit**
Terminals X1(+) und X4(-)

Maximum internal inductance	L_i		240	nH
Maximum internal capacitance	C_i		3.3	nF
Maximum input voltage	U_i	DC	30	V
Maximum input current	I_i		101	mA
Maximum input power	P_i		760	mW

or

Maximum input voltage	U_i	DC	29	V
Maximum input current	I_i		110	mA
Maximum input power	P_i		800	mW

15.3.1.1.2 **Interface for connecting a current measuring device**
Contacts Test X2(+), X3(-)

For connection of an active current measuring circuit with protection level "ia":
In this case, the allowable parameters of the supply circuit apply for the supply and meter circuit combination.

or

For connecting a passive, floating power meter (device without own power supply, without battery or mains connection)

Note:

Within potentially explosive atmospheres, only simple electrical equipment or certified equipment may be connected.

15.3.1.2 **For connection to a non-intrinsically safe circuit**
(Type of protection "db", "ec", "tb" or "tc")

15.3.1.2.1 Supply circuit

Nominal voltage		DC	10.5...45	V
Nominal current			0...20	mA
Maximum input voltage	U_m	DC	55	V

For type of protection "db": When used as a partition wall device at areas that require EPL Ga, a power supply is required which is safely isolated from earth. This can be achieved e.g. by use of a SELV power supply unit.

15.3.1.2.2 Interface for connecting a current measuring device
Contacts Test X2(+), X3(-)

Only for use outside potentially explosive areas!

To connect an ammeter:

For connection of an active current measuring circuit, the allowable parameters of the supply circuit apply to the supply and meter circuit combination.

15.3.2 **Electrical Parameter type PA-FF (c = 1 oder 2)**

15.3.2.1 **For use as intrinsically safe component:**

15.3.2.1.1 connect to an intrinsically safe circuit; level of protection "ia", "ib"

Supply circuit
Terminals X1(+) und X4(-)

Maximum internal inductance	L_i		4.8	µH
Maximum internal capacitance	C_i		1.1	nF
Maximum input voltage	U_i	DC	24	V
Maximum input current	I_i		174	mA
Maximum input power	P_i		1000	mW

or

FISCO

Maximum input voltage	U_i	DC	17.5	V
Maximum input current	I_i		380	mA
Maximum input power	P_i		5320	mW

15.3.2.1.2 Connect to an intrinsically safe circuit; level of protection "ic"
Supply circuit
Terminals X1(+) und X4(-)

Maximum internal inductance	L_i		4.8	µH
Maximum internal capacitance	C_i		1.1	nF
Maximum input voltage	U_i	DC	32	V
Maximum input current	I_i		132	mA
Maximum input power	P_i		1000	mW

or

FISCO

Maximum input voltage	U_i	DC	17.5	V
Maximum input current	I_i		570	mA

15.3.2.2 For connection to a non-intrinsically safe circuit
(Type of protection "db", "ec", "tb" or "tc")

15.3.2.2.1 Supply circuit

Nominal voltage		DC	10.5...45	V
Nominal current			0...20	mA
Maximum input voltage	U_m	DC	55	V

For type of protection "db": When used as a partition wall device at areas that require EPL Ga, a power supply is required which is safely isolated from earth. This can be achieved e.g. by use of a SELV power supply unit.

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15.3.3 **Thermal parameters**

	Temperature class / max. surface temperature T	Permissible ambient temperature	Permissible medium temperature
"ia", "ib" HART	T4	-40 °C to +80 °C	-40 °C to +100 °C
"ia", "ib", "ic" PA-FF	T4	-40 °C to +75 °C	-40 °C to +100 °C
"ia", "ib" HART	T6	-40 °C to +55 °C	-40 °C to +70 °C
"ia", "ib", "ic" PA-FF	T6	-40 °C to +50 °C	-40 °C to +70 °C
"ia IIIC" HART	T120 °C	-40 °C to +80 °C	-40 °C to +100 °C
"ia IIIC" PA-FF	T120 °C	-40 °C to +75 °C	-40 °C to +100 °C
"db"	T4	-40 °C to +80 °C	-40 °C to +100 °C
"db"	T6	-40 °C to +70 °C	-40 °C to +70 °C
"ec"	T4	-40 °C to +80 °C	-40 °C to +100 °C
"ec"	T6	-40 °C to +40 °C	-40 °C to +70 °C
"tc", "tb"	T120 °C	-40 °C to +80 °C	-40 °C to +100 °C

16 **Report Number**

BVS PP 18.2131 EU, as of 2020-11-02

17 **Special Conditions for Use**

17.1 For type of protection "db": When used as a partition wall device at areas that require EPL Ga, a power supply is required which is safely isolated from earth. This can be achieved e.g. by use of a SELV power supply unit.

17.2 For type of protection "db": Repairs of flame-proof joints can only be done by the original manufacturer.

17.3 For type of protection "ec": Class 2 power supply or transient protection shall be provided that is set at a level not exceeding 140 % of the peak rated voltage value at the supply input.

17.4 The transmitter with overvoltage protection TSS-P 6kV (order option D70) does not withstand the dielectric strength test with 500 V_{eff} according to IEC 60079-11. This must be considered during installation. The dielectric strength test can be carried out with a maximum of 500 V DC for 1 min.

17.5 The plug connection type HAN 7D/8U (A32, A33, A36, A37, A41) and type M12 (A62, A63) and type M12 Anheuser Busch plug (L34) may only be operated in combination with an intrinsically safe transmitter (with an intrinsically safe circuit up to max. 30 V).

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18 **Essential Health and Safety Requirements**

The Essential Health and Safety Requirements are covered by the standards listed under item 9.

19 **Drawings and Documents**

Drawings and documents are listed in the confidential report.

We confirm the correctness of the translation from the German original.
In the case of arbitration only the German wording shall be valid and binding.

DEKRA Testing and Certification GmbH
Bochum, 2020-11-02
BVS-Scho/Mu A 20200668

Managing Director

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12.9. Flow meter, Fuji

CERTIFICATE

EU-Type Examination

(1)

(2) **Equipment or protective systems intended for use in potentially explosive atmospheres - Directive 2014/34/EU**

(3) EU-Type Examination Certificate Number: **DEKRA 13ATEX0222 X** Issue Number: **2**

(4) Product: **Electronic Pressure Transmitters Type FCX-AIII or FCX-AII**

(5) Manufacturer: **Fuji Electric Co., Ltd.**

(6) Address: **1, Fuji-machi, Hino-City, Tokyo 191-8502, JAPAN**

(7) This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(8) DEKRA Certification B.V., Notified Body number 0344 in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential test report number 216829300, issue 2.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 60079-0 + A11 : 2013 **EN 60079-11 : 2012**

except in respect of those requirements listed at item 18 of the Schedule.

(10) If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Specific Conditions of Use specified in the schedule to this certificate.

(11) This EU-Type Examination Certificate relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

(12) The marking of the product shall include the following:

II 1 G Ex ia IIC T4 / T5 Ga
II 1 D Ex ia IIIC T100 °C / T135 °C Da

Date of certification: 6 July 2018

DEKRA Certification B.V.

R. Schuller
Certification Manager

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(13) **SCHEDULE**

(14) **to EU-Type Examination Certificate DEKRA 13ATEX0222 X** Issue No. **2**

(15) **Description**

Electronic Pressure Transmitters Type FCX-AIII or FCX-AII are used to measure the differential, absolute or relative pressure of a liquid or a gas. The measurement signal is converted into a digital signal. Different versions are available: 4-20mA, Foundation Fiedbus / FISCO and SIL. Optionally, the transmitter is provided with a digital or analog display.

The enclosure of the transmitter provides a degree of ingress protection of at least IP66 in accordance with EN 60529.

Ambient temperature ranges:
For 4-20mA/HART models and also for SIL option:
Ex ia IIC T4 Ga; T_a = -40 °C to +70 °C
Ex ia IIC T5 Ga; T_a= -40 °C to +50 °C
Ex ia IIIC T135 °C Da; T_a = -40 °C to +70 °C
Ex ia IIIC T100 °C Da; T_a = -40 °C to +50 °C

For Fieldbus Foundation:
Ex ia IIC T4 Ga; T_a = -40 °C to +60 °C
Ex ia IIIC T135 °C Da; T_a = -40 °C to +60 °C

Electrical data

Supply and output signal 4-20mA/ HART versions;	In type of protection intrinsic safety Ex ia IIC, only for connection to a certified intrinsically safe circuit, with following maximum values: U_i = 28 Vdc I_i = 94,3 mA P_i = 660 mW L_i = 0,6 / 0,7 mH for models with/without Analog Indicator C_i = 26 / 36 nF for models with/without Arrester Board
Supply and output signal Foundation Fieldbus	In type of protection intrinsic safety Ex ia IIC, only for connection to a certified intrinsically safe circuit, with following maximum values: U_i = 24 Vdc I_i = 250 mA P_i = 1,2 W L_i = 9,87 µH for models with/without Analog Indicator C_i = 4,04 nF for models with/without Arrester Board or FISCO parameters: U_i = 17,5 V I_i = 380 mA P_i = 5,32 W C_i = 4,04 nF L_i = 9,87 µH

(13) **SCHEDULE**

(14) **to EU-Type Examination Certificate DEKRA 13ATEX0222 X** Issue No. **2**

Supply and output signal SIL versions	In type of protection intrinsic safety Ex ia IIC, only for connection to a certified intrinsically safe circuit, with following maximum values: U_i = 28 Vdc I_i = 110 mA P_i = 770 mW L_i = 0,7 / 0,6 mH for models with/without Analog Indicator C_i = 39 / 26 nF for models with/without Arrester Board

Installation instructions

The instructions provided with the product shall be followed in detail to assure safe operation.

(16) **Report Number**

No. 216829300, issue 2.

(17) **Specific conditions of use**

Measured process pressure and process temperature are limited for each specific installation in order to assure that the design ratings are not exceeded in any application. The application process temperature in conjunction with ambient temperature of the application does not elevate the temperature inside the enclosure above the maximum ambient temperature rated for the transmitter which is 70 °C for temperature code T4 and 50 °C for temperature code T5.

Suitable rated cable glands or plugs shall be used to assure IP66/IP67 rating of the final installation.

Installations for models incorporating the Arrester Board shall consider that these models do not assure electrical insulation of minimum 500Vac between the input circuitry and enclosure.

In case of Ga application, sufficient actions shall be taken to avoid, even in case of rare fault, an ignition hazard due to impact or friction.

(18) **Essential Health and Safety Requirements**

Covered by the standards listed at item (9).

(19) **Test documentation**

As listed in Report No. 216829300, issue 2.

(20) **Certificate history**

Issue 0 -	216826100	initial certificate
Issue 1 -	222308300	added new Foundation Fieldbus / FISCO versions and SIL versions; Assessed in accordance with latest edition of the standard; EN 60079-26 removed.

12.10. Sample Pump, SPP-100 with Orange1 explosion proof motor

12.10.1. Orange1 instructions

GB

ORANGE1 ELECTRIC MOTORS

Motors series O-M

Safety, installing maintenance instructions

www.orange1.eu

(Rev.00 – 28-01-2019)

1. GENERAL SAFETY INFORMATION

These security instructions refer to the installation, utilization and maintenance of motors O-M series to be used in potentially explosive areas with presence of combustible GAS and/or DUST. The information of these instructions are only for qualified personnel. Except for the opening of terminal cover, any other opening cancels the warranty conditions of the motors.
Here below you can see the different markings of the motors and the different zones where they can be used:

GAS	II 2G Ex db IIC T3 Gb T.amb –40°C , +60°C II 2G Ex db IIC T4 Gb T.amb –40°C , +60°C II 2G Ex db IIC T5 Gb T.amb –40°C , +40°C II 2G Ex dbeb IIC T3 Gb T.amb –40°C , +60°C II 2G Ex dbeb IIC T4 Gb T.amb –40°C , +60°C II 2G Ex dbeb IIC T5 Gb T.amb –40°C , +40°C	Zones 1, 2
DUST	II 2D Ex tb IIIC T125°C T.amb –40°C , +60°C (maximum thicknes of dust layer 5mm)	Zones 21, 22

The motors comply with the Essential Health and Safety Requirements for potentially explosive atmospheres provided by European Standards:
IEC/EN 60079-0, IEC/EN 60079-1, IEC/EN 60079-7, IEC/EN60079-31

Electric rotating machines present dangers from live and rotating parts, and probably very hot surfaces. All work on them including transportation , connection , commissioning and maintenance must be by qualified and responsible specialists (IEC 364 must be observed). Inadequate work can lead to severe damage to persons and property.

It is imperative to observe the data printed on the nameplate before operating the motor. Low voltage motors are components to be installed into machines in accordance with Directive 2006/42/EC.
Commissioning is not allowed until the conformity of the end product with this directive has been established.
These asynchronous motors comply the EMC (2014/30/UE) Directive and no particular shielding is necessary when connected to a pure sinewave voltage supply.

Before working on the motor, ensure it has stopped and is disconnected from the power supply (including auxiliary equipment).If there is any form of automatic starting, automatic resetting, relays or remote starting.. avoid any possibility of unexpected re-starting, paying attention to specific recommendations on equipment application.

2. TRANSPORT, STORAGE

On receipt verify that the motor has not been damaged during transport and in this case avoid any installation and communicate immediately to the transport service.
Eyebolts, when provided with the motor, must be tightened properly as they are suitable only for lifting the motor. no additional loads are allowed to be attached. If necessary use sufficiently dimensioned devices as a means of transport.
Do not use any projection of the motor body to hang the motor for transport purposes.
If two eyebolts are present on the motor use both for lifting.
Store low voltage motors in a dry, dust free and low vibration (v eff <0,2 mm/s) area to prevent bearing damage. Before commissioning, the insulation resistance must be measured. In case of values < 1,5 MΩ the winding must be dried. Contact our technical department directly for information on the drying procedure.

3. INSTALLATION

Installation must comply with the rules of the standard IEC/EN 60079-14 or with the national standards (edition into effect).
Before the installation in an explosive atmosphere, the installer must ensure that the motor is suitable for the classified area in consideration of the different inflammable substances present in the installation area (**please verify the marking on the motor plate before installation**).
The motor must be installed only by qualified people with knowledge about electrical apparatus for explosive gas atmospheres and electrical installations in hazardous areas and has to be done with the motor and driven machine at standstill, electrically dead and locked against restart.
The rating on the nameplate corresponds to voltage and frequency of the power supply and all other electrical and mechanical data, as well as the safety data regarding the motor (protection type, temperature class, ambient temperature etc.).

The coupling components must also be balanced with a half key on a smooth mandrel. Coupling belts and pulleys must be assembled by suitable tools to protect the bearings.
After assembly check that the coupling components are well fixed on the shaft end; they must be properly pushed against the shaft shoulder. Where the hub of the coupling gear is shorter than the shaft end, compensate the difference by use of a bush spacer.
Too large or too small pulleys can impair the shaft bearing life; similarly excessive belt tension can cause low bearing life or shaft breakage.
The motors must be installed in a proper position so that cooling air can go in and out easily. The ventilation must not be hindered and the outgoing air - also from adjacent units - must not be directly sucked in again. To keep a good cooling of the motor, there must be a minimum distance of 40mm between the fan cover and another element capable to reduce the air aspiration of the ventilation. Avoid heat sources near the motor that might affect the temperatures both of cooling air and of the motor.
In case of outdoor installation protect the motor from solar radiation and extremes of weather. In case of vertical mounting with shaft down use fan cover with rain roof.
It is advisable to protect the motor with such as overcurrent devices and torque limiters where it is not protected by winding temperature transducers connected to appropriate switchgear.
In case of environments with wide thermal excursions and when can be preview the presence of moisture, Orange1 EM will equip the motor with heaters.
Instead of use anti-condensation heaters, is possible to supply the motor on pins U1-V1 with a voltage 4-10% of the rated motor phase-voltage; 20-30% of the rated current is enough to heat the motor.

Check the direction of rotation with the motor not coupled fastening the shaft key to avoid its violent ejection during rotation.
If the direction of rotation is not as desired, disconnect the motor and wait until the motor is completely stopped:

- in case of three phase motors interchange two phases at the terminals.
- in case of single phase motors refer to the diagram supplied with the motor

Cable entries

Depending on the type of protection of the motor the cable entries shall comply with the standards written in the table and having the range of temperature of the motor itself:

	Type of protection	T.amb	Standard
GAS	Ex eb	–40°C , +60°C	IEC/EN 60079-0, 7
	Ex db	–40°C , +60°C	IEC/EN 60079-0, 1
DUST	Ex tb	–40°C , +60°C	IEC/EN 60079-0, 31

The cable diamaeter for each size of cable gland are like below:

Cable gland thread	Motor size	Range of cable diameter (mm)
M16x1.5	(*) on request	6-12
M20X1.5	56-63-71-80-90-100-112	6-12 / (*)9-16
M25X1.5	132	12,5-20,5
M32X1.5	160-180	17-26

Cable glands and plugs if not supplied with the motor shall be like above.

The cable glands shall be completely screwed to the motor with a tightening torque of 5Nm

As the feet can be mounted on the frame it is possible to fix them in 3 different positions so to have the possibility to have the terminal box on the top or on the right and left sides of the motor.
At the same time the terminal box can be mounted on the motor so to have the cable entries where it is necessary. So the cable entries can be in the four different positions. This operation has to be done before connection, removing the box cover, unscrewing the 4 screws that fix the box to the motor and screwing them completely in respect of the tightening torque of 5Nm.

4. CONNECTION TO THE POWER SUPPLY

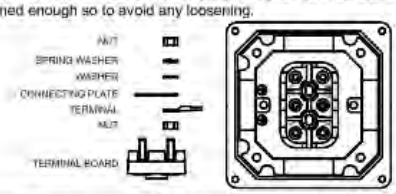
Only qualified people are allowed to connect the motor to the power supply.
The connection to the electric supply must be done by through the cable entry supplied with the motor or through another type of cable entry certified in accordance with the European Standards showed above in compliance with Directive 2014/34/EU and IECEx approved.
In case of motor complete with cable, the free end of the cable should be connected in a safe zone or inside an Ex enclosure with a type of protection suitable for the explosive atmosphere.

Always refer to the data printed on the nameplate for voltage and frequency to ensure the motor is appropriate for the mains supply.
If not specified it is possible to assume tolerances of ±5% on voltage and ±1% on frequency indicated on the nameplate (X on the certificate number.
For motor with temperature class T3 and T4 is possible to have ±10% on voltage.
The connection diagrams are normally supplied together with the motor or are printed in the terminal box. If they are missing please refer to this manual or contact directly to our technical office.
Check and make sure that, in the case of star /delta start, the switching from star to delta can only be executed after the starting current of the star step has fallen, this is important because of the risk of not allowed operational loads.
The cable size choice must be suitable to the motor ratings and the plant type.
The motors shall be protected by a tripping device, which in case of breakdown could cut off the power supply before the surface temperature exceeds the ignition temperature of the explosive atmosphere.

The motors with increased safety terminal box ("eb") are built with a special terminal board with improved insulation and distances.

The Ex d motors have a normal terminal board.

The power connection shall be made as in the picture. The nuts shall have to be tightened enough so to avoid any loosening.



Thread	M4	M5	M6	M8
Tightening Torque (Nm)	1,5	2	3	6

IMPORTANT: Motors with Ex eb terminal box REPLACE THE GASKET (SEAL) IN THE RIGHT POSITION BEFORE CLOSING THE TERMINAL BOX AND SCREW COMPLETELY ALL THE SCREWS.

Earth connection

In addition to the earth screw terminal fitted inside the terminal box, another external one must be on the motor frame. If the line conductors have a section S the earth connections have to be:

Earth conductor	Line conductors
= S	S ≤ 16 mm²
16	16 mm² < S ≤ 35 mm²
≥ 0,5 S	S > 35 mm²

Connection of auxiliary cables ("e" terminal box)

If the motor is provided with terminal board with auxiliary pins the connection of thermal protection and/or heaters can be made in such pins.
If the motor is provided with just a terminal board having just the 6 mains pins the connection of thermal protection and heaters have to be made by welding the wires of auxiliary devices with the wires of the cable and insulate using a heat-shrink sheath.

Protection

The motor must be protected by a tripping device that in case of breakdown, cut off the supply of the motor so that the surface temperature of the parts in contact with the explosive atmosphere doesn't reach the ignition temperature.

Motors for inverter duty

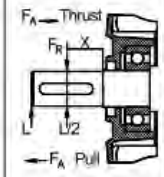
In case the motors are supplied by inverter, they shall be provided with protectors inside the windings (normally PTC thermistors), capable of assuring the respect of temperature class limits.
Such devices shall be connected to a control device able to cut off power to the motor in case of reaching of the limit temperature.

Heaters

The heaters shall be supplied only when the motor is not under power. The cables have to be adequate for a power of 25W with supply that can be from 110V up to 240V (±10%).

Permissible load

Assuming a life-span of 20.000h for 2P motors and 40.000h for 4,6,8P motors:



Motor size	Bearings	Max radial load in L/2	Max axial load (Thrust)	Max axial load (Pull)
63	6202	365	230	120
71	6202	450	280	160
80	6204	590	370	220
90	6205	645	400	230
100	6206	920	560	350
112	6306	1280	700	480
132	6308	1345	770	590
160	6309	2465	1401	714
180	6310	3000	1498	615

Allowed duty services

S1: Continosus duty: the motor works at a constant load until thermal equilibrium is reached.
S2: Intermittent duty: Once started, the motor works at a constant load for a limited period and thermal equilibrium is not reached. Motor will be started a second time then when its temperature has decreased to room temperature.
S3: Intermittent duty: A sequence of identical duty cycles, made up with a time of operation at constant load and a time at rest. When at rest, the motor is not fed. Starting current does not significantly influence temperature rise.
S9: Load and speed vary periodically within the permissible operating range. Frequent overloading may occur. Tipical of motors supplied by inverter (see above).

Motors with forced ventilation (IC416)

In case of motors with forced ventilation, the main motor can be supplied only when the auxiliary ventilation is already working.

5. MARKING

CE (*)		Marking of conformity to the European Directives
Ex (*)		Specific marking of explosion protection
II (*)		Motor for surface plants (different from mines)
2 (*)		Category 2: high level of protection
GAS	G (*)	explosive atmosphere due to presence of combustible gas vapour or mist
GAS	Ex db	Flameproof motor and terminal box
GAS	Ex dbeb	Flameproof motor, increased safety terminal box
GAS	IIC	Gas group, suitable for IIB and IIA
GAS	T3, T4, T5	Temperature class
DUST	D (*)	explosive atmosphere due to presence of combustible dust
DUST	Ex tb IIIC	tb enclosures suitable for zone 21 (cat. 2D)
DUST	T125°C	Max surface temperature
T.amb		Ambient temperature
AB xx yyy		AB : laboratory which issues the CE type certificate xx : year of issue of certificate yyy : number of CE type certificate
ZZZZ (*)		Notified Body that gives the Product Quality Assurance Notification
(*) Only for ATEX marking		

6. MAINTENANCE AND REPAIR

MAINTENANCE shall be performed only by qualified people in accordance with the standard IEC/EN 60079-17 or national standards (last edition).
Qualified people must have knowledge about electrical apparatus for explosive atmospheres and electrical installations in hazardous areas.
- Every 3000 hours of service verify and restore, if necessary, the grease on the radial seals (for example V-rings).

Periodically (depending on the environment and duty) verify:
- motor cleanliness (oil, DUST, dirt and machining residuals absence) and free passage of cooling air
- correct tightening of electrical connections, of fastening screws
- free motor running with low vibration (v eff<3,5mm/s for Pn<15KW v eff<4.5 mm/s for Pn>15KW) and absence of anomalous noises; where there is high vibration and/or noise verify the motor fastenings, machine balancing and that the bearings are in good condition.

REPAIRS shall be made in accordance with the rules as defined in EN 60079-19 standard.
These repairs can only be done under the control and authorization of Orange1 EM or by certified repair workshop.
When the repair is made by a certified repair workshop, they must respect all the original characteristic of the motor and use only original spare parts.
Furthermore they have to place an additional nameplate on the motor with written a symbol to identify the Repair, company name and certification, repair operation number and date.
Nothing regarding the type of protection can be modified.
In case all these rules are not respected, the motor loses all its characteristic of certification.
FLAMEPROOF JOINTS CANNOT BE REPAIRED

7. MODULAR COMPONENTS

The motors are completely modular.
Feet and flanges can be mounted without affecting the ATEX certificate, as they are external and are not part of the type of protection.
In the table here below we show you the screws to be used to mount the different modular components.

Taglia Motore	Flange	Piedi	Coperchio scatola morsetti
63	M5x16	M6x16	M5x14
71	M5x16	M6x16	M5x14
80	M6x20	M6x20	M5x14
90	M6x20	M8x20	M5x14
100	M8x20	M8x30 DADO M8	M5x14
112	M8x20	M8x35 DADO M8	M5x14
132	M10x20	M10X50 DADO M10	M6x16
160	n.3 M10x95 n.1 M10x70	M10x70 + DADO M10	M6X20
180	n.3 M10x95 n.1 M10x70	M10x70 + DADO M10	M6X20
Viti classe 8.8			

ORANGE 1 ELECTRIC MOTORS S.P.A.
Via Mantova 93 43122 Parma Italy
Te. +39 (0)521 272383
www.orange1.eu

Dichiarazione UE di Conformità / UE Declaration of Conformity / Déclaration UE de Conformité
UE Konformitätserkärung / Declaration UE de Conformidad

I motori elettrici asincroni /Electric asynchronous motors / Les moteurs électriques asynchrone
Elektrische asynchron motoren typ / Los motores electricos asincronos del tipo

Serie O-M

Che riportano la marcatura
Bearing the marks / Marques / Kennzeichnung / Que llevan marcado

CE 0477	Ex	**II 2G Ex db IIC T3 Gb or II 2G Ex db IIC T3 T_{amb}–40°C +60°C**	**EPT 17 ATEX 2588 X**
CE 0477	Ex	**II 2G Ex db e IIC T3 Gb or II 2G Ex db eb IIC T3 T_{amb}–40°C +60°C**	**EPT 17 ATEX 2588 X**
CE 0477	Ex	**II 2G Ex db IIC T4 Gb or II 2G Ex db IIC T4 T_{amb}–40°C +60°C**	**EPT 17 ATEX 2588 X**
CE 0477	Ex	**II 2G Ex db e IIC T4 Gb or II 2G Ex db eb IIC T4 T_{amb}–40°C +60°C**	**EPT 17 ATEX 2588 X**
CE 0477	Ex	**II 2G Ex db IIC T5 Gb or II 2G Ex db IIC T5 T_{amb}–40°C +40°C**	**EPT 17 ATEX 2588 X**
CE 0477	Ex	**II 2G Ex db e IIC T5 Gb or II 2G Ex db eb IIC T5 T_{amb}–40°C+40°C**	**EPT 17 ATEX 2588 X**
CE 0477	Ex	**II 2D Ex tb IIIC T125°C T_{amb}–40°C +60°C**	**EPT 17 ATEX 2588 X**

Sono prodotti da/ Are manufactured by/ Sont fabriqués par la société/ Wurden gefertigt von/ Han sido fabricadospor

ORANGE 1 ELECTRIC MOTORS S.P.A.

in accordo alle seguenti Direttive CE/in compliance with the EC Directives/selon les Directives CE suivantes
in übereinstimmung mit den folgenden EG-Richtlinien/de acuerdo con las siguientes Directivas EC

2014/34/UE	(ATEX)
2014/30/UE	(EMC)
2006/42/EC	(Machinery)
2011/65/CE	(RoHS II)

e in conformità alla seguenti Norme/ and comply with the following Standards / et enconfrmité avec les Normes
und entsprechen den folgenden Standard / y conform a las sigulentes Normas

EN 60079-0:2012+A11:2013, EN 60079-1:2014, EN 60079-31:2014, EN 60079-7:2015
EN 60034-1,2,5,6,7,9,12,14, IEC60072-1, EN 60259

NOTA/ NOTE/ BEMERKUNG/ NOTAS
(Directive 2006/42/EC Direttiva Macchine, Machinery Directive, Directive Machine, Maschinen-Richtlinie, Directiva Maquinaria)

I motori in oggetto sono considerati componenti, in accordo con la direttiva macchine. Il motore non deve essere messo in servizio finché la macchina stessa su cui è montato non venga dichiarata conforme alla direttiva macchine.

Above motors considered as components, comply with the directive machine. The motor must not be incorporated in service until the machine itself has not been declared in conformity with the machinery directive.

Les moteurs ci-dessus considérés comme composants sont conformes à la directive machine. Le moteur ne peut être incorporé et mis en service avant que la machine dans laquelle il est incorporé ne soit déclarée conforme à la directive machine.

Für die korrekte installation der oben genannten Motore sowie der entsprechenden komponenten, die in ihrer Bauart mit den zu dieser Bescheinigung aufgeführten Vorschriften übereinstimmen, ist der Mashinenherstelle/Maschinenbetreiber verantwortlich. Die Motoren entsprechen den Vorschriften nur, solange díe Anlage, in der sie eingebaut wurden, in übereinstimmung mit den geltenden Maschinen-richtlinien und Vorschriften errichtet wurde.

Los motores en objecto, por tratarse de componentes, cumplen las normas de la directiva si la instalacion està correctamente controlada por el constructor de la màquina. El motor no debe entrar en servicio hasta que la màquina en que ha sido incorporado disponga de la declaration de la directive maquinaria

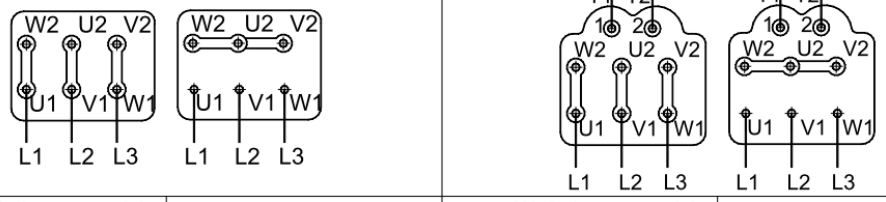
Product Quality Assurance Notification Number: EPT 18 ATEX 2964 Q
Notified by Eurofins Product Testing Italy S.r.l. – Notified Body n.0477 - Via Courgné 21 - 10156 Torino Italy

02/01/2019

Mauro Grana
Legale Rappresentante

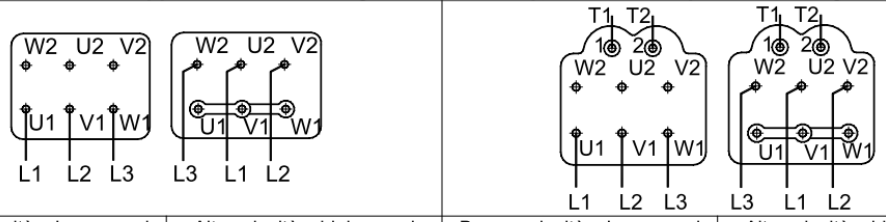
Schemi di collegamento / Wiring diagrams

Trifase 1 Velocità 2-4-6-8 poli (6 fili) – Three-phase 1 speed 2-4-6-8 poles (6 wires)



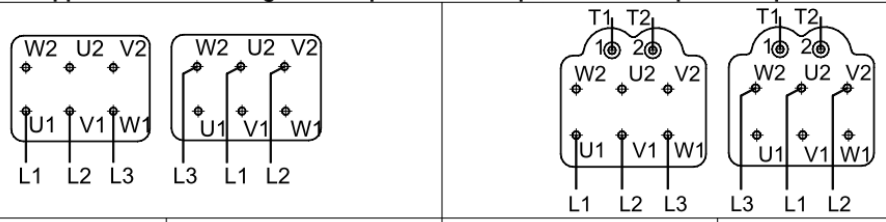
(Δ) Collegamento delta Tensione inferiore Delta connection lower voltage	(Y) Collegamento stella Tensione superiore Star connection higher voltage	(Δ) Collegamento delta Tensione inferiore Delta connection lower voltage	(Y) Collegamento stella Tensione superiore Star connection higher voltage

Trifase doppia velocità 1 avvolgimento – Three-phase double speed 1 winding



Bassa velocità – Low speed	Alta velocità – high speed	Bassa velocità – Low speed	Alta velocità – high speed

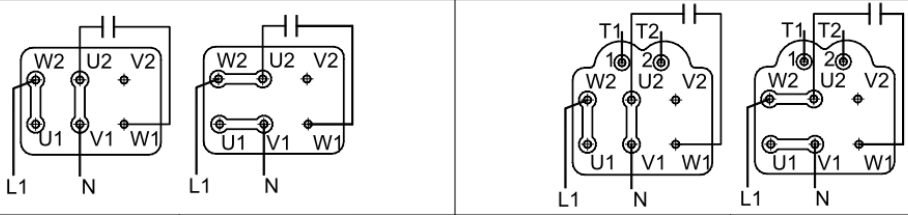
Trifase doppia velocità 2 avvolgimenti separati – Three-phase double speed 2 separate windings



Bassa velocità – Low speed	Alta velocità – high speed	Bassa velocità – Low speed	Alta velocità – high speed

Monofase 4 fili – Single-phase 4 wires

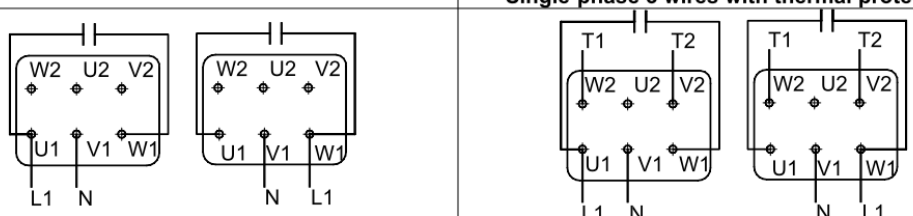
Monofase 4 fili con protezione termica
Single-phase 4 wires with thermal protection



Rotazione oraria Clockwise rotation	Rotazione antioraria Counter clockwise rotation	Rotazione oraria Clockwise rotation	Rotazione antioraria Counter clockwise rotation

Monofase 3 fili – Single-phase 3 wires

Monofase 3 fili con protezione termica
Single-phase 3 wires with thermal protection



Rotazione oraria Clockwise rotation	Rotazione antioraria Counter clockwise rotation	Rotazione oraria Clockwise rotation	Rotazione antioraria Counter clockwise rotation

12.10.2. Orange1 Certificate, EPT 17 ATEX 2588 X

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[1] **EU-TYPE EXAMINATION CERTIFICATE**

[2] **Equipment and Protective System intended for use in potentially explosive atmospheres Directive 2014/34/EU – Annex III**

[3] Certificate Number: **EPT 17 ATEX 2588 X** **Issue 1**

[4] Equipment: **Electric motor**

Series: **O-M**

[5] Manufacturer: **ORANGE1 ELECTRIC MOTORS S.p.A.**

[6] Address: Via Mantova n° 93, 43122 Parma - Italy

[7] This equipment and its accepted variations are specified in the annex to this Certificate.

[8] Eurofins Product Testing Italy S.r.l., Notified Body n. 0477 in accordance with Article 21 of the Directive 2014/34/EU of the European Parliament and of the Council of 26 February 2014, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II of the Directive.
The examination and test results are recorded in the confidential Report N° EPT.19.REL.02/56858

[9] Compliance with the essential health and safety requirements is assured through the verification of them and by compliance with the standards:

EN 60079-0:2012+A11:2013, EN 60079-1:2014, EN 60079-31:2014, EN 60079-7:2015

[10] If the sign "X" is placed after the Certificate number, it indicates that the equipment is subject to the special conditions for safe use specified in the annex to this Certificate.

[11] This EU-TYPE EXAMINATION CERTIFICATE relates only to the design, the exam and the tests of the specified equipment.
Further requirements of the Directive 2014/34/EU apply to the manufacture and supply of this equipment. These requirements are not object of this Certificate.

[12] The equipment shall include the sign Ex and at least one of the following string:

II 2G Ex db IIC T3 Gb	**-40°C ≤ T_{amb} ≤ +60°C**
II 2G Ex db eb IIC T3 Gb	**-40°C ≤ T_{amb} ≤ +60°C**
II 2G Ex db IIC T4 Gb	**-40°C ≤ T_{amb} ≤ +60°C**
II 2G Ex db eb IIC T4 Gb	**-40°C ≤ T_{amb} ≤ +60°C**
II 2G Ex db IIC T5 Gb	**-40°C ≤ T_{amb} ≤ +40°C**
II 2G Ex db eb IIC T5 Gb	**-40°C ≤ T_{amb} ≤ +40°C**
II 2D Ex tb IIIC T125°C Db	**-40°C ≤ T_{amb} ≤ +60°C**

Place and date of issue:
Torino, 2019-02-08

CE

Dionisio Bucchieri
Directive Responsible

Paolo Trisoglio
Managing Director

Eurofins Product Testing Italy S.r.l. eurofins Notified Body N. 0477

ACCREDIA L'ENTE ITALIANO DI ACCREDITAMENTO
PRD N° 1198
Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC
Signatory of EA, IAF and ILAC Mutual Recognition Agreements

This Certificate has 4 pages and it is reproducible only in its entirety. Conditions of validity are reported below.

Eurofins Product Testing Italy S.r.l. - Via Cuorgnè, 21 - 10156 Torino - Italia
Notified Body N. 0477

[13] [14] **ANNEX**
EU-TYPE EXAMINATION CERTIFICATE N. EPT 17 ATEX 2588 X Issue 1

[15] **Equipment description**

The three-phase and single-phase asynchronous squirrel cage rotors motors, series O-M, supplied by mains or inverter, are identified by a code as follows:

OD 063 A 4 H 230 5 P 4 U

Motor Type			
MD	Single Phase Ex d	ME	Single Phase Ex de
OD	Three Phase Ex d	OE	Three Phase Ex de

Shaft height
56, 63, 71, 80, 90, 100, 112, 132, 160, 180

Stator Dimensions	
A, B	56, 63, 71, 80
S, L	90 – 132 – 160 - 180
K, M	100 – 132 – 160 - 180

Poles	
2, 4, 6	Single phase motor
2, 4, 6, 8	Three phase motor 1 speed
3, 5, 7, 9	Three phase motor 2 speed 2/4, 4/8, 4/6, 6/8 poles – constant torque
C, D, E, F	Three phase motor 2 speed 2/4, 4/8, 4/6, 6/8 poles – quadratic torque

Mounting System (See technical note)

Supply Voltage
For double voltage motors is indicated the lowest (ex. 230 for 230/400)

Frequency	
5	50Hz
6	60Hz
7	50/60Hz

Protection	
P	Motor 2G
Q	Motor 2GD

Temperature class	
3	Temperature class T3 (200°C)
4	Temperature class T4 (135°C)
5	Temperature class T5 (100°C)

Thermal protectors	
-	Without protectors
3	Protector (PTO) – temperature class T3
4	Protector (PTO) – temperature class T4
5	Protector (PTO) – temperature class T5
P	PTC – temperature class T3
U	PTC – temperature class T4
V	PTC – temperature class T5

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Directive Responsible

[13] [14] **ANNEX**
EU-TYPE EXAMINATION CERTIFICATE N. EPT 17 ATEX 2588 X Issue 1

The three phase and single-phase asynchronous motors series O-M are made of aluminum (the paint used has a maximum thickness of 0.2 mm) with separate components: motor enclosure, terminal box for supply and a capacitor enclosure (optional). The motors are suitable for group IIC and group IIIC.
The motor enclosure has types of protection "Ex d" and "Ex t";
The terminal box can have types of protection "Ex d" and "Ex t" or "Ex e" and "Ex t";
The capacitor enclosure has types of protection "Ex d" and "Ex t";
All the parts of the flameproof enclosures have flameproof joints independent from each other.
The motors can be equipped with auxiliary devices (heaters, thermal protectors, capacitor).
The anti-condensation heater can be activate only when the motor is not powered.
In case of single phase motors the capacitors have to be placed in the appropriate enclosure or in safe zone.

Electrical characteristics:

Mains Supply
Maximum rated voltage: 850 V
Maximum rated power: 30 kW
Rated frequency: 50/60 Hz
Insulation class: F or H
Duty: S1, S2, S3, S9
Poles: 2, 4, 6, 8, 2/4, 4/8, 4/6, 6/8
Degree of protection: IP 66
Ambient temperature. -40 ÷ +40 °C (or +60°C for T3,T4 class of temperature)

Temperature classes and Maximum surface temperature:
T5, T4, T3, T 125°C as a function of the ambient temperature and of the electrical characteristics as indicated in the technical note.

Inverter supply
Frequency range: 5-100 Hz
Possibility of supply through inverter exclusively with the use of thermal protectors applied on the windings. Such protectors may be either PTO and PTC and they shall be connected to an appropriate control device conforming to EN 50495.
Activation temperature related to the temperature class:

- 90°C for temperature class T5;
- 130°C for temperature class T4;
- 150°C for temperature class T3.

Ventilation
The motors can be ventilated and not ventilated (with half power in respect to the ventilated corresponding motors so to maintain a T3 temperature class with ambient temperature of 60°C or T4 temperature class with ambient temperature of 40°C).
Ventilation can be made by fan, who is fitted directly on the shaft, or by using an auxiliary motor.
The auxiliary motor belongs to O-M series. It will be a two poles 63 motor (for shaft height from 80 to 132) or a two poles 71 motor (for shaft height from 160 to 180).

Impellors for Ex db motors, which have a peripheral speed below 50 m/s, are made of plastic material.

Impellors for Ex tb or Ex db tb or Ex db motors (which have a peripheral speed below 50 m/s) are made of plastic dissipative material or metallic material.

The degree of protection (IP) of ventilation openings are:

- IP 20 on the air inlet side
- IP 10 on the air outlet side

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Directive Responsible

[13] [14] **ANNEX**
EU-TYPE EXAMINATION CERTIFICATE N. EPT 17 ATEX 2588 X Issue 1

Cable entries

The cable entries integrated in motor body, terminal box, capacitor box are part of this certification.
All the other cable entries devices used on the enclosures are already properly certified.

The accessories used for cable entries and for unused holes must be subjected to a separate ATEX certification according to the applicable standards IEC 60079-31 and IEC 60079-1 or IEC 60079-0.

Warning label

"Flameproof joints cannot be repaired"
"Use screws quality 8.8"

[16] **Assessment Report n° EPT.19.REL.02/56858**

This EU-Type Examination Certificate is released after the positive result of the conformity assessment of the Council Directive 2014/34/EU and to harmonized technical standards listed in this Certificate; performed by the Notified Body Eurofins Product Testing Italy S.r.l., and reported in the Assessment Report above cited.

[17] **Special condition for a safe use**

Supply voltage must be within:

- ±5% of the nominal value for temperature class T5;
- ±10% of the nominal value for temperature class T3 or T4.

[18] **Essential Health and Safety Requirements**

Assured by compliance with harmonized standards.

[19] **Descriptive documents**

The equipment objects of this Certificate is described by the following documents.
Scheduled documents are indicated with the symbol "✓". They cannot be modified without the explicit authorization of the Notified Body.

Document	Name	Rev	Date	Sched.
Technical Note	Technical Note Asynchronous Motors Series O-M sizes 56-180	00	2019-01-28	✓
Safety instructions	Motors Series O-M safety, installing maintenance instructions	00	2019-01-28	✓
Assembly drawing _motor_Exd	Assieme_motore_Exdb_ATEX-IECEx	00	2019-01-28	✓
Assembly drawing _motor_Exde	Assieme_motore_Exdbeb_ATEX-IECEx	00	2019-01-28	✓
Drawing – capacitor enclosures	Custodia_condensatore_Exdb_ATEX-IECEx	00	2019-01-28	✓

[20] **Terms and conditions**

The product liability rests with the Manufacturer, his representative or, in the absence of a representative, with the importer, in accordance with the General Product Safety Directive 2001/95/EC.

The following conditions may render this certificate invalid:

- changes in the design or construction of the product;
- changes or amendments to the 2014/34/EU Directive;
- changes or amendments in the standards which form the basis for documenting compliance with the essential requirements of the 2014/34/EU Directive.

[21] **Certificate History**

Issue	Description	Issue date
0	First emission, replacement of the EC-TYPE EXAMINATION CERTIFICATE n. EUM1 10 ATEX 0350 and its supplements n. 1 and 2.	2017-02-06
1	Constructive change and changing of manufacturer's references	2019-02-08

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Dionisio Bucchieri
Directive Responsible

Page 4 of 4
2019-02-08

End of Certificate

Eurofins Product Testing Italy S.r.l. - Via Cuorgnè, 21 – 10156 Torino - Italia
Notified Body N. 0477

12.10.3. Hummel Cable Gland Certificate, DEKRA 12ATEX0139 X

Translation, original language: German

CERTIFICATE

(1) EU-Type Examination

(2) **Equipment or protective systems intended for use in potentially explosive atmospheres - Directive 2014/34/EU**

(3) EU-Type Examination Certificate Number: **DEKRA 12ATEX0139 X** Issue Number: **3**

(4) Product: **Cable Gland, Series EXIOS A2F**

(5) Manufacturer: **Hummel AG**

(6) Address: **Lise-Meitner-Straße 2, 79211 Denzlingen, Germany**

(7) This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(8) DEKRA Certification B.V., Notified Body number 0344 in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential test report number NL/DEK/ExTR12.0032/02.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 60079-0 : 2012 + A11 **EN 60079-1 : 2014** **EN 60079-7 : 2015**
EN 60079-31 : 2014

except in respect of those requirements listed at item 18 of the Schedule.

(10) If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Specific Conditions of Use specified in the schedule to this certificate.

(11) This EU-Type Examination Certificate relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

(12) The marking of the product shall include the following:

II 2 G Ex db eb IIC Gb
II 1 D Ex ta IIIC Da

Date of certification: 19 July 2017

DEKRA Certification B.V.

T. Pijpker
Certification Manager

Page 1/2

PRODUCTS RvA C 001

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T +31 88 96 83000 F +31 88 96 83100 www.dekra-certification.com Registered Arnhem 09085396

DEKRA

(13) **SCHEDULE**

(14) **to EU-Type Examination Certificate DEKRA 12ATEX0139 X** Issue No. **3**

(15) **Description**

Cable Gland, Series EXIOS A2F, made of brass, nickel plated brass or stainless steel, for use with effectively filled circular non-armoured or braided cables.
Available thread sizes are M16 to M90 and 3/8" to 3" NPT.

Operating temperature range -60 °C to +105 °C.

The cable gland provides a degree of ingress protection of IP66/68 (0,5 MPa (5 bar) for 30 min.) in accordance with EN 60079-0 and EN 60529.

Installation instructions

The instructions provided with the product shall be followed in detail to assure safe operation.

(16) **Report Number**

No. NL/DEK/ExTR12.0032/02.

(17) **Specific conditions of use**

- The cable glands are tested with a reduced tensile force (25 %) in accordance with clause A.2.3.2 of EN 60079-0 and shall only be used for fixed installation. The user shall ensure adequate clamping of the cable.
- The cable glands are provided with a sealing ring with a minimum axial sealing height of 5 mm.
- The installer shall ensure that, taking into account the presence of an undercut, at least five full threads are in engagement when the cable glands are assembled onto the flameproof enclosure.

(18) **Essential Health and Safety Requirements**

Covered by the standards listed at item (9).

(19) **Test documentation**

As listed in Report No. NL/DEK/ExTR12.0032/02.

(20) **Certificate history**

Issue 0 -	215435000	initial certificate
Issue 1 -	217933400	applied standards upgrade
Issue 2 -	221754600	applied standards upgrade

Form 227A
Version 1 (2016-04)

12.11. Sample Pump, Speck pump with Gast air motor

12.11.1. Declaration of Conformity, Speck, Gast

Only included if delivered with Speck sample pump.
Please, see **14. Project specific drawings and data sheets** page **217** at the end of this manual.

If missing, please contact Brannstrom Sweden AB to receive the complete ATEX certificate of and information about the Speck sample pump with Gast air motor.
Email: info@brannstrom.se

CE

speck

Declaration of Conformity EU

The manufacturer
Speck Pumpen Walter Speck GmbH & Co. KG
Regensburger Ring 6–8
91154 Roth
Germany

hereby declares that the aggregate
Type: Y-2951.0123
Serial no.: 1002222151 - 1002222160

complies with all relevant provisions of the following EU Directives:
Directive 2006/42/EG; Directive 2014/34/EU

Marking:
Ex II 2G Ex IIC T4 ... T1 Gb X / Ex II 2D Ex IIIC T135°C ... T450°C Db X / +1 °C<Ta<+40°C

Combination of devices
No new ignition sources result from the combination of the devices to form an aggregate.

The technical documentation as per attachment III of the Directive 2014/34/EU is deposited in Physikalisch-Technische Bundesanstalt (PTB), Bundesallee 100, 38116 Braunschweig/Germany

Applied harmonised standards:
EN 809:1998 + A1:2009 + AC:2010; EN 1127-1:2019; EN ISO 80079-36:2016;
EN ISO 80079-37:2016

Person authorised to compile the technical documentation:
Documentation officer
Speck Pumpen Walter Speck GmbH & Co. KG
Regensburger Ring 6–8
91154 Roth
Germany

The sole responsibility for issuing this declaration of conformity lies with the manufacturer.

Place, date:
Roth, 14.06.2021

Authorised persons to issue this declaration:

Technical Manager

COO, Quality Manager

IDEX HEALTH & SCIENCE

GAST JUN-AIR

GAST Mfg.
2300 M-139 HWY
Benton Harbor, MI USA

EU Declaration of Conformity

Konformitätserklärung

(according to EU Directive 2014/34/EU, Annex VIII)
(im Sinne der Richtlinie 2014/34/EU, Anhang VIII)

Declares in sole responsibility that the Air motors in category 2G and 2D that are listed below and that are subject to this declaration are meeting the requirements set forth in **Directive** 2014/34/EU

*erklärt in alleiniger Verantwortung, dass die im Folgenden aufgelisteten Druckluftmotoren der Kategorie 2G und 2D, auf die sich diese Erklärung bezieht, übereinstimmen mit der **Richtlinie** 2014/34/EU*

Motor types / *Motortypen:*

1AM-YYY-XX	1UP-YYY-XXX	1AM-YYY-XXX-GRZZ	1UP-YYY-XXX-GRZZ
2AM-YYY-XXX	4AM-YYY-XXX	4AM-RV-XXX-GRZZ	
6AM-YYY-XXX	8AM-YYY-XXX	16AM-YYY-XXX	
NL22-YYY-XXX	NL32-YYY-XXX		

YYY – Mounting/Rotation designator. 3 alphabetic digits

YYY – Montage/Drehung Bezeichner. 3 alphabetische Ziffern

XXX – Model descriptor not affecting performance. 1 to 6 alphanumeric digits

XXX – Der Modelldeskriptor beeinflusst die Leistung nicht. 1 bis 6 alphanumerische Ziffern

ZZ – Gear reduction ratio

ZZ - Getriebe-Untersetzung

Applicable standard: **DIN EN 1127-1:2011, DIN EN ISO 80079-36:2016, DIN EN ISO 80079-37:2016**

*Angewandte Norm: **DIN EN 1127-1:2011, DIN EN ISO 80079-36:2016, DIN EN ISO 80079-37:2016***

The products are marked with the following characteristics:

Die Produkte sine mit folgender Kennzeichnung versehen:

II 2 GD Ex h IIC T4 Gb Ex h IIIC T135°C Db (+1° C < Ta < +40° C)

GAST will archive the documents required according to 2014/34/EU Annex VIII at the following location: CSA Group Netherlands B.V., EU Code 2813 :

***GAST** hinterlegt die gemäß 2014/34/EU Anhang VIII geforderten Unterlagen bei benannter Stelle: CSA Group Netherlands B.V., EU-Kennnummer 2813*

GAST Manufacturing, Benton Harbor Michigan, USA
Place and date of issue: *Ort und Datum der Ausstellung*

March 1, 2020

Mike Douglass
Regulatory Manager

John Cullen
Assessing Engineer

12.12. Supplementary instructions, sample pump with mechanical seal

No changes or conversions should be made to the sample pump and only approved spare parts should be used for servicing and maintenance work.
Only use the equipment when it is fault-free.

Potential ignition sources on the pump:

- Hot surfaces
- Mechanical sparks
- Electrostatic charge

Hot surfaces may be caused by the following:

- Ambient temperature too high
  - Verify the ambient temperature to be lower than the maximum temperature for the sample pump used. See chapter **3. Analyzing unit types:** page **12**.
  - Not enough open space around the pump motor for its fan to cool efficiently.
- Inlet temperature of the media too high
  - Verify the media temperature to be lower than the maximum temperature for the sample pump used. See chapter **3. Analyzing unit types:** page **12**.
- Dry running mechanical seal
  - Follow the instructions given in chapter **5. Start/Stop procedure** page **39** and in chapter **4.8. Pressure alarm settings** page **25.**
- Flow too low
  - Follow the instructions given in chapter **5. Start/Stop procedure** page **39** and in chapter **4.8. Pressure alarm settings** page **25**
  - Check the inlet filter, the sample pump, the measuring cell, the measuring cell outlet orifice and the inlet and outlet pipe for contamination.
  - Refer also to chapter **8.7. Measurement sample alarms** page **87**.
- Roughening of the impeller
  - if the pressure alarm settings changes or if the pump fan is not easily rotated the status of the impeller should be checked.

Mechanical sparks may be caused by the following:

- Spark formation due to tools
  - Use tools approved for use in hazardous areas.

Electrostatic charge may be caused by the following:

- High potential difference against ground
  - Ground the frame.
- Charging of non-conductive layers
  - Only use antistatic material for servicing and cleaning.

13. Appendix, Work shop test and Calibration Certificate

The 4 following pages contains:
Work shop test: 4 pages
Calibration Certificate: 1 page

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14. Project specific drawings and data sheets

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