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Operations and Technical manual for Oil Discharge Monitoring Equipment

CleanTrack 1000 B

(Revision 2.20xd 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 Resolution MEPC.240(65) and is also approved for Bio-fuel blends in accordance with MEPC.1/Circ.761 as revised.

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. 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.

2.2. 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.

2.3. 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 disconnector 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 NMEA alike serial communication port it can 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".

2.4. 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 major functional changes have been listed above.

Version 2.20x -> 2.20xc:

1. New "Declaration of Conformity", issued 2019-01-02. Chapter **12.1. Declaration of Conformity** page **166**.
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 **166**.

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.

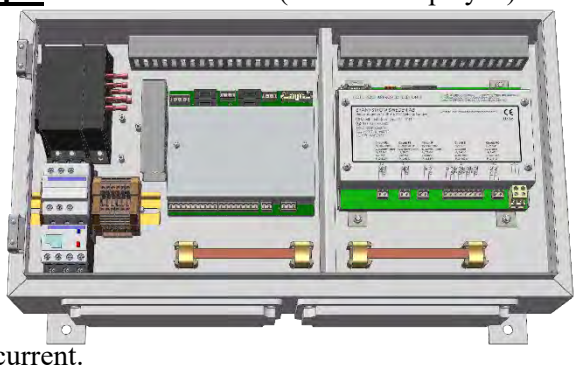
1. Computer unit:

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.

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

Or;

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

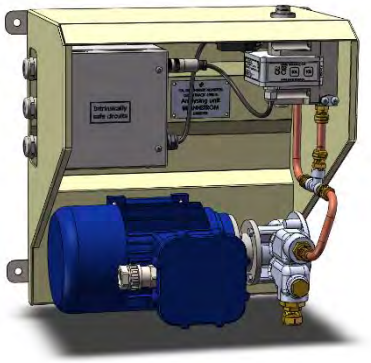
(door not displayed)

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 SPP-100 sample pump motor current.

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 **71**.
See also drawing **CTB10003 sheet 4 of 4, Converting Unit** page **103**.

3. Analyzing unit:

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



(Voltage is supplied via converting unit)

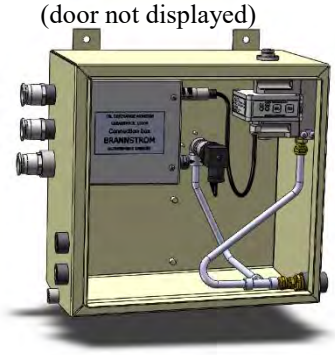
Voltage	380 or 440 VAC 3-phase
Frequency	50/60 Hz
Power Consumption	0.66 kW
Sample flow	600 l/h (nominal)
Sample Temp.	0 - 65 ºC
Ambient Temp.	-20 - +55 ºC
Weight	~35 kg
Dimensions	approx. 350 x 410 x 250 mm
Color	RAL-7035

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:

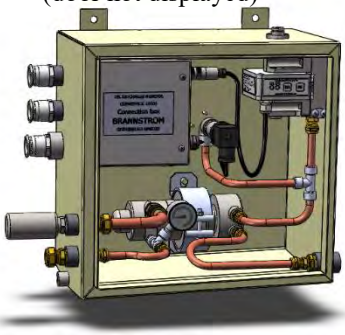
(Intended for retrofit installation inside an existing cabinet)
(Existing sample pump and pressure transmitter to be used)

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

Or:

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

(door not displayed)



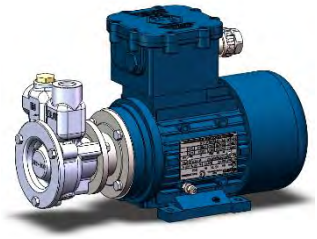
Air pressure	5.2 bar
Air consumption	~30 Nm³/h
Sample flow	240 l/h (nominal)
Sample Temp.	0 - 65 ºC
Weight	~18 kg
Ingress Protection:	IP56
Ambient Temp.	+1 - +40 ºC[1]
Dimensions	approx. 350 x 410 x 250 mm
Color	RAL-7035

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

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

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

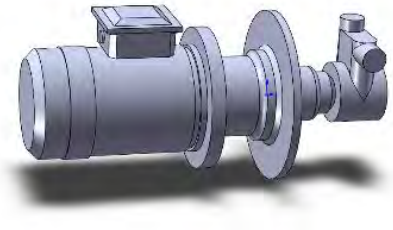
Supply voltage	400 VAC,50 Hz / 440 VAC,60 Hz 3-phase
Current	1.4 A / 1.5 A
Power Consumption	0.55 kW / 0.66 kW
Cos φ	0.78
Speed	2840 rpm / 3400 rpm
Sample flow	600 l/h (nominal)
Sample temp.	0 - +65 ºC
Ambient temp.	-20 - +55 ºC
Ingress Protection	IP66
Weight	~11.5 kg
Dimensions	approx. 300 x 140 x 200 mm
Ex. class	Ex II 1 G Ex d IIC T4 Ga
Details	See chapter **10.4. SPP-100 Sample pump with Ex. Motor** page **119** and **12.8. Sample Pump, SPP-100 with Elprom 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 **121**. Matre: See chapter **10.6. Matre Sample pump for Bulkhead mounting** page **124**.



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
Ex. class	Ex II 2 GDc T4
Details	See chapter **12.9. Sample Pump, Speck pump with Gast air motor** page **228**.

[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)
Ex. class	Ⓔx II 1 G Ex ia IIC T4 Ga Tamb -40ºC - +60 ºC

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
Ex. Class	Ⓔx II 1/2 GD Ex ia IIC T4 Ga/Gb

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
Ex. Class	Ⓔx II 1 G Ex ia IIC T6…T4 Ga

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 **67** and about their connections in chapter **10.10. Electrical** page **138**.

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)	NMEA type, 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
Sample pump motor dis-connector switch feedback	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 **98**
Computer unit, Comp. I/O d5
Converting unit, Power Terminals d3, **CTB10003 sheet 3 of 4, Converting Unit** page **102**
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 **106**
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 **97**. Both wall and panel mount options are shown.
- **P3715090 sheet 1, Computer Unit panel mount instructions** page **99**.

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 **138**.
- CTB110204.1bh, chapter **10.10.2. Electrical cable diagram for bulkhead mounted sample pump** page **139**.
- CTB110204.1pn, chapter **10.10.3. Electrical cable diagram for air motor sample pump** page **140**.

Supply voltage should be single phase 110/220VAC, 50-60Hz.
(Computer unit work on voltages 85 - 265VAC).
Power consumption 30VA.
The power 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 **100**.

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**.101.**
- **CTB10003 sheet 3 of 4, Converting Unit** page **102.**
  - 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 **130**.
- **CTB10917 sheet 1 of 1, GA-plan with skid Ex. motor sample pump and flushing** page **131**.
- **CTB10908 sheet 1of 1, GA plan with free standing Ex. Motor sample pump** page **132**.
- **CTB110204.1el, electrical cable diagram for electrical Ex. motor sample pump** page **138**.

For electrical bulkhead penetration sample pump:
- **CTB10906 sheet 1 of 1, GA-plan with bulkhead penetrating Sample pump** page **133**.
- **CTB10916 sheet 1 of 1, GA-plan with bulkhead penetrating Sample pump and flushing** page **134**.
- **CTB110204.1bh, electrical cable diagram for bulkhead mounted sample pump** page **139**.

For air motor sample pump:
- **CTB10901 sheet 1 of 1, GA-plan with air motor sample pump** page **135**.
- **CTB10911 sheet 1 of 1, GA-plan with air motor Sample pump and flushing** page **136**.
- **CTB10903 sheet 1 of 1, GA-plan with pilot-controlled air motor sample pump** page **137.**
- **CTB110204.1pn, electrical cable diagram for air motor sample pump** page **140**.

Refer also to the document "INSTRUCTIONS Oil Monitor interface type Z11"
- Chapter **4.9. Zener Barrier Instructions and Replacement** page **25.**

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.

A 3-pole disconnector switch can be installed in the safe area on Cb2 to being able to detach the sample pump while keeping power to the converting unit. This can be useful if a zener barrier input is used for the overboard valve feedback. An additional normally closed auxiliary contact can 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 CT10003 sheet 3 page 102, 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 CT10003 sheet 3 page 102, 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 **129**.

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 **104**.

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

- Chapter **10.4. SPP-100 Sample pump with Ex. Motor** page **119**.

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

- Chapter **10.3.2. Analyzing Unit with external Sample pump** page **107**.
- Chapter **10.5. Nikuni Sample pump for Bulkhead mounting** page **121**.
- Chapter **10.6. Matre Sample pump for Bulkhead mounting** page **124**.

For air motor sample pump refer to drawings/chapters:

- Chapter **10.3.4. Analyzing Unit with Air motor Sample pump** page **114**.

For retrofitting inside existing analyzing cabinet

- Chapter **10.3.3. Analyzing Unit with Freestanding items for External Sample pump** page **112**.
- Chapter **10.7. Connection box** page **126**.

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 **12.8.1. Elprom instructions** page **201**
- **CTB110204.1el, electrical cable diagram for electrical Ex. motor sample pump** page **138**
- Chapter **10.3.1. Analyzing Unit skid with Ex. motor Sample** pump page **104**.
- Chapter **10.7. Connection box** page **126**

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

- **CTB110204.1bh, electrical cable diagram for bulkhead mounted sample pump** page **139**.
- Chapter **10.3.2. Analyzing Unit with external Sample pump** page **107**
- Chapter **10.7. Connection box** page **126**

For air motor sample pump refer to drawings/chapters:

- **CTB110204.1pn, electrical cable diagram for air motor sample pump** page **140**.
- **CTB10010 sheet 3 of 5, Analyzing unit with air motor sample pump** page **116**.
- **CTB10010 sheet 5 of 5, Analyzing unit with air motor sample pump** page **118**.
- Chapter **10.7. Connection box** page **126**

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 **129**.
- **10.3.3. Analyzing Unit with Freestanding items for External Sample pump** page **112**.
- Chapter **10.7. Connection box** page **126**

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

- Chapter **4.10. Measuring Cell Instructions and Replacement** page **30** 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 **105** 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 **12.8.1. Elprom 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 **143**.

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 **130**.
- Chapter **10.3.1. Analyzing Unit skid with Ex. motor Sample** pump page **104**.

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 **133**.
- Chapter **10.3.2. Analyzing Unit with external Sample pump** page **107**.
- Chapter **10.5. Nikuni Sample pump for Bulkhead mounting** page **121**.
- Chapter **10.6. Matre Sample pump for Bulkhead mounting** page **124**.

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 **135**.
- Chapter **10.9.5. GA-plan with pilot-controlled Air motor Sample pump** page **137**.
- Chapter **10.3.4. Analyzing Unit with Air motor Sample pump** page **114**.

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 damages.*
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 **22**.*

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 **131**.

For electrical bulkhead penetration sample pump refer to drawing:

- **CTB10916 sheet 1 of 1, GA-plan with bulkhead penetrating Sample pump and flushing** page **134**.

For air motor sample pump refer to drawing:

- **CTB10911 sheet 1 of 1, GA-plan with air motor Sample pump and flushing** page **136**.

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 **129**.
- **10.3.4. Analyzing Unit with Air motor Sample pump** page **114**.

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]	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

Initial pressure, [bar]

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, so as 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 diameters 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 in order 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 in order 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 applies to the particular 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 **68**, **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 **145.**
- **CT900503.1, CleanTrack Flow meter unit, Horizontal** page **146.**

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 **70** 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 **98**.

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 manage 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*
Bulk head 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 **41** and chapter **7. Menu layout** page **45.**

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 **36**.
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 **93**.

   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 **118,** 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 **102**.
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 **67**.
   - 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 **53** for alarms and consult chapter **8. Fault-finding** page **82** for fault finding.

Communication is continuously going on between the Computer Unit, the Converting Unit and the Measuring Cell. This gives 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 **24** and chapter **7.8.5. Pressure** page **69**.

The pressure alarms above are important to avoid to harm 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".

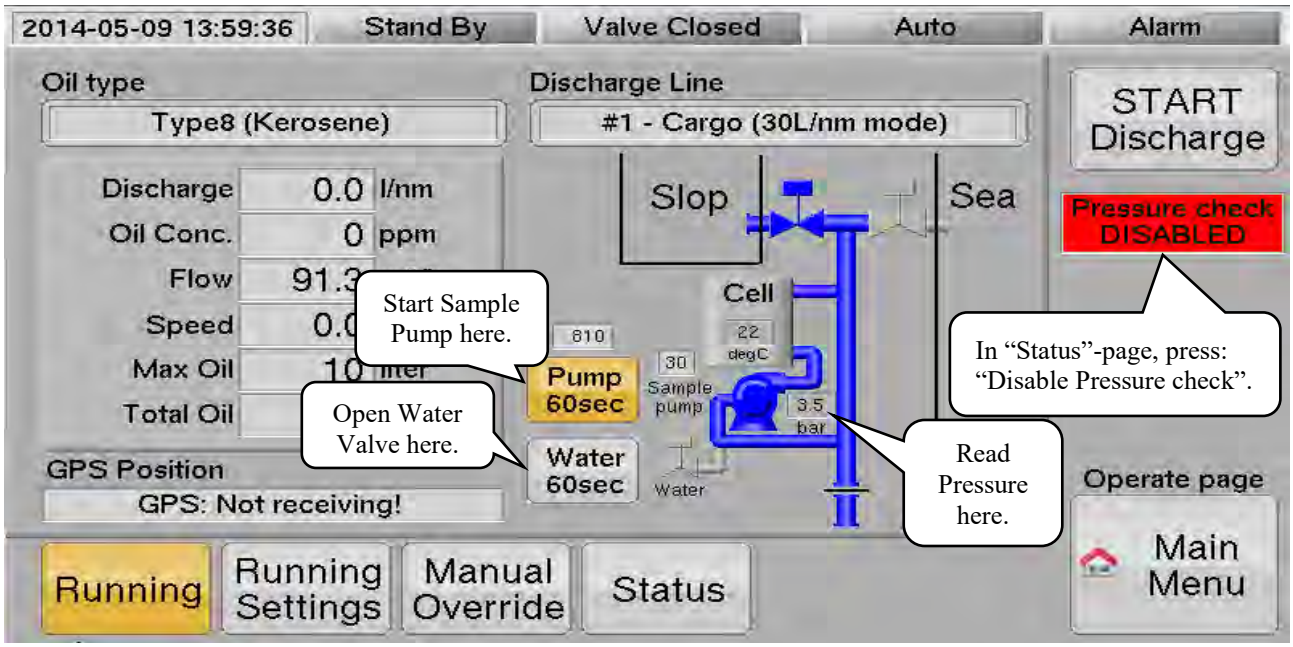
After finishing the first start-up it is recommended to save settings on a USB-stick. See chapter **7.5. USB** page **56**.

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.

1. Make the CleanTrack ready for “RUNNING” mode, see chapter **5.2. Start-up procedure** page **38** 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 **46.**
   Calculated pressure limits are inserted in the “Setup”/”Pressure”-page, see chapter **7.8.5. Pressure** page **69**.



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 **69**
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 **69**
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 is **“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 **39**.

4.9. Zener Barrier Instructions and Replacement

Brannstrom Sweden AB
Roland Brännström
2012-07-03
ZB111205.1 rev B+, 5 pages.
f=ZB111205_1_Z11_Zener_barrier_instructions_rev_B+.doc

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.

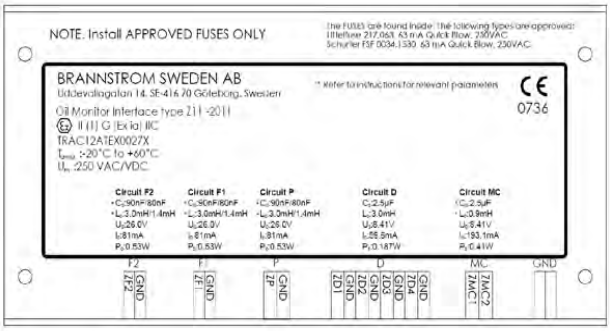
"Conditions of Use" for Ex Equipment or "Schedule of Limitations" for Ex Components:

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

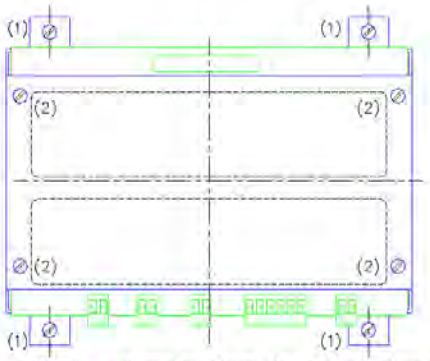
Identification.



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.

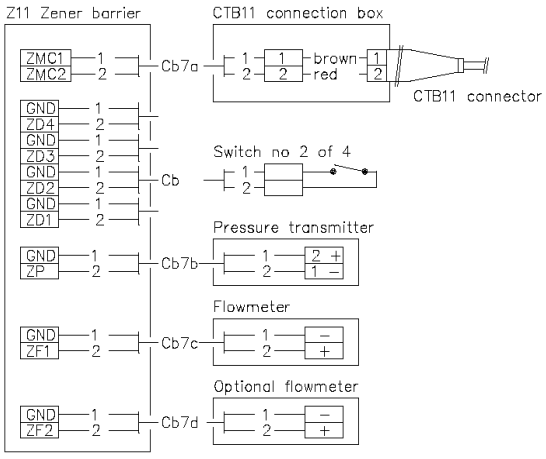


1. Disconnect mains from the Converting unit.
2. Disconnect the cable terminators from the Oil Monitor Interface.
3. Disconnect the ribbon-cable by pulling the two locker handles apart. Alternatively disconnect the terminals adjacent to the ribbon cable connector.
4. Disconnect GND.
5. Dismount the four 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.
f=CTB111214_1_CTB11_Measuring_cell_instructions_rev_B+.doc

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.

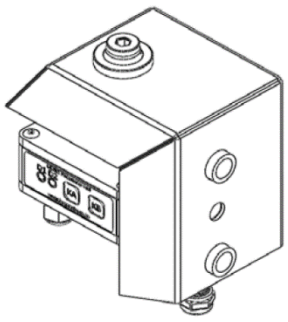
Additional system information can be found in the Cleantrack manual.

"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.

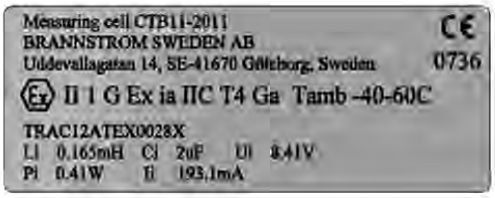
The housing of the measuring cell is partly made of aluminium and shall not be subject to



impacts or friction in order to avoid sparks.

1

Identification.



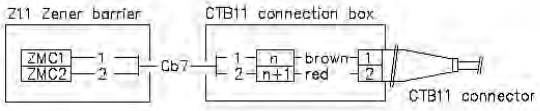
Note: This instruction also applies to systems manufactured later then 2011. I.e. any number can appear instead of "2011".

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:

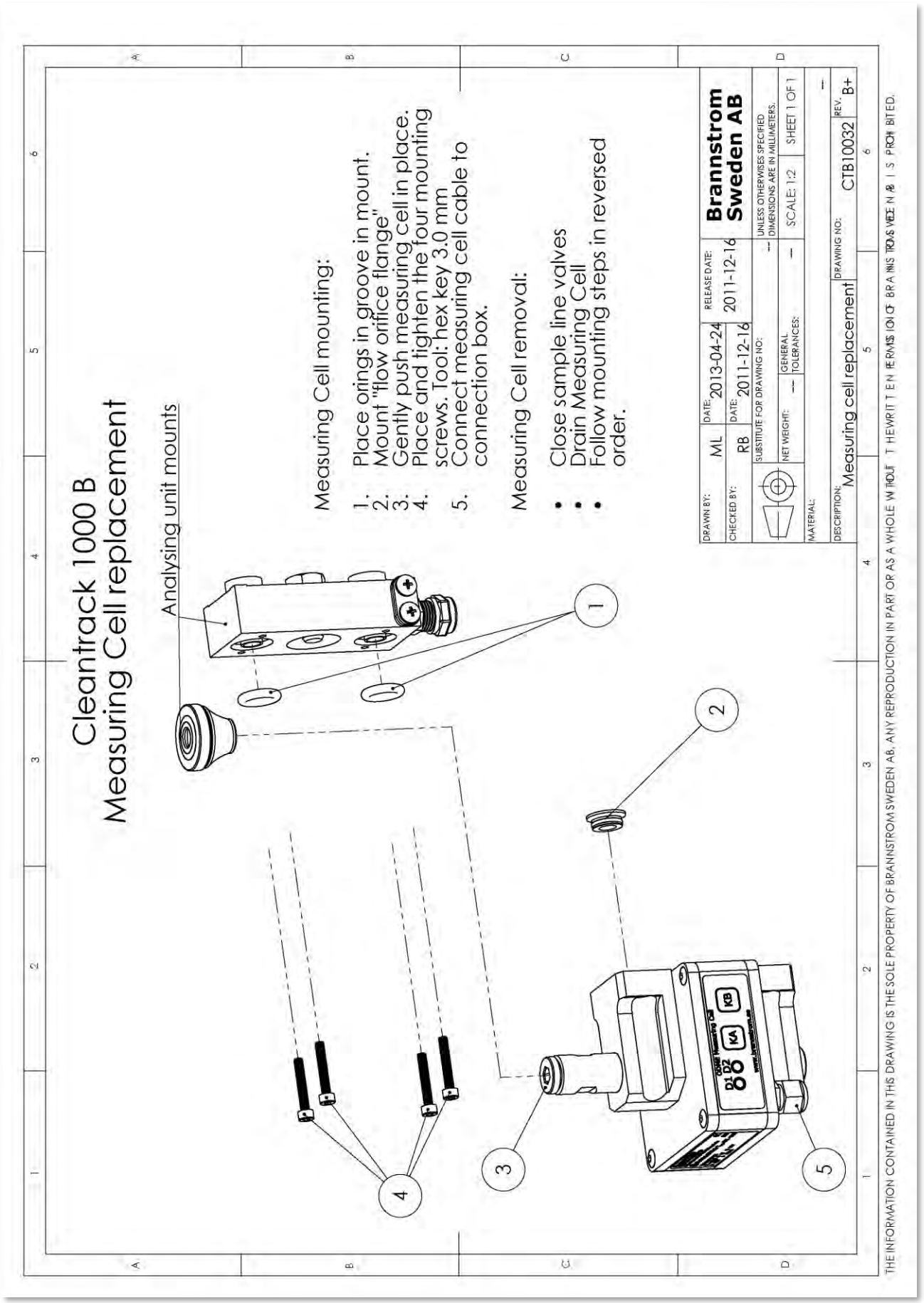
AA) If the unit after long time period is reacting abnormal, the glass pipe inside shall be cleaned manually by using the brush supplied in the spare part kit set.
When cleaning manually, make sure the system is depressurised, remove the top plug, and insert carefully the brush. Move up and down until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

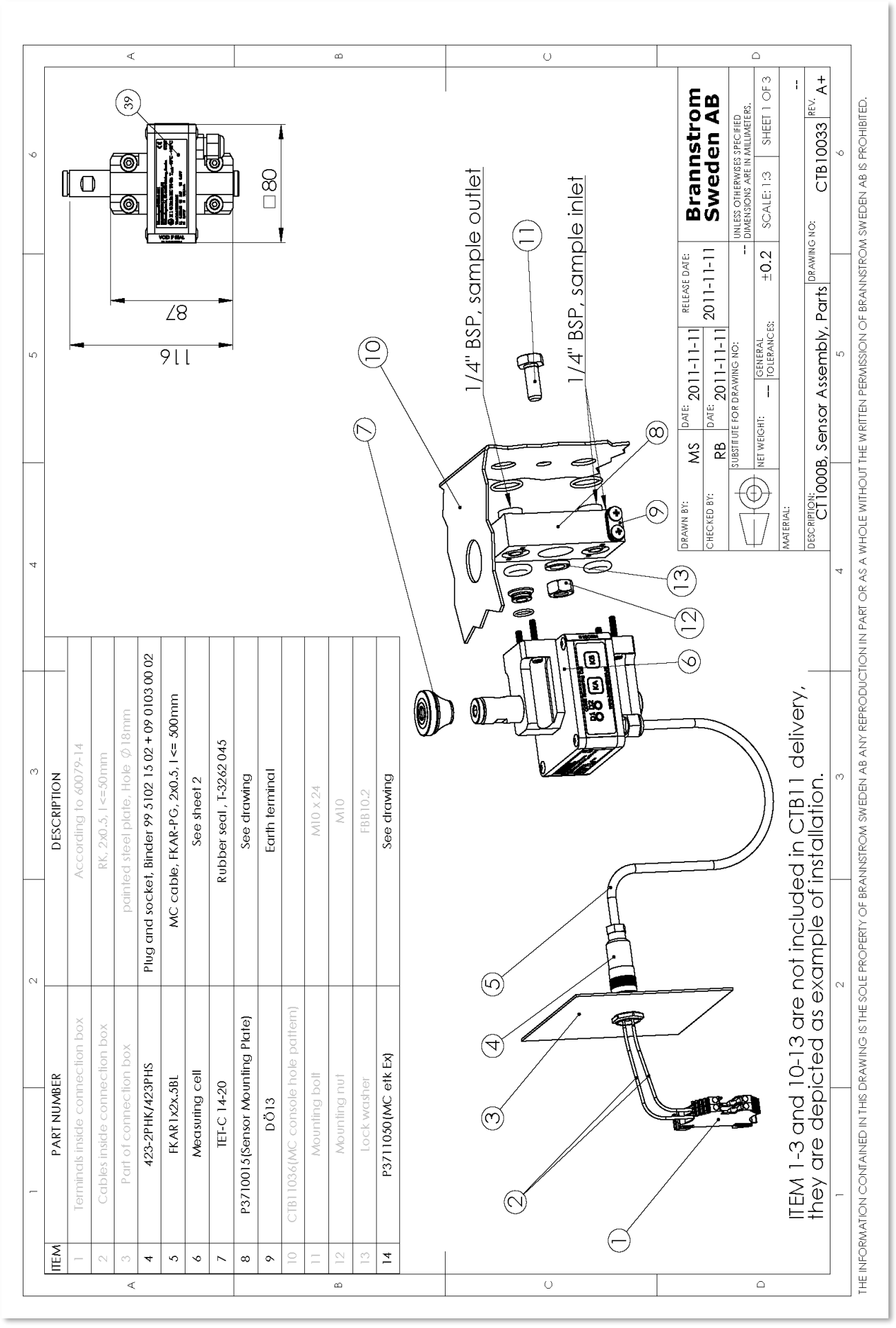
Attachments:
Drawing CTB10033 page 1, CT1000B Sensor assembly, parts.
Drawing CTB10032, Measuring Cell replacement.
Drawing CTB11036, MC console hole pattern.

3

4.10.1. Measuring Cell replacement (CTB10032)

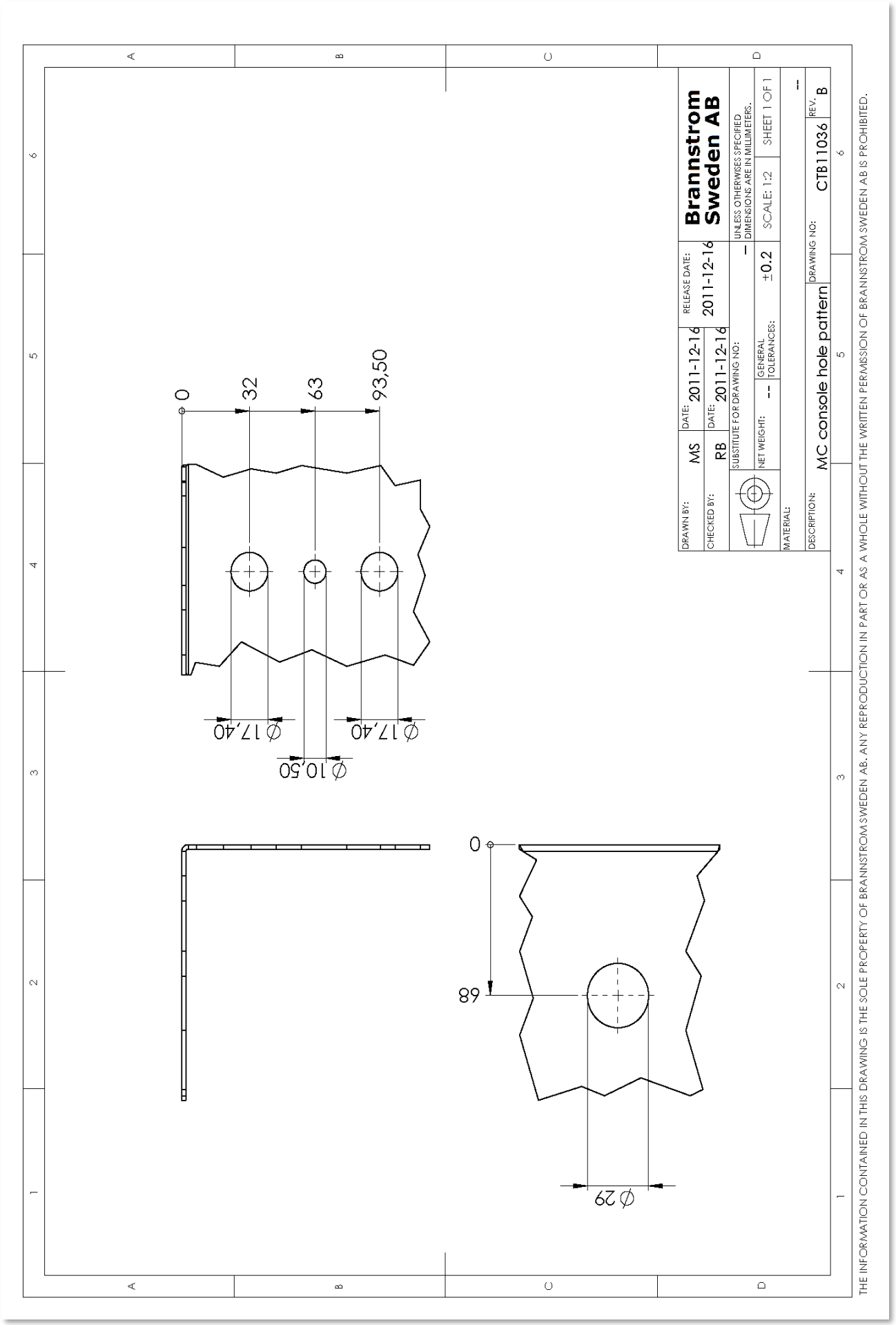


Drawing: CTB10033 sheet 1, Measuring Cell assembly and connection.



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 Ø 18mm
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	TEI-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 in order 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 **12.7. Flow meter, Fuji** page **198.**

ISP Intrinsically safe Pressure transmitter.
- Values below from Siemens type /MF156x.

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 depends 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

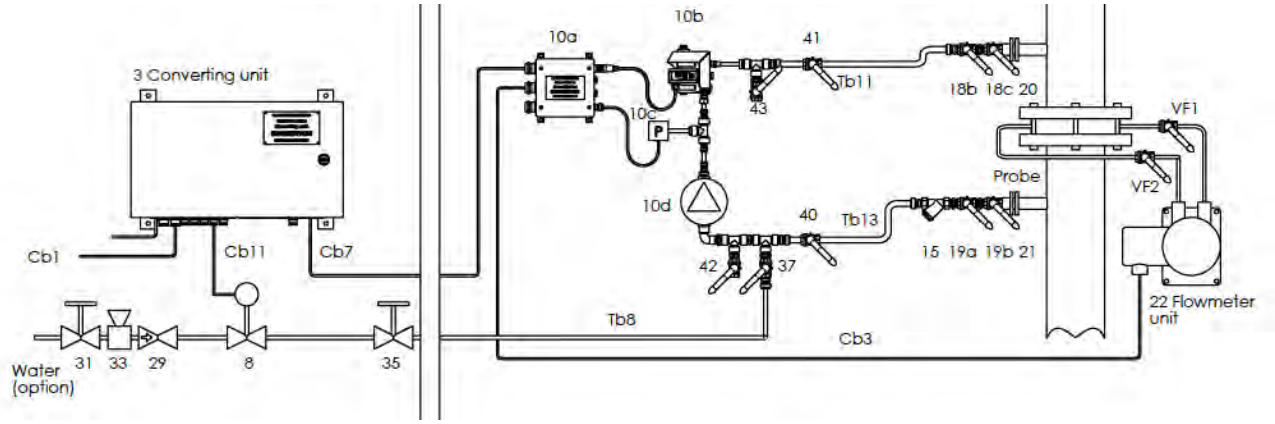
The electrical parameters (*C*c and *L*c) or (*C*c and *L*c/*R*c) for all cables used (see 12.2.5) shall be determined according to a), b) or c):

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 googles and follow normal occupational safety on a ship.***
- ***Prevent the sample pump from running dry or against a closed valve.***
- ***The overboard line must be filled with water.***
- ***Pressure settings correct according to chapter* 4.8. Pressure alarm settings *page* 24.**

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 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 **93**.
2. Inspect and clean the Inlet Sample Filter, pos 15. See chapter **9.6. Cleaning of Inlet Filter** page **93**.
3. Check that the Measuring Cell is mounted in its Analyzing unit docking position.
   (It might have been removed for cleaning or service).
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 40, 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 installed, check that the sample pump disconnector switch is ON.

    If the sample pump is powered by an air motor:

- Check that the air motor Exhaust protection (muffler) is not clogged, see drawing **CTB10010 sheet 4 of 5, Analyzing unit with air motor sample pump** page **117**.
- Check that the valve between the Analyzing Unit and the Exhaust protection (if installed) is open.
- 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.

14. Check that there are no alarms on the Computer unit, and if necessary, reset 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 **47**.
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 inlet and outlet valves, pos 19a, 19b, 18b and 18c.
7. Close down Converting unit/Sample pump
   For a sample pump powered by an electrical motor:
   a. If installed, set the sample pump disconnector switch to OFF.
   b. For units with serial numbers lower than CTB 2892, check that the sample pump contactor feedback is enabled.
      See chapter **7.8.9. System Configuration, Alarms&Extras** page **71** and the setting of the property **"ConvertingUnitType"** is **"PumpFeedback".**

   For a Sample pump powered by an air motor:
   c. Close all air supply valves.
   d. Close the valve between the Analyzing Unit and the Exhaust protection, if installed.
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.

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

10. Check that steps in the **5.3. Close down procedure** above has been followed.
11. 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.

12. Open the Drain and Grab Sample Valves, pos 42 and 43 and use pressurized 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.
13. The measuring cell can be disconnected and removed. If so, clean it, and store it in a dark, dry and temperature controlled location.

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.)

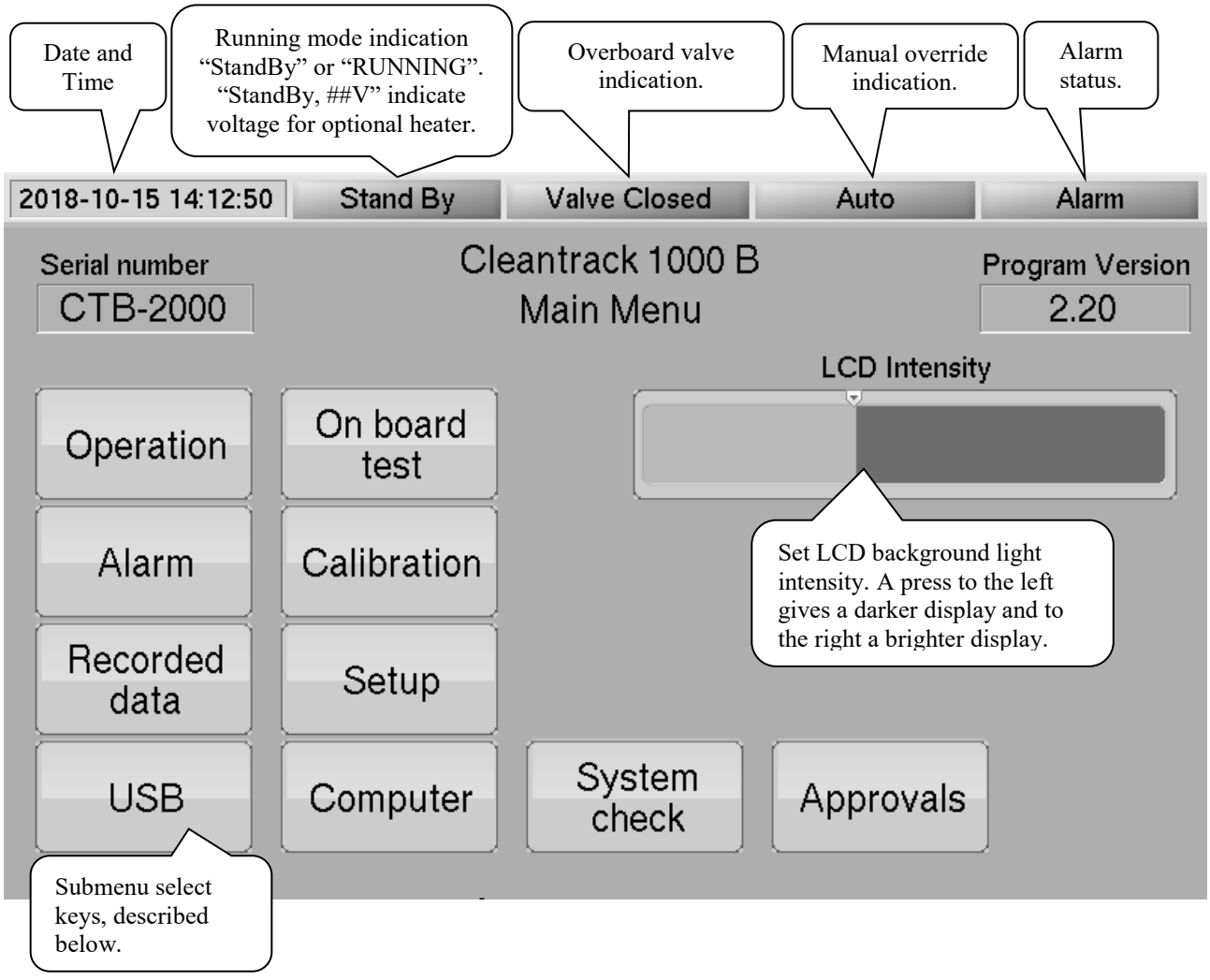
- Grey "Valve Closed" — Overboard valve is closed.
- Grey/Black "Valve Closed" — Overboard valve is closed but the output control is opening the valve.
- Yellow "VALVE OPEN" — Overboard valve is open.
- Yellow/Black "VALVE OPEN" — Overboard valve is open but the output control is closing the valve.

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

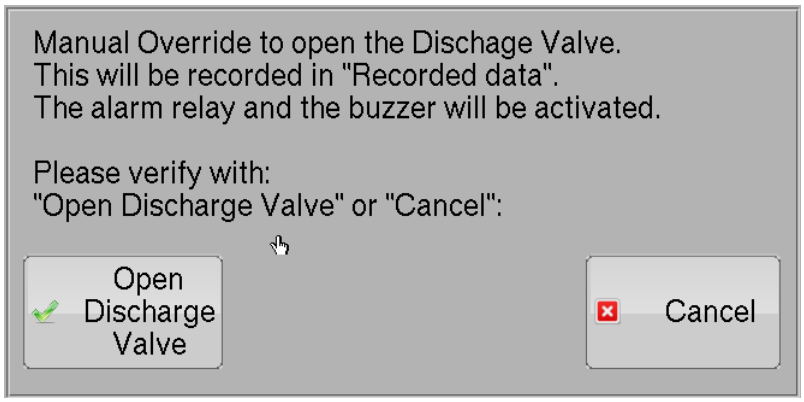
Values with white background are set values and can be changed.
Press the indicated value with the tip on your finger and a Numeric Keyboard pops up.
Normally the present value and text to indicate the selection are displayed on the Numeric Keyboard.

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 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"

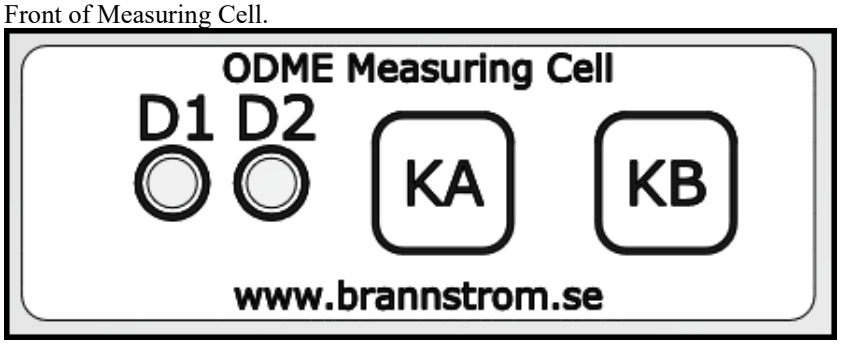
First enter the Password and then select "Admin" for administrator level or "User" for lower level.

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”

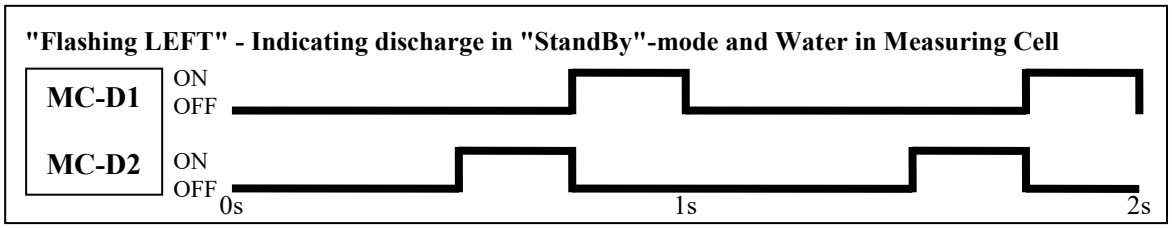
6.5. Measuring Cell - Indications and Keys

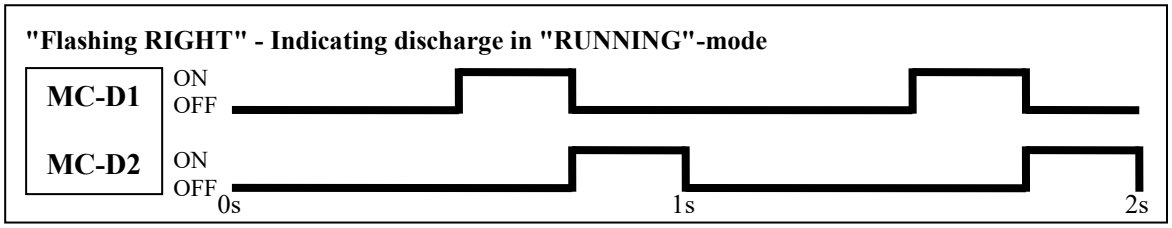
Front of Measuring Cell.

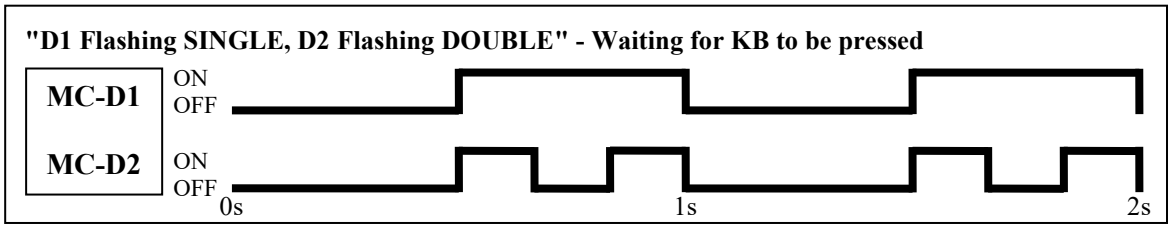


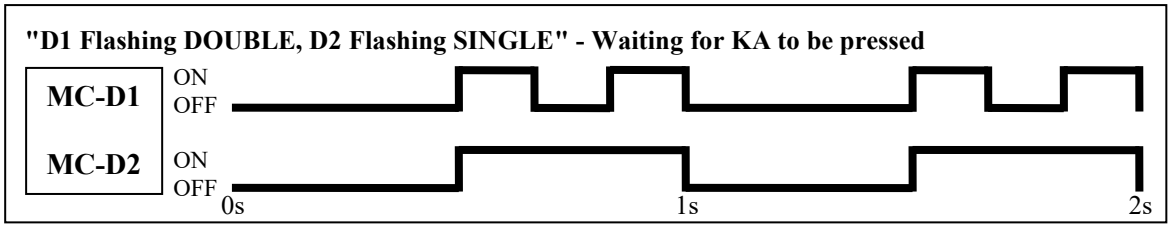
The front of the "Measuring Cell" has two yellow light emitting diodes, "D1" and "D2".
It also has 2 touch keys, "KA" and "KB".
The yellow light emitting diodes, D1 and D2, normally indicates if ODME is in "StandBy"-mode, "RUNNING"-mode or "RUNNING STARTUP"-mode. In ”RUNNING STARTUP"-mode or during "CALIBRATION" 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.





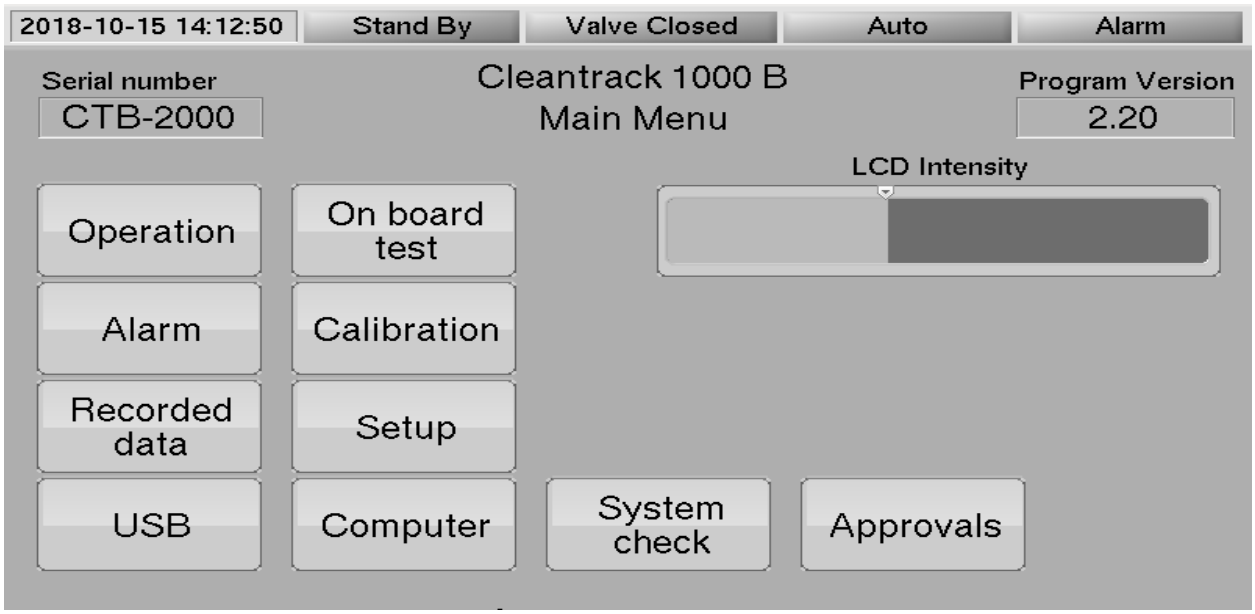




7. Menu layout

7.1. Main Menu

See chapter **6. Menu operations** page **41** 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 **46**
"Alarm"	Go to "Alarm table".	**Chapter 7.3. Alarm Table,** page **53**
"Recorded data"	Go to "Recorded data table".	**Chapter 7.4. Recorded data,** page **54**
"USB"	Go to "USB" page.	**Chapter 7.5. USB,** page **56**
"On board test"	Go to "On board test" page.	**Chapter 7.6. On-board Test,** page **59**
"Calibration"	Go to "Calibration" page.	**Chapter 7.7. Measuring Cell Check/Calibration** page **63**
"Setup"	Go to "Setup" page.	**Chapter 7.8. Setup of parameters,** page **67** Password: "3" and "Admin".
"Computer"	Go to "Computer" page.	**Chapter 7.9. Computer,** page **73** Password: "1" and "User".
"System check"	Go to "System check" page.	**Chapter 7.10. System Check,** page **75** Password: "2" and "Admin".
"Approvals"	Go to "Approvals" page.	**Chapter 7.11. Approvals** page **81**

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”.

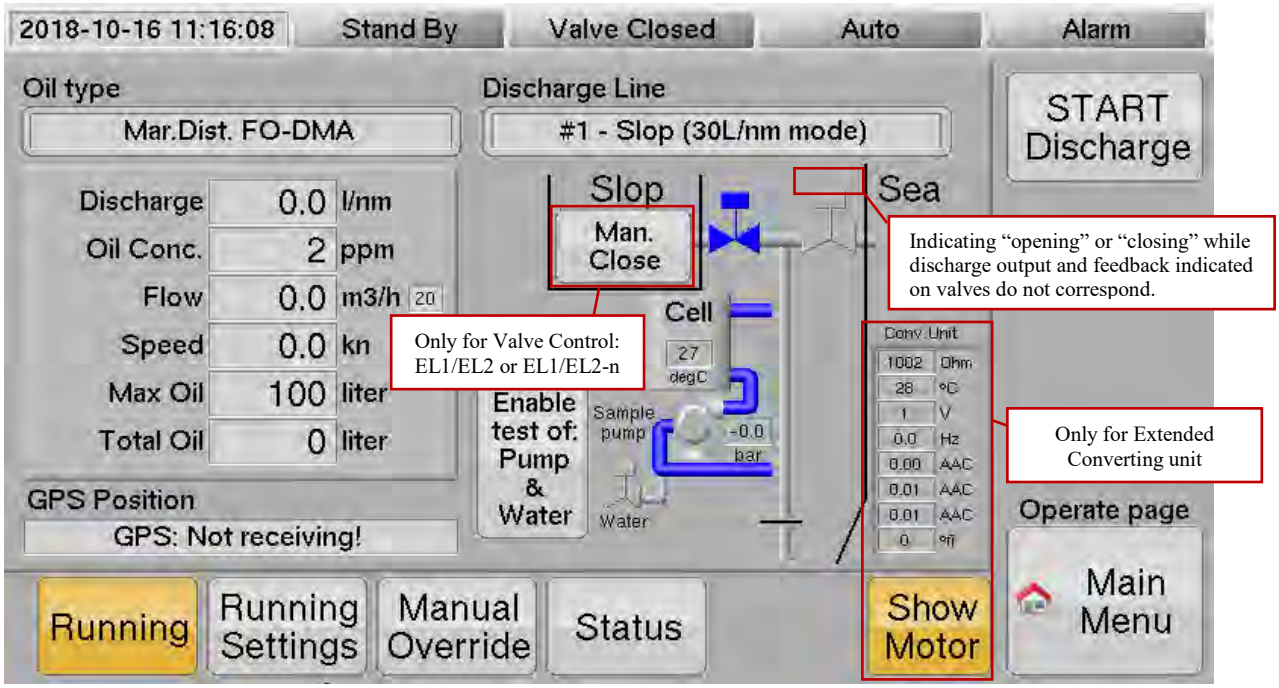
7.2. Operation

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.

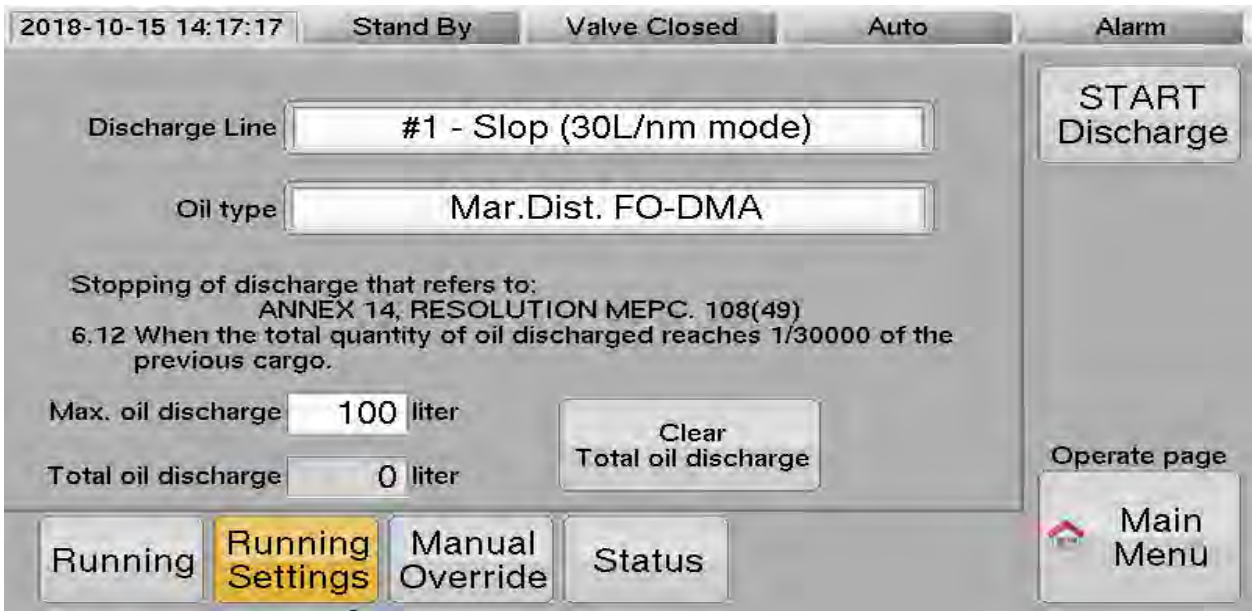
- Overboard valve is grey, indicating closed, and slop tank valve is blue, indicating open.
- The water sensor in the measuring cell is not active and this is displayed with grey sample lines. The sample lines turn blue when the water sensor is activated.
- The "Sample pump" turn blue when its control 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 **38** 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 **38** 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 **52** 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 **67**.
“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.

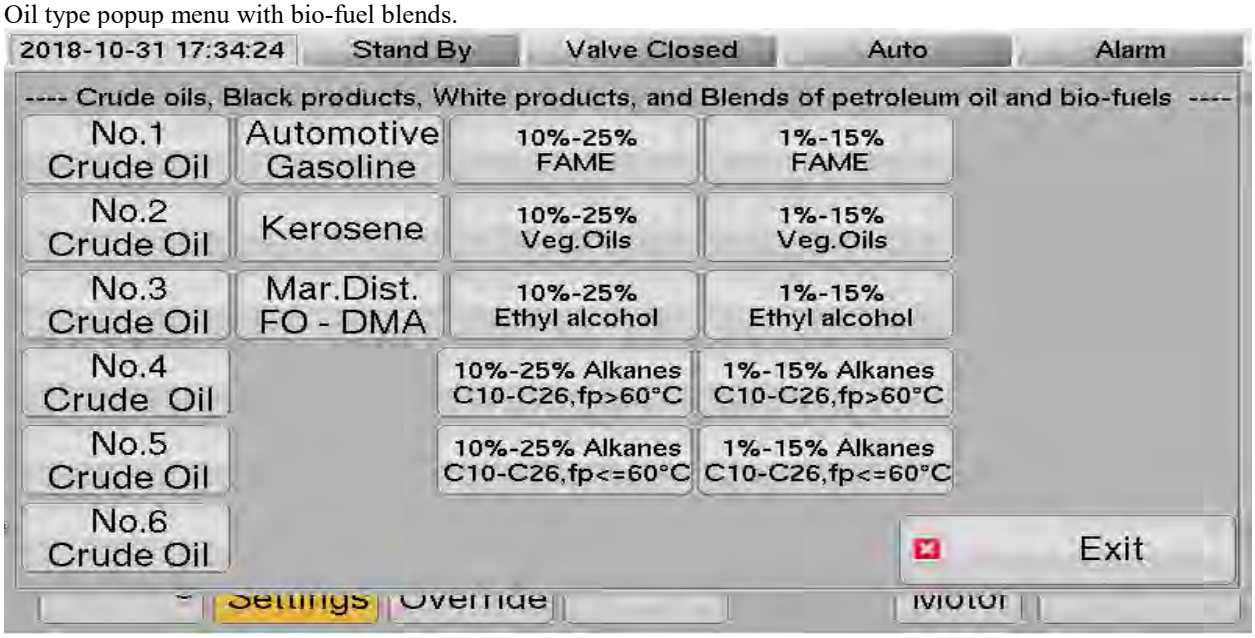
7.2.2.1. "Discharge line"

Discharge line popup menu.
(This popup menu will differ depending on selections made in Chapter **7.8.1. Line of discharge** page **67**)

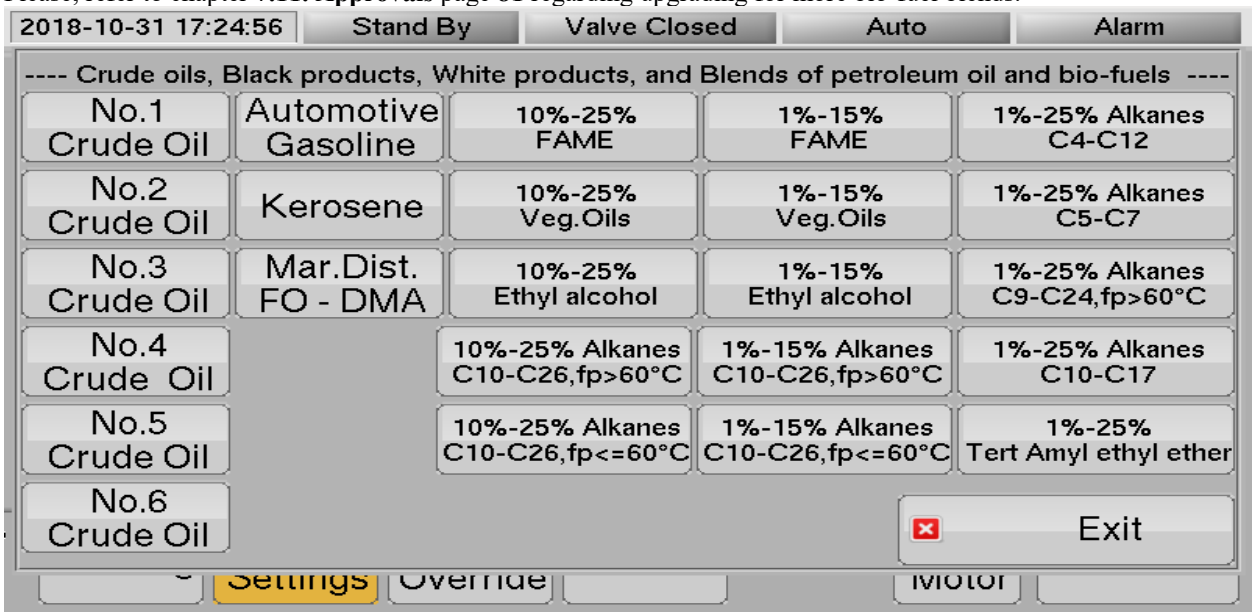
"#1", "#2", "#3" or "#4"	Select line for discharging.

7.2.2.2. "Oil type"

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 **81** 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

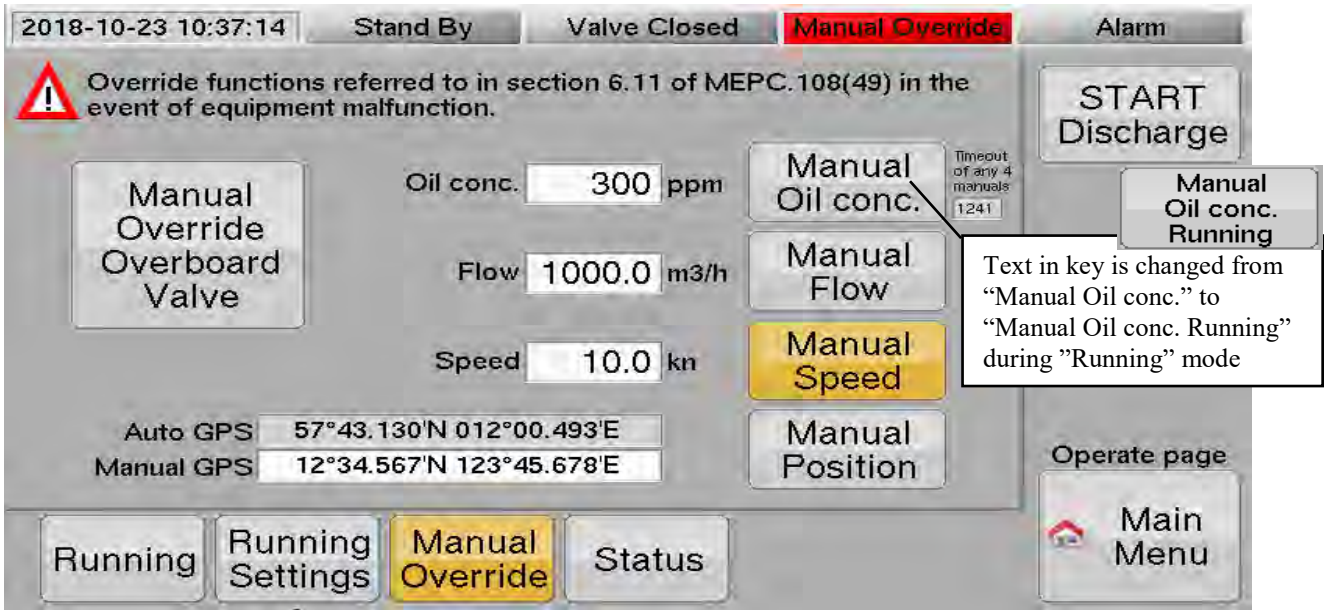
Blended Type	Description
1%-15% FAME	Bio-fuel blends of Diesel/gas oil and FAME (>85% but <99% Diesel gas oil by volume)
10%-25% FAME	Bio-fuel blends of Diesel/gas oil and FAME (>75% but <90% Diesel/gas oil by volume)
1%-15% Veg.Oils	Bio-fuel blends of Diesel/gas oil and Vegetable oils (>85% but <99% 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% Alkanes C10-C26,fp>60°C	Bio-fuel blends of Diesel/gas oil and Alkanes (C10-C26), linear and branched with a flashpoint >60°C (>85% but <99% Diesel/gas oil by volume)
10%-25% Alkanes C10-C26,fp>60°C	Bio-fuel blends of Diesel/gas oil and Alkanes (C10-C26), linear and branched with a flashpoint >60°C (>75% but <90% Diesel/gas oil by volume)
1%-15% Alkanes C10-C26,fp<=60°C	Bio-fuel blends of Diesel/gas oil and Alkanes (C10-C26), linear and branched with a flashpoint ≤60°C (>85% but <99% Diesel/gas oil by volume)
10%-25% Alkanes C10-C26,fp<=60°C	Bio-fuel blends of Diesel/gas oil and Alkanes (C10-C26), linear and branched with a flashpoint ≤60°C (>75% but <90% Diesel/gas oil by volume)
1%-25% Alkanes C4-C12	Bio-fuel blends of Naphtha and Alkanes (C4-C12), linear, branched and cyclic (>75% but <99% Naphtha by volume)
1%-25% Alkanes C5-C7	Bio-fuel blends of Naphtha and Alkanes (C5-C7), linear and branched (>75% but <99% Naphtha by volume)
1%-25% Alkanes C9-C24,fp>60°C	Bio-fuel blends of Diesel/gas oil and Alkanes (C9-C24), linear, branched and cyclic with a flashpoint >60°C (>75% but <99% Diesel/gas oil by volume)
1%-25% Alkanes C10-C17	Bio-fuel blends of Kerosene and Alkanes (C10-C17), linear and branched (>75% but <99% Kerosene by volume)
1%-25% Alkanes 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 **71**.

"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.

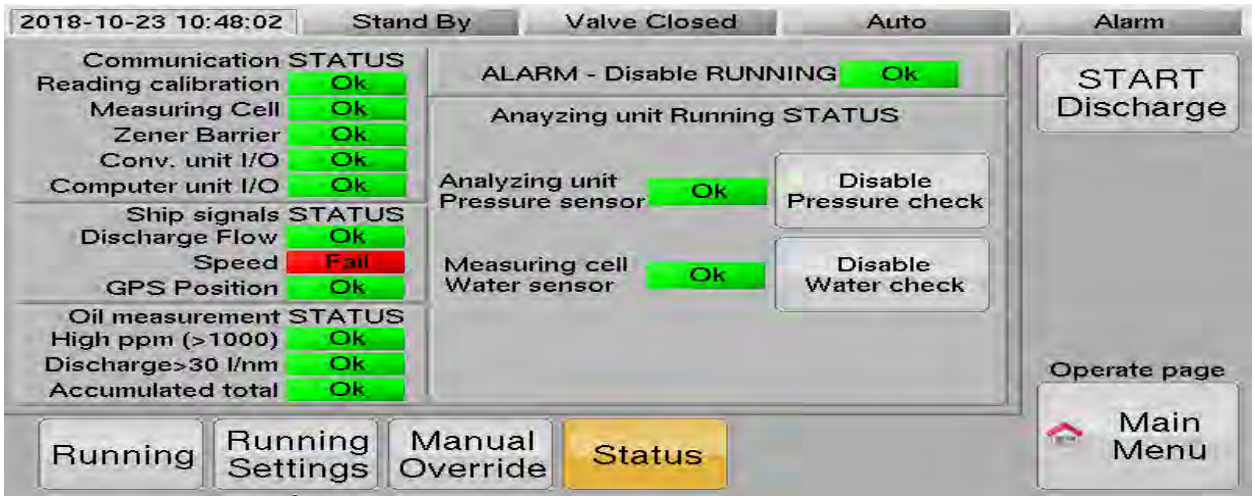
"Manual GPS" Press indicator to manually insert coordinates for the shop's position.

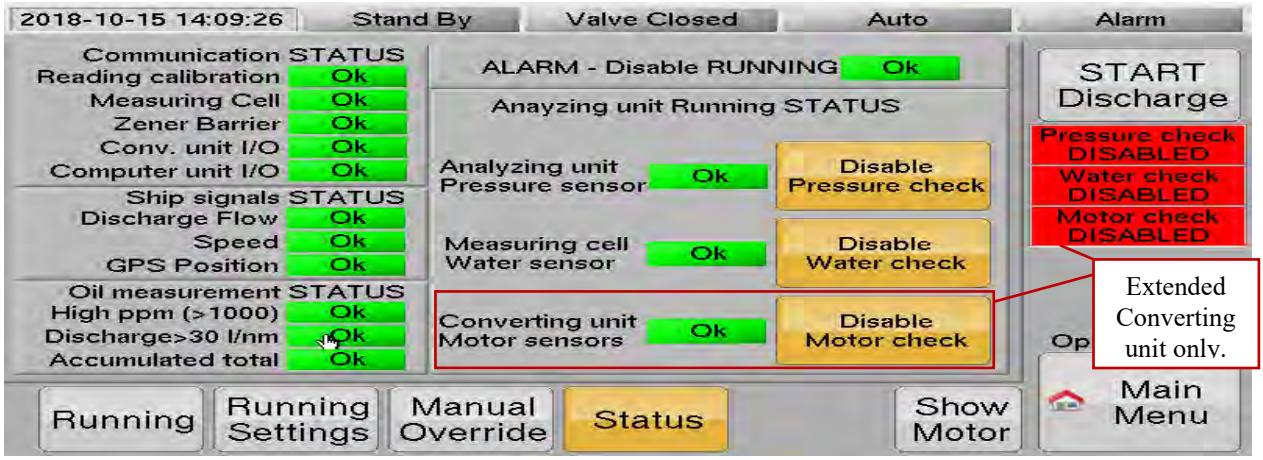
"Manual Position" Override ship's position with the **"Manual GPS"** value.
This selection needs to be verified on a popup window.

"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

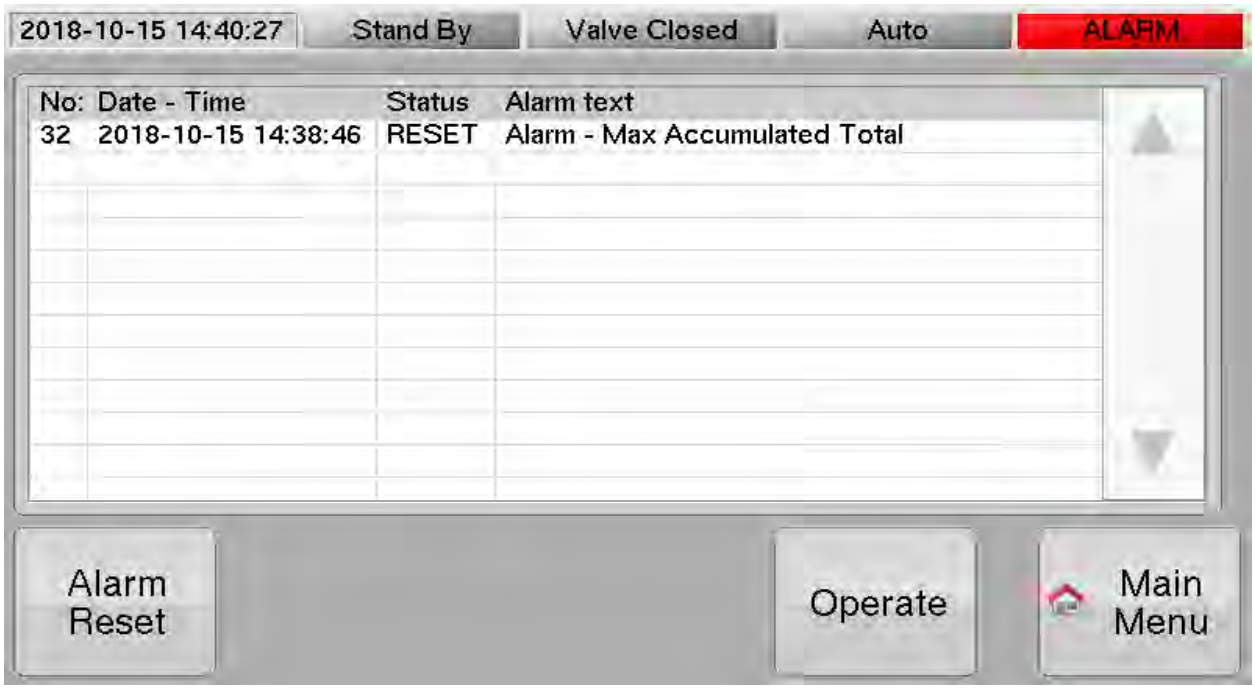
A system status indication is displayed on this page.
This status indication gives an immediate information if discharge can be started.





"<u>Communication STATUS</u>" Any RED indication stops "RUNNING" mode and blocks starts.
"<u>Ship signals STATUS</u>" Any RED indication stops discharging and blocks starts.
"<u>Oil measurement STATUS</u>" 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.

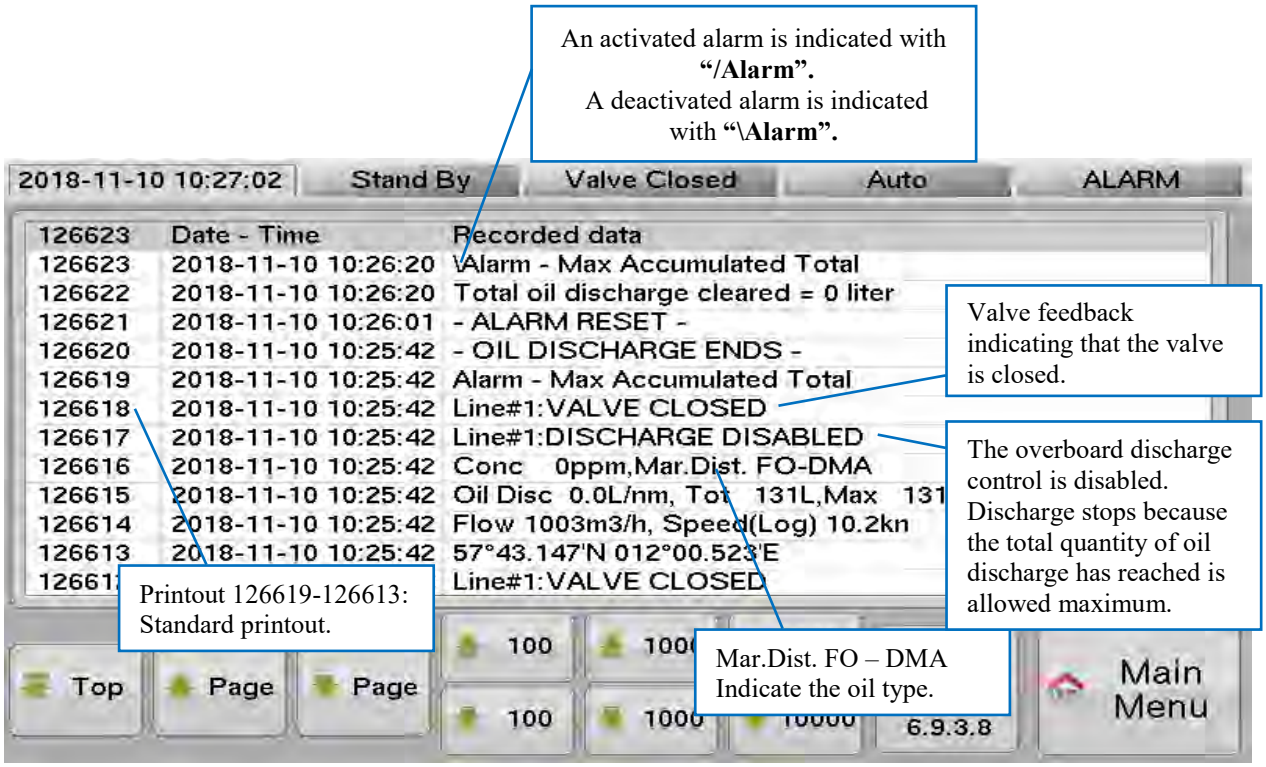
"Operate" Go to "Operate page".

"MENU" Go to "Main Menu".

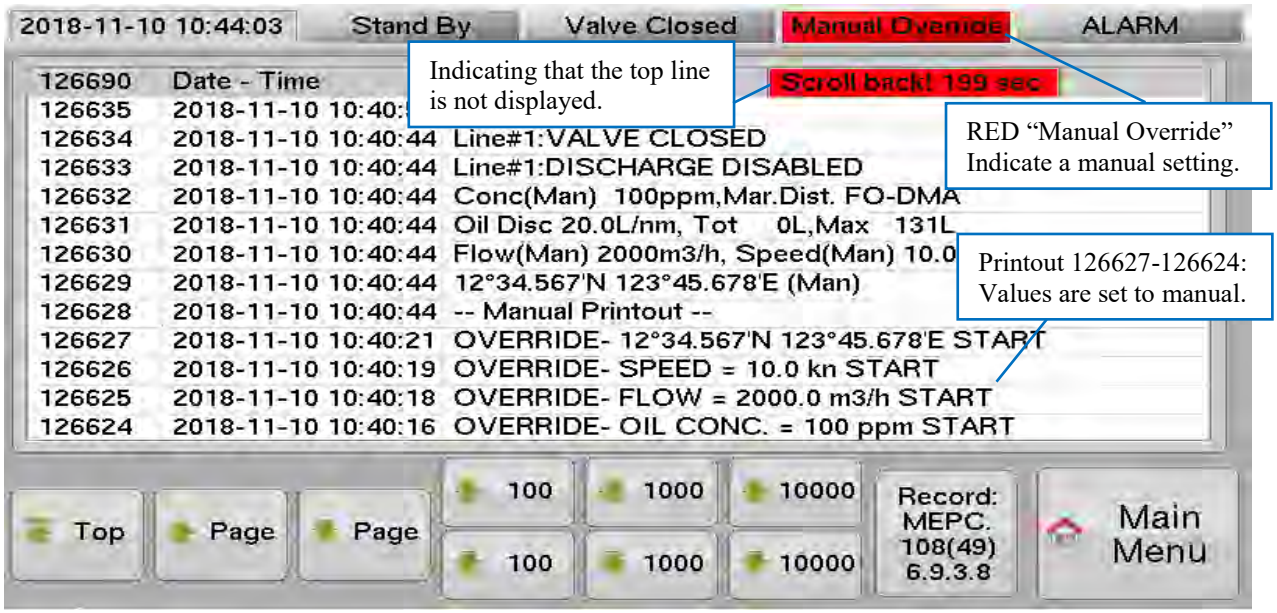
7.4. Recorded data

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 **56.**



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
```

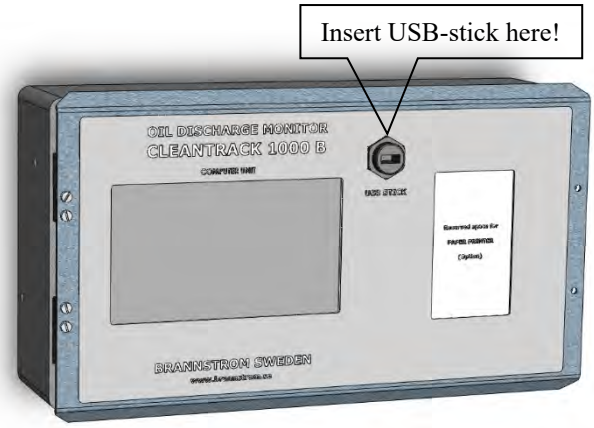
Line 126741 show that the overboard valve control is set to manual.
Line 126742 show with the initial “/Alarm” the time that the alarm overboard valve in manual is activated.
Line 126743 and 126744 show that position, flow and speed are inserted manually by succeeding “(Man)” indications.
Line 126745 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.

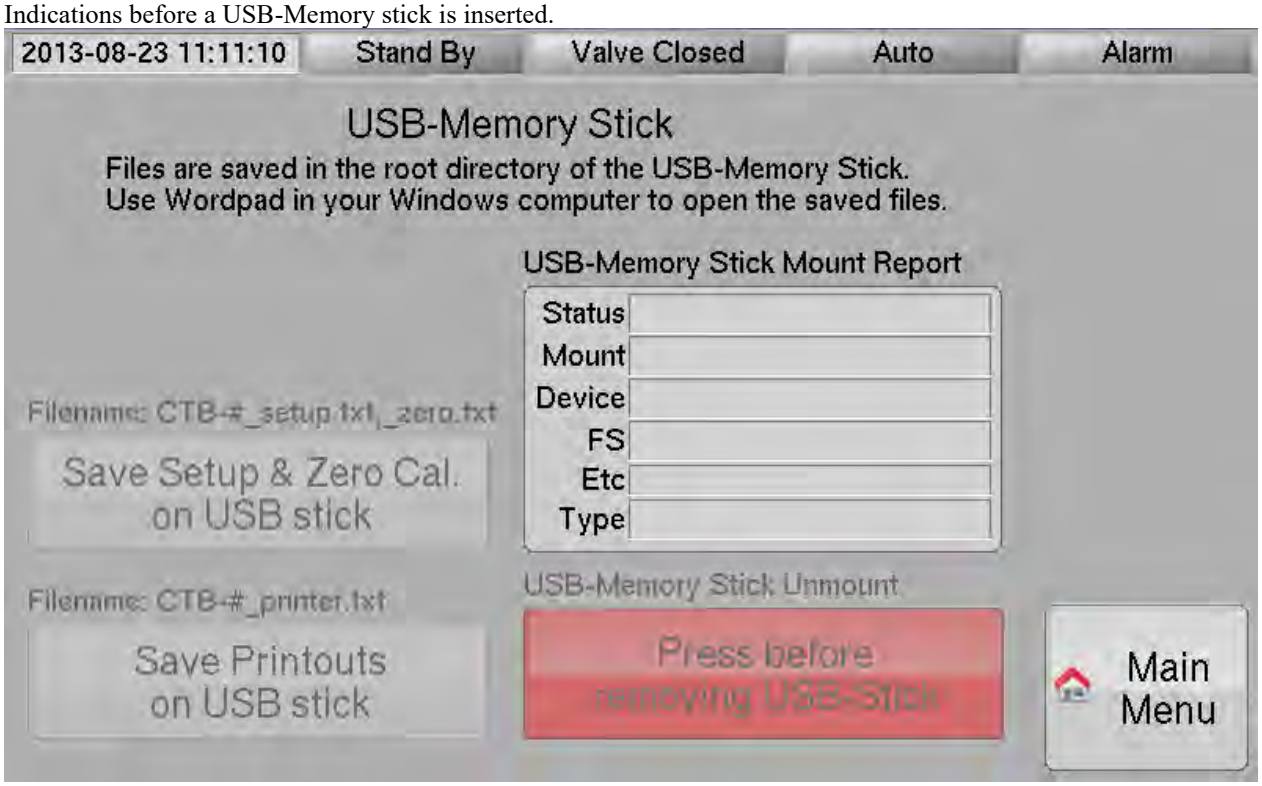
Recorded data can be copied to a USB-memory stick. Use a USB-stick with a Windows FAT32 file system. (Most memory sticks are preformatted with FAT32)

For information regarding Recorded data see chapter **7.4.1. Recorded data examples** page **55**.

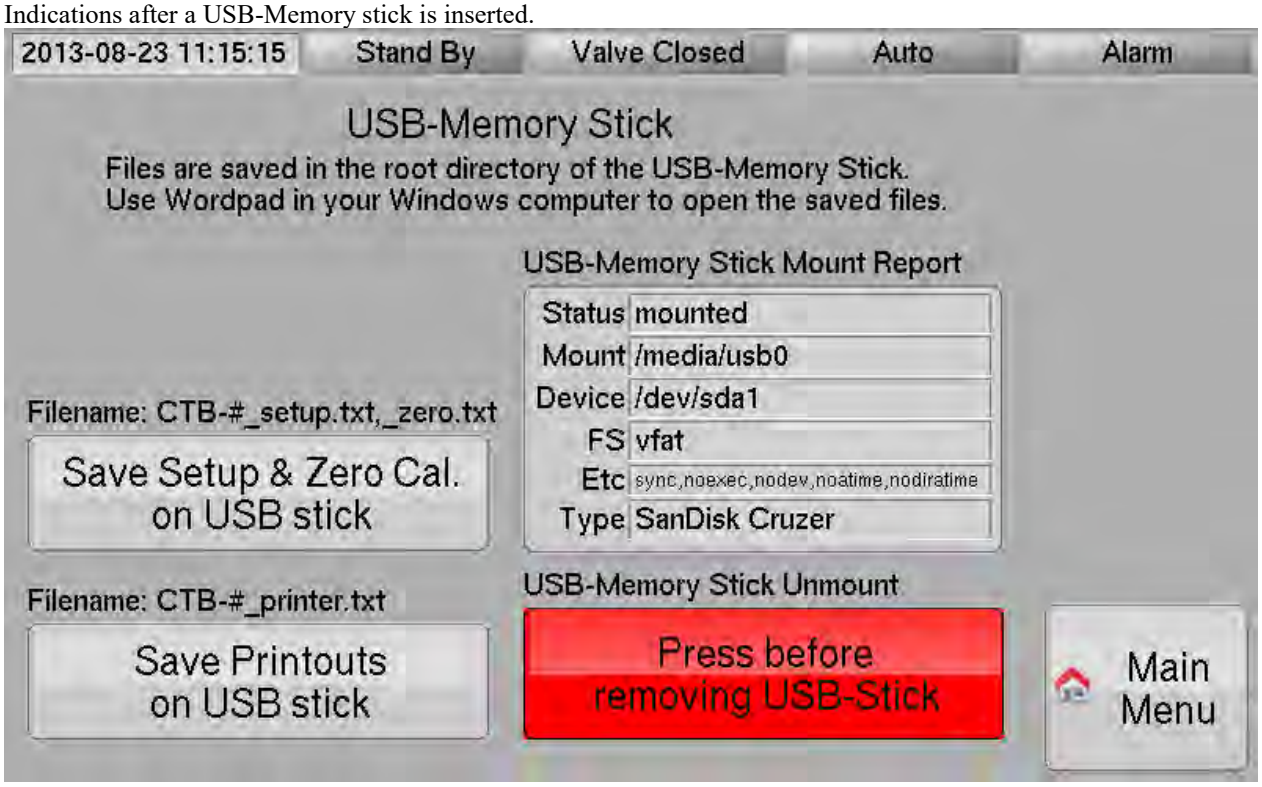


7.5.1. USB-Memory stick

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"

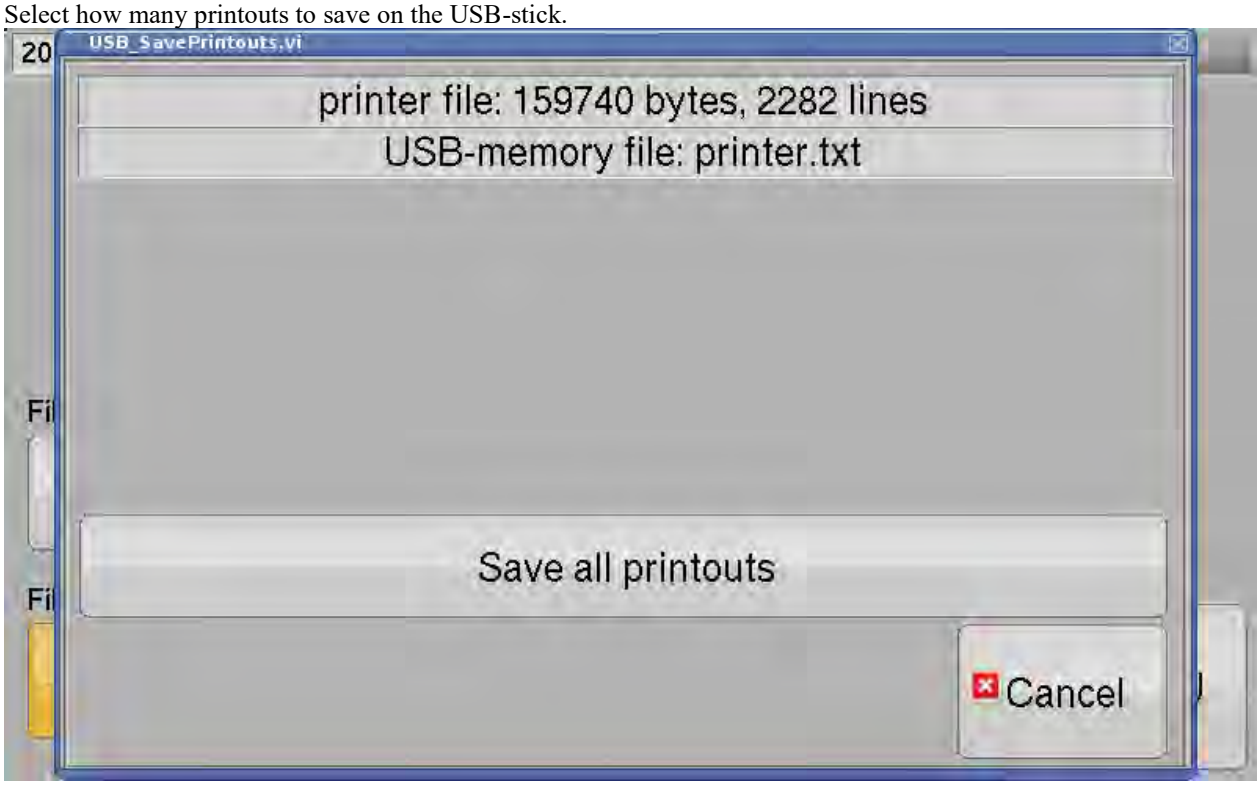
"Save Setup & Zero Cal. on USB stick"
Copy the Setup file and the zero calibration files to the USB-Memory stick.
The Setup file contains all settings made from the touch screen.
The file name is "CTB-#_setup.txt"
The Zero calibration file contains the result from the latest successful calibration.
The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

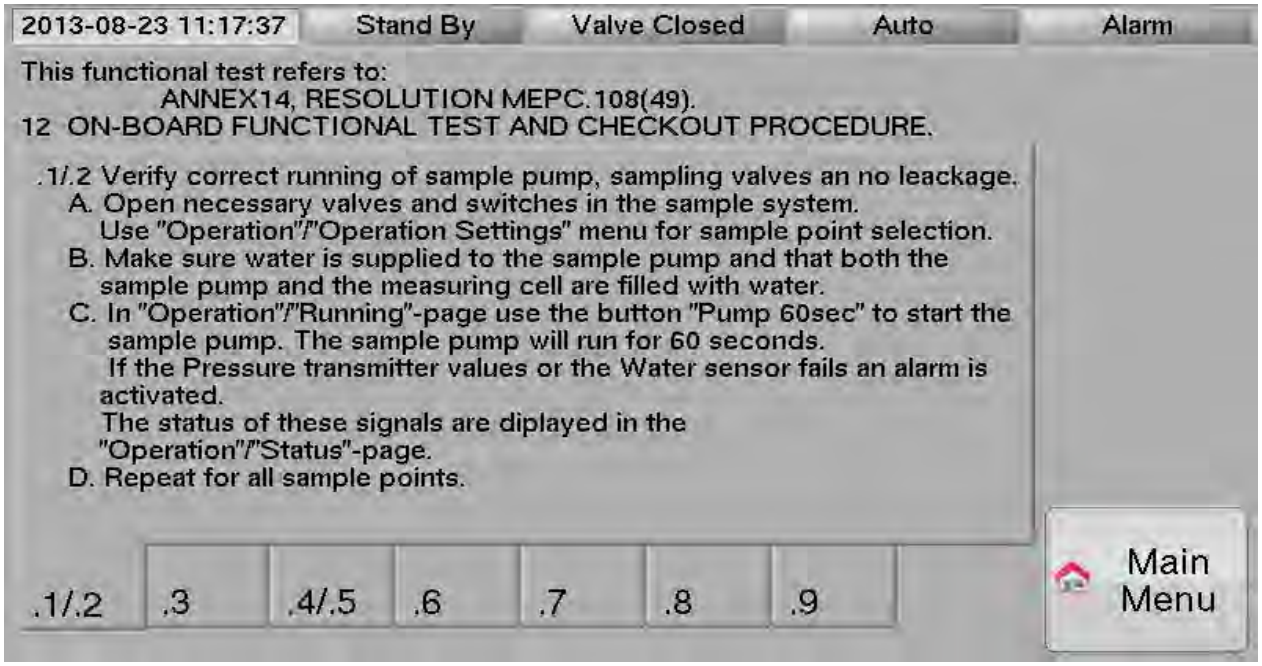


7.6. On-board Test

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

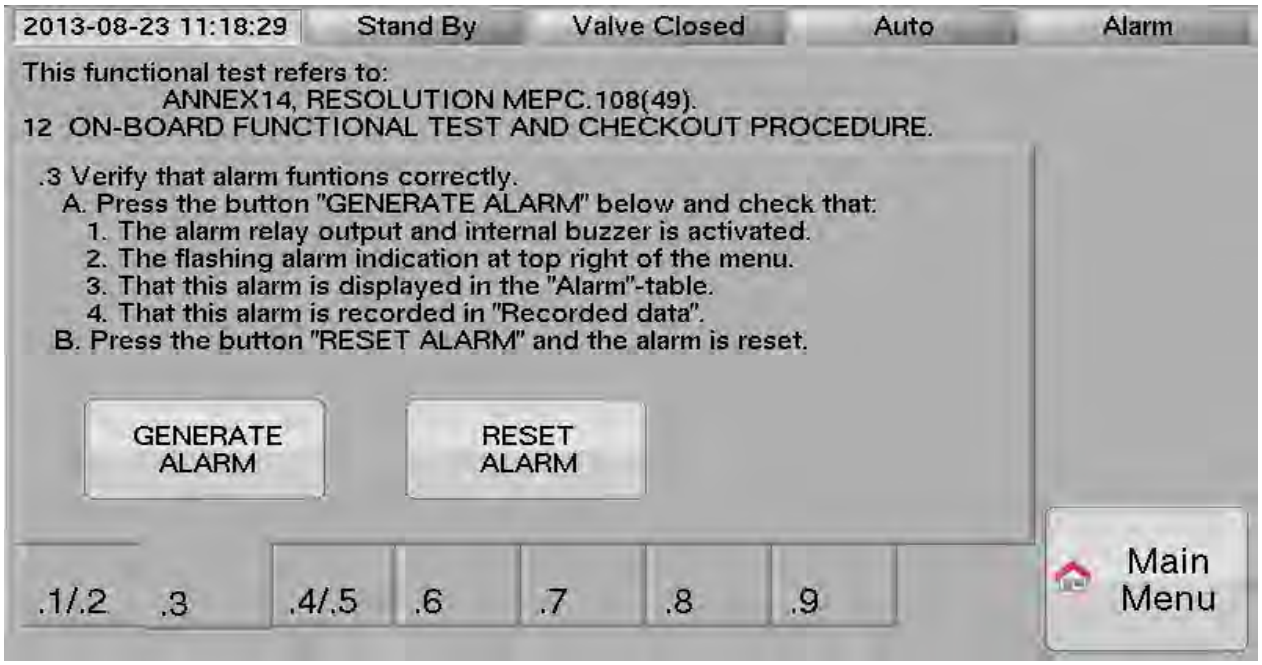
12 ON-BOARD FUNCTIONAL TEST AND CHECKOUT PROCEDURE

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:



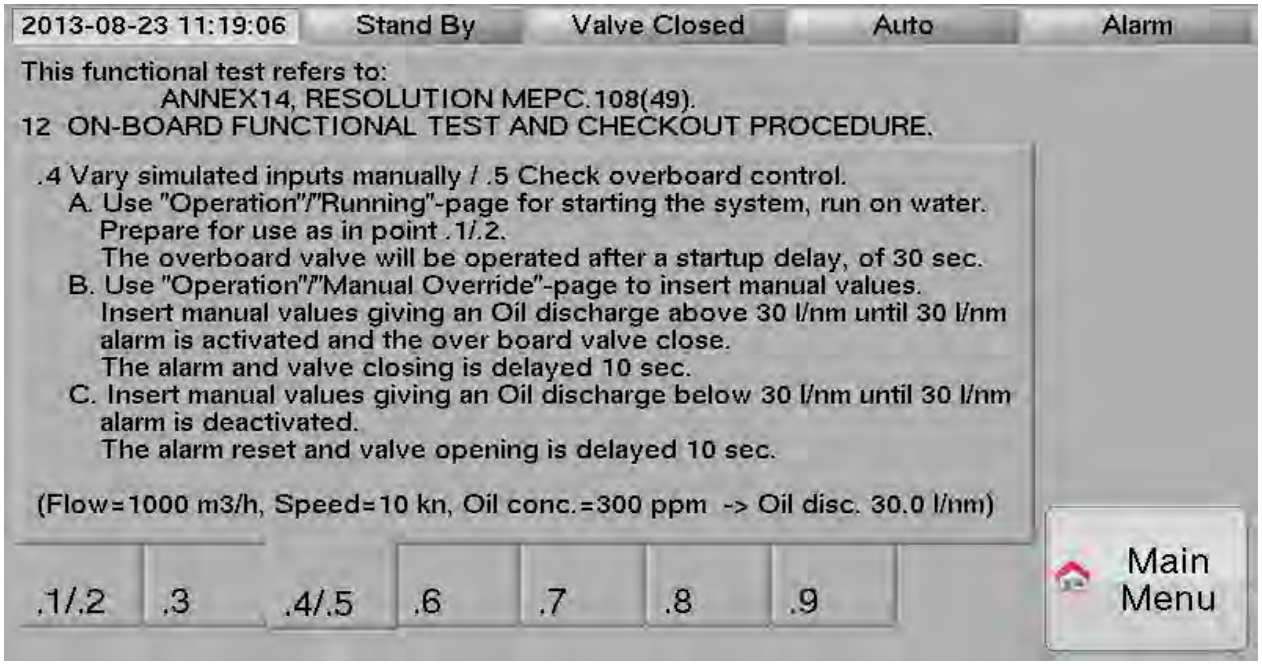
.1 verify correct running of pumps, absence of leakage in the sample pumping and piping system, correct functioning of remote-controlled sampling valves, etc.

.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;



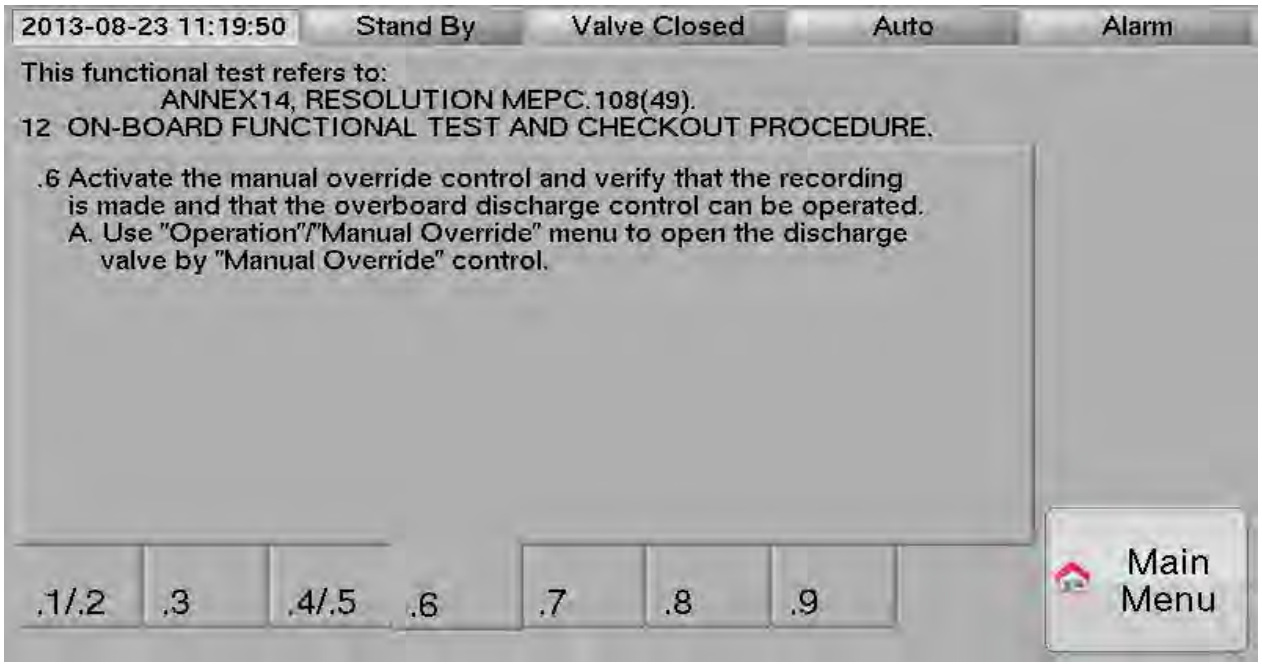
.3 verify that alarms function correctly when a malfunction occurs external to the monitoring system, such as no sample flow, no flow meter signal, power failure, etc.;

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

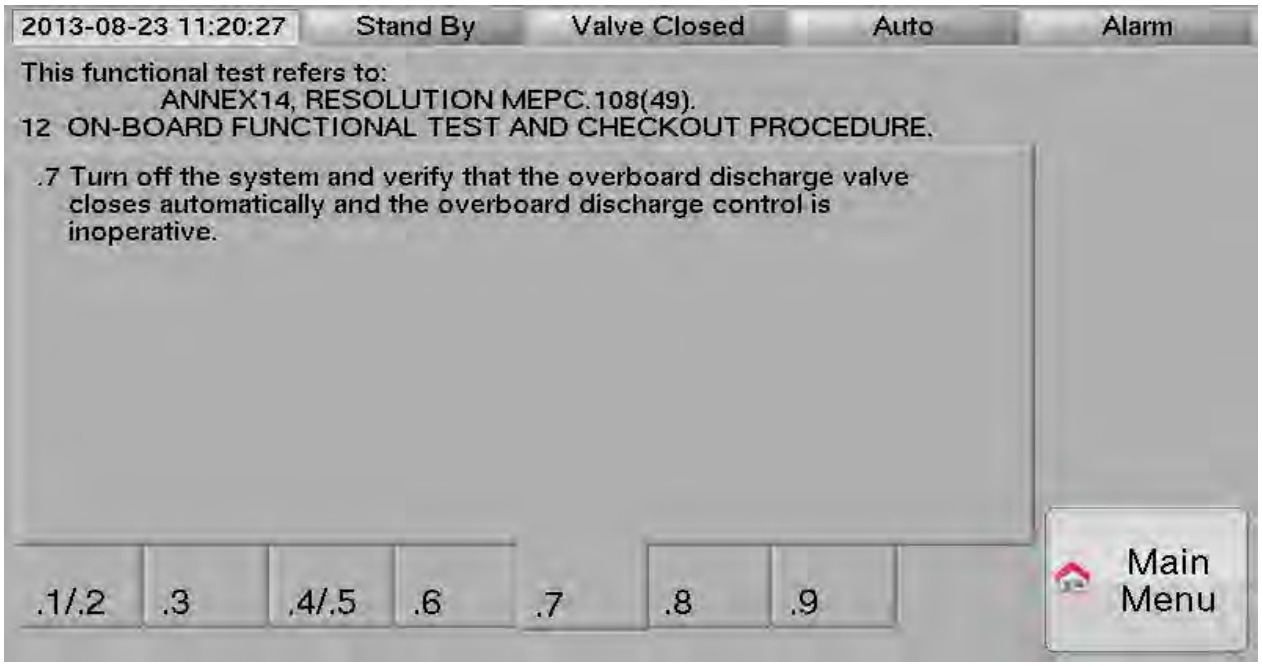


.4 vary the simulated input signals manually while the monitoring system is operating on water and check the recordings for correct values and timing. Vary the simulated manual input signals until alarm conditions are obtained, and verify proper recordings. Ascertain that the overboard discharge control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

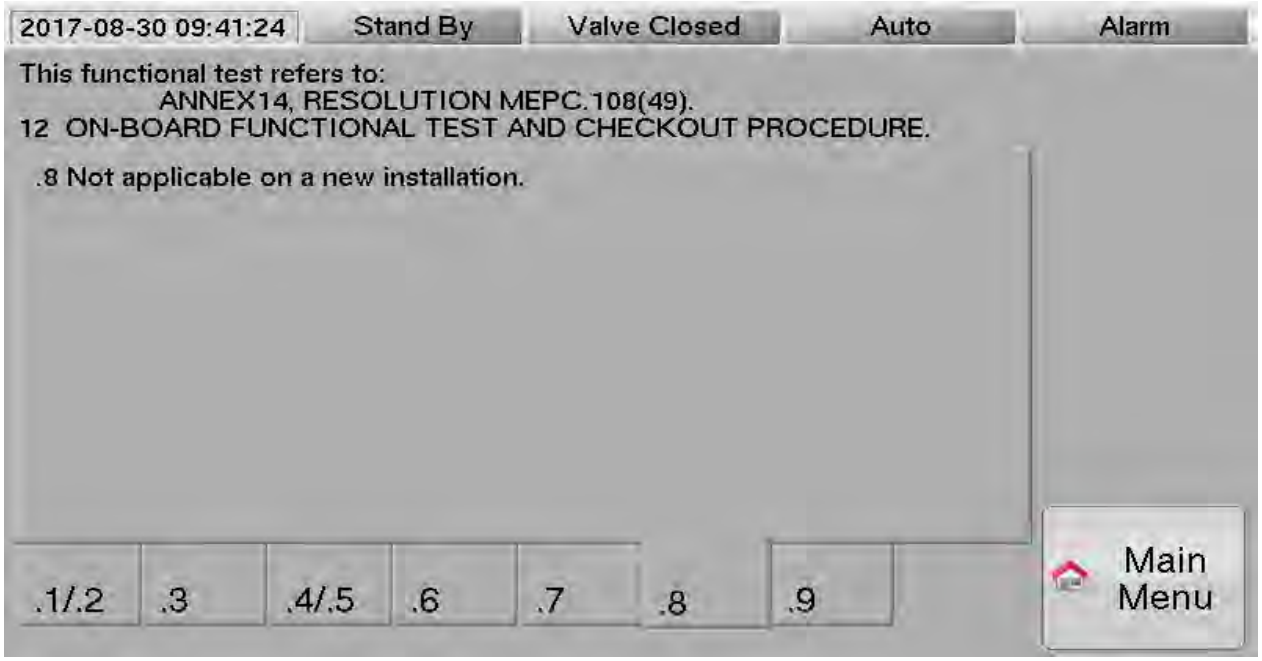
.5 verify that normal operating condition can be reset when the value of the instantaneous rate of discharge is reduced below 30 liters per nautical mile;



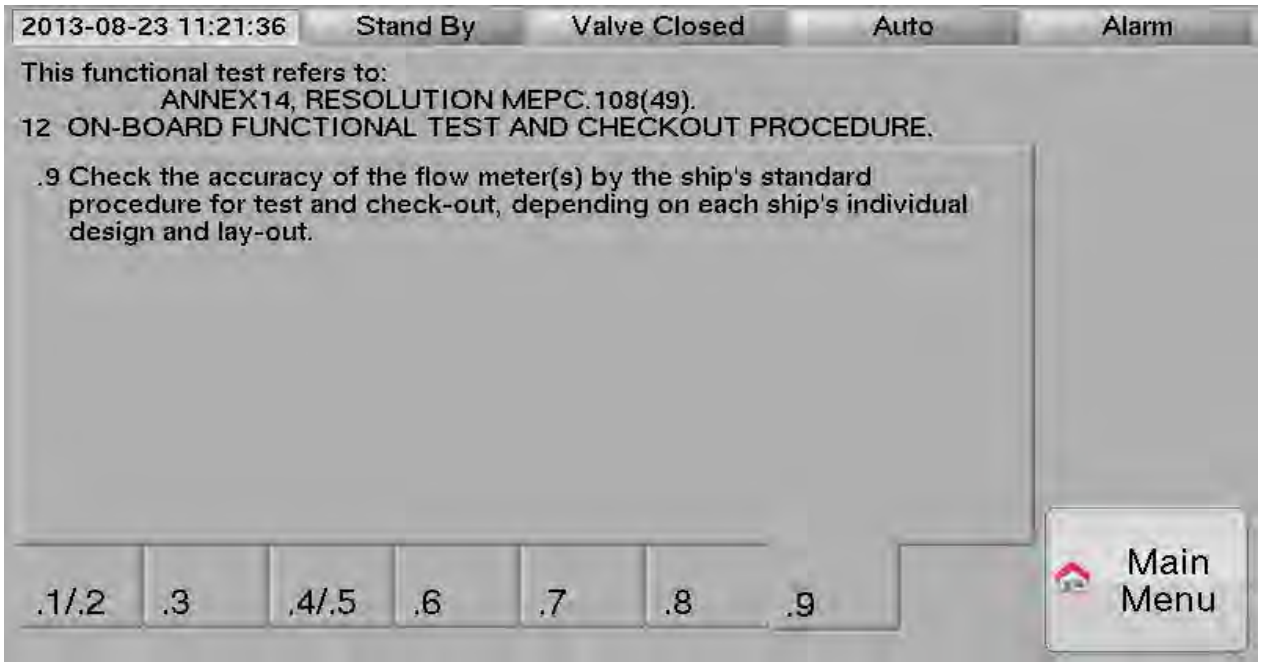
.6 activate the manual override control and verify that a recording is made and that the overboard discharge control can be operated;



.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;

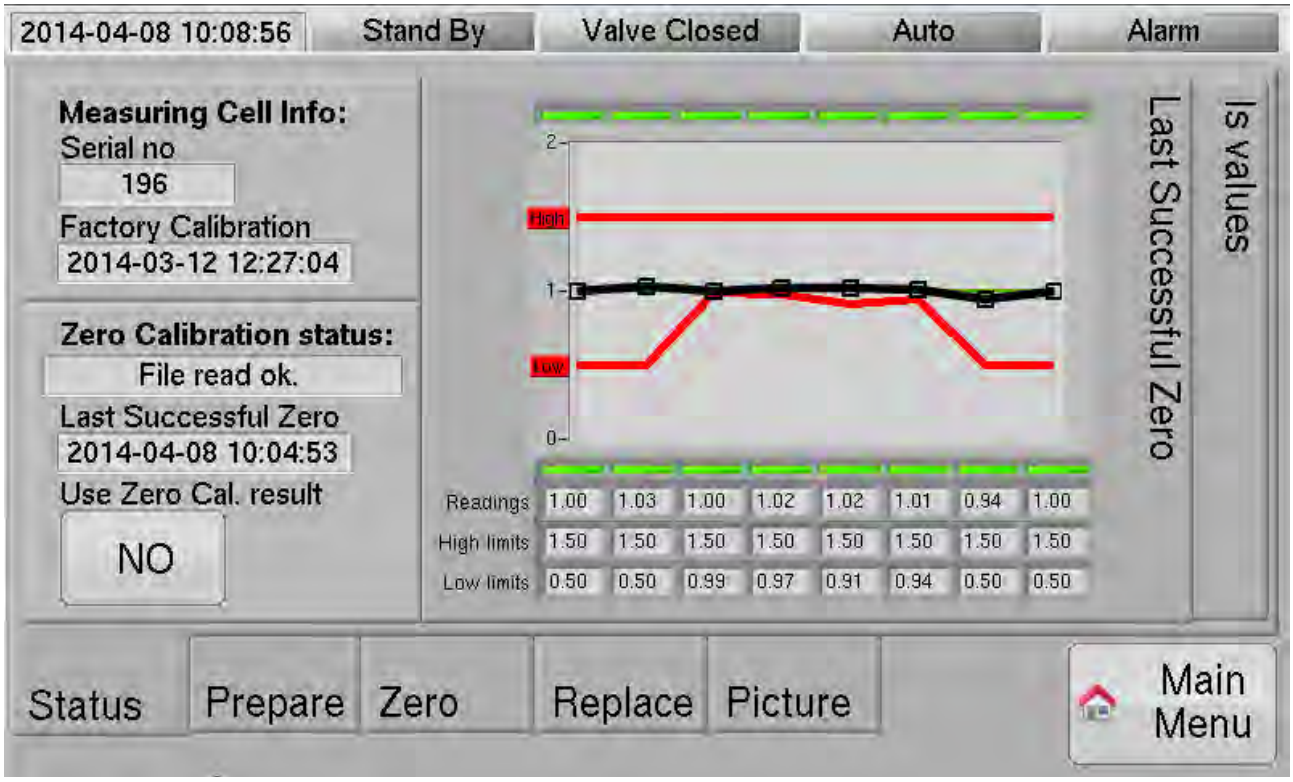


.9 check the accuracy of the flow meter(s), for example by pumping water in a loop where the flow rate may be calculated from the level change in a tank. The check should be made at a flow rate of about 50% of the rated flow of the flow meter.

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

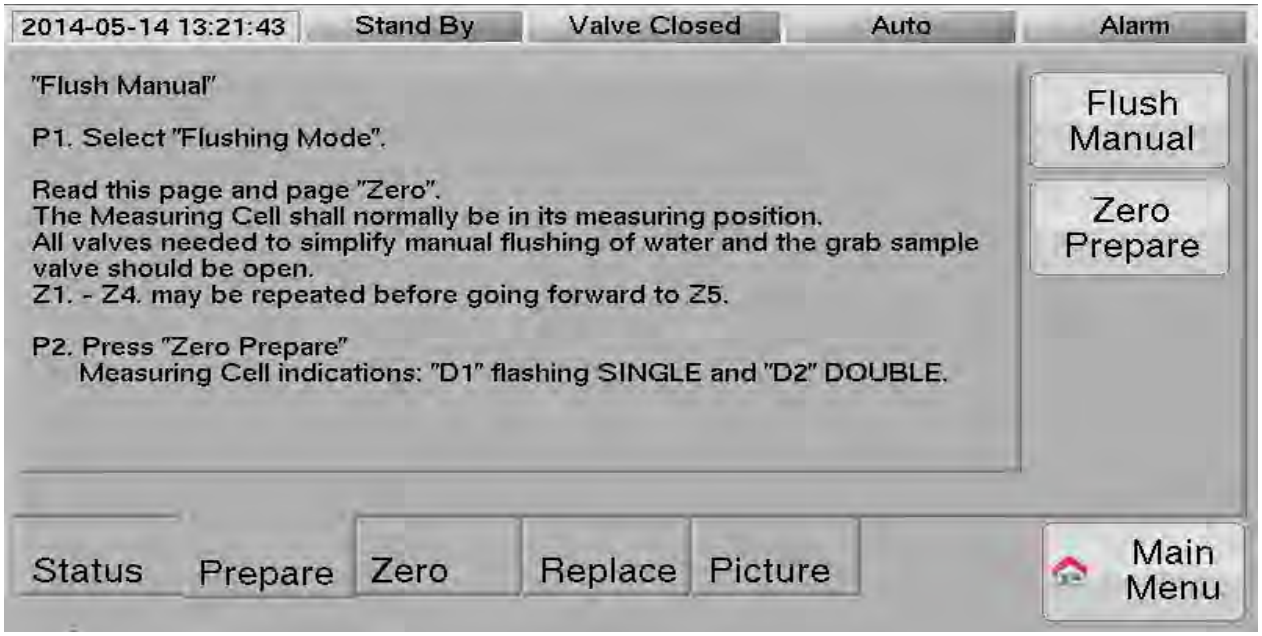
"Last Successful Zero"	Displays the values from the last successful zero.
"Is values"	Displays the measured values.

7.7.2. Zero Calibration Prepare

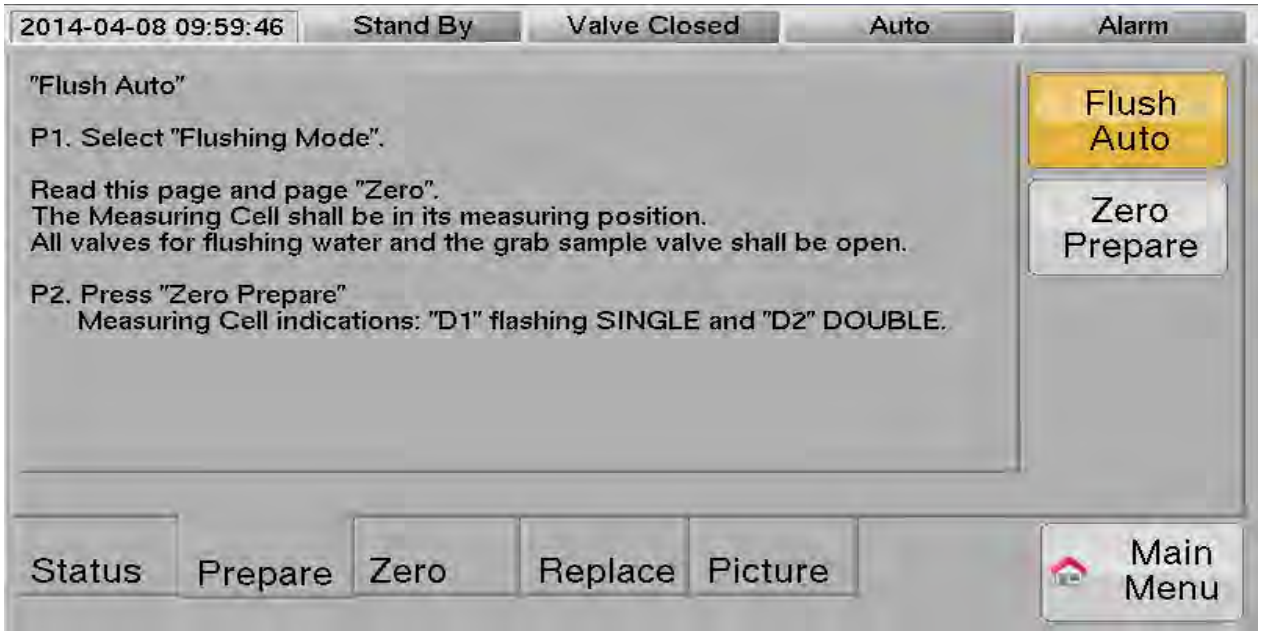
Zero Calibration can be performed in 2 different ways. If the installation has a "Controlled Water Valve" this fresh water can be used for calibration. If not, water has to be manually poured into the Measuring Cell.

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

Flush Manual:



Flush Auto:



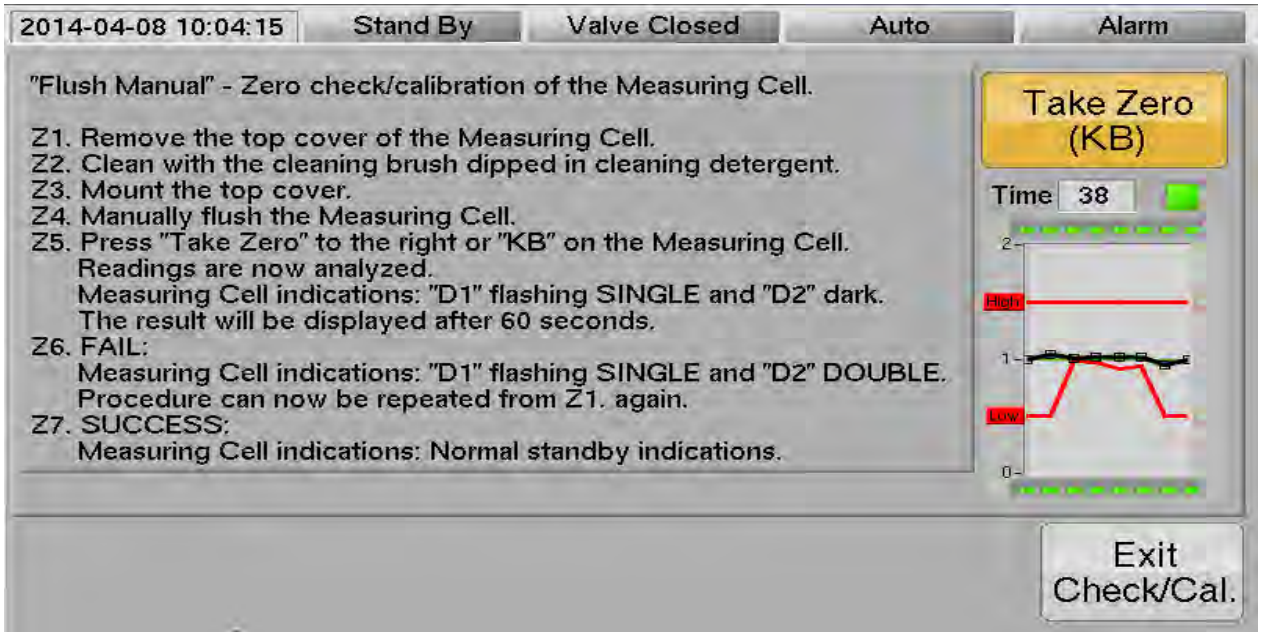
"Flush Manual/Auto" Press this key to toggle between manual flushing and automatic flushing by the "Controlled Water Valve". If "No Controlled Water Valve" is selected in the Setup/Config-page this key is not visible.

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

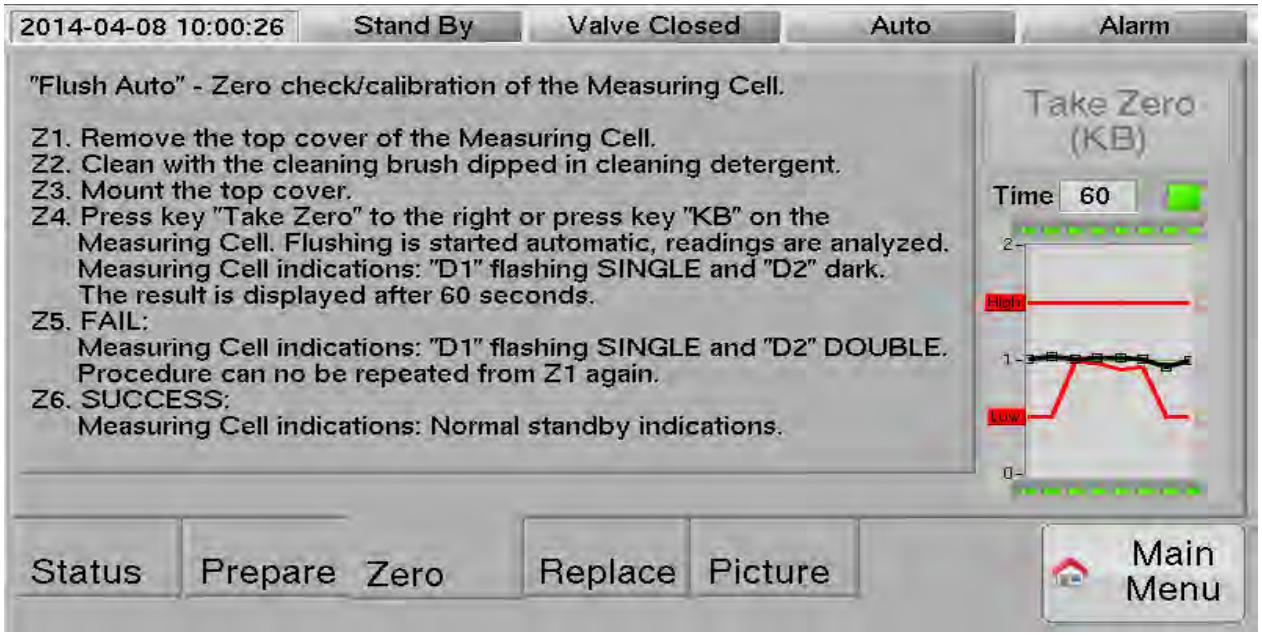
7.7.3. Zero Calibration Take Zero

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

Flush Manual:



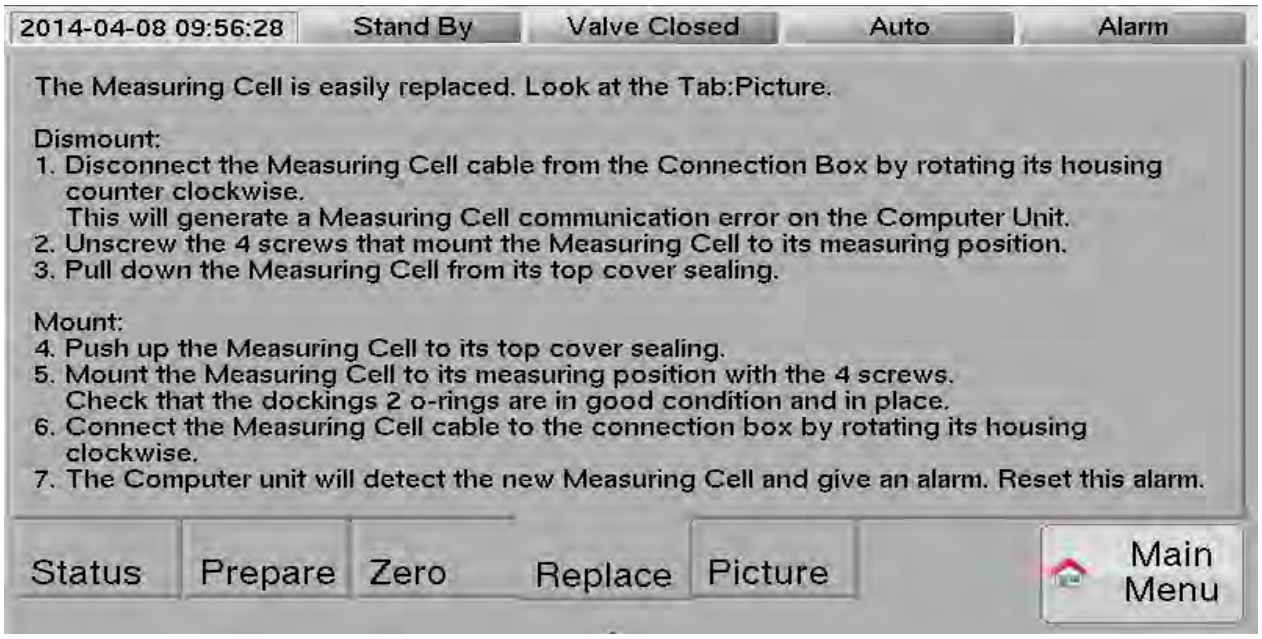
Flush Auto:



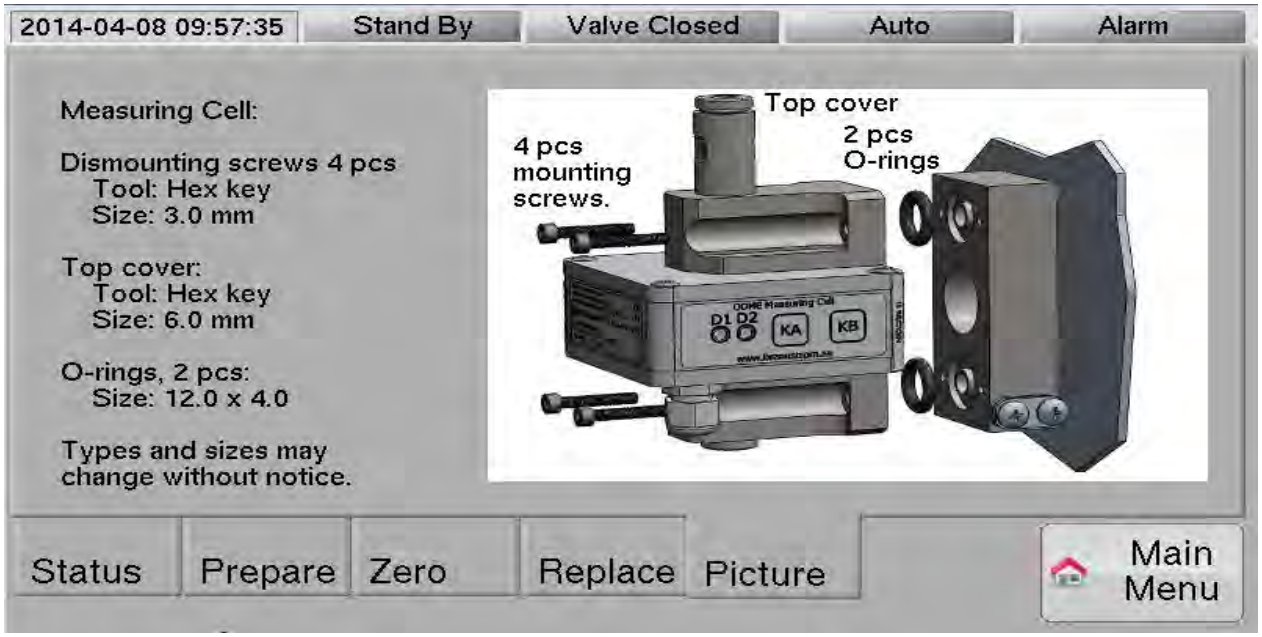
"Take Zero (KB)"	Press this key to start Zero Check/Calibration. Reading are analyzed for 60 seconds.
"Time"	Counting down seconds while readings are analyzed.
"Square indication"	Indicates the result of the Check/Calibration, red = fail / green = ok.
"Graph indication"	See explanation 2 pages up when 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 **30**.

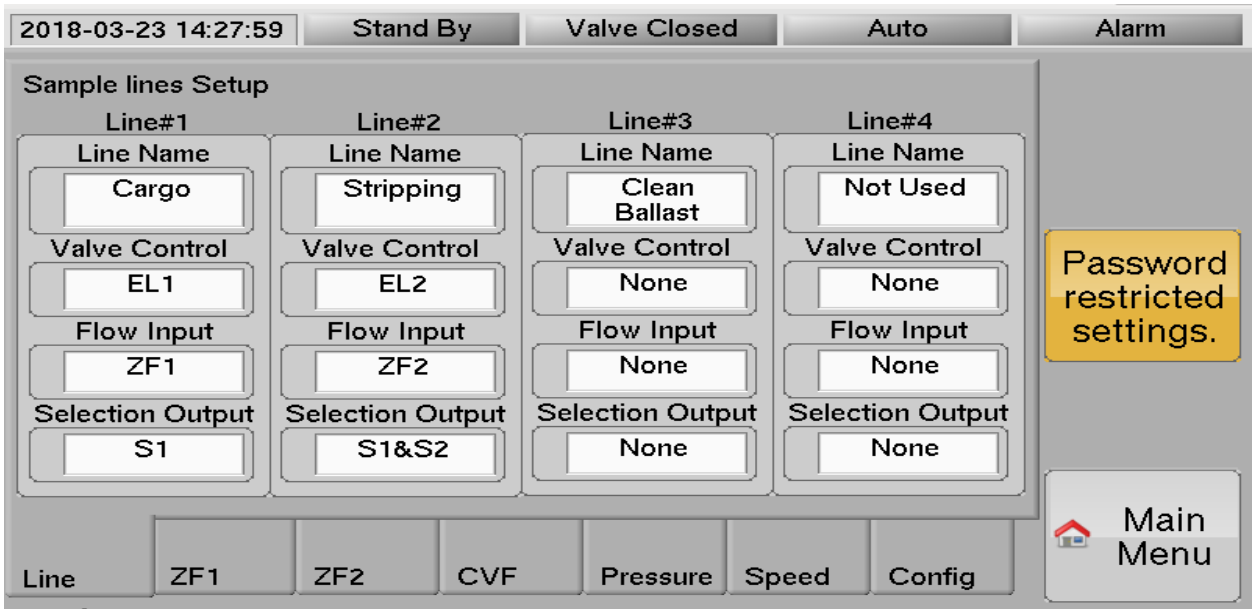


7.8. Setup of parameters

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.

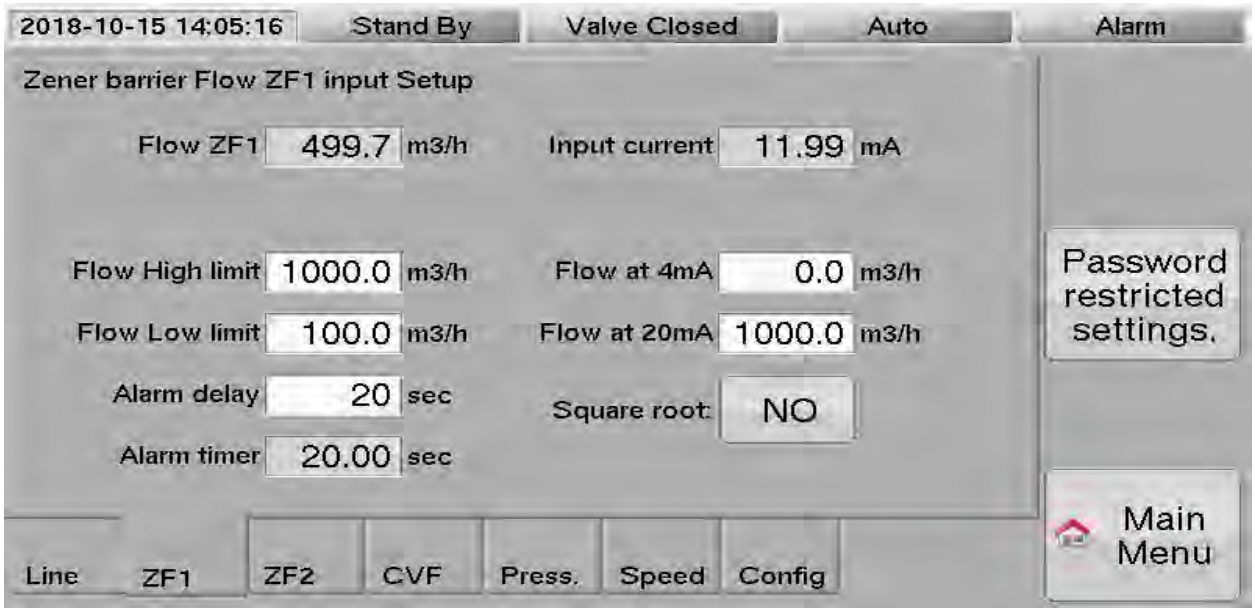
Relay output on terminals 5 and 6 in computer unit controls the slop tank valve.
Feedback input on terminals 26 and 27 in computer unit for the overboard valve.
Feedback input on terminals 28 and 29 in computer unit for the slop tank valve.
Closed contact indicating open overboard valve / slop tank valve.
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.

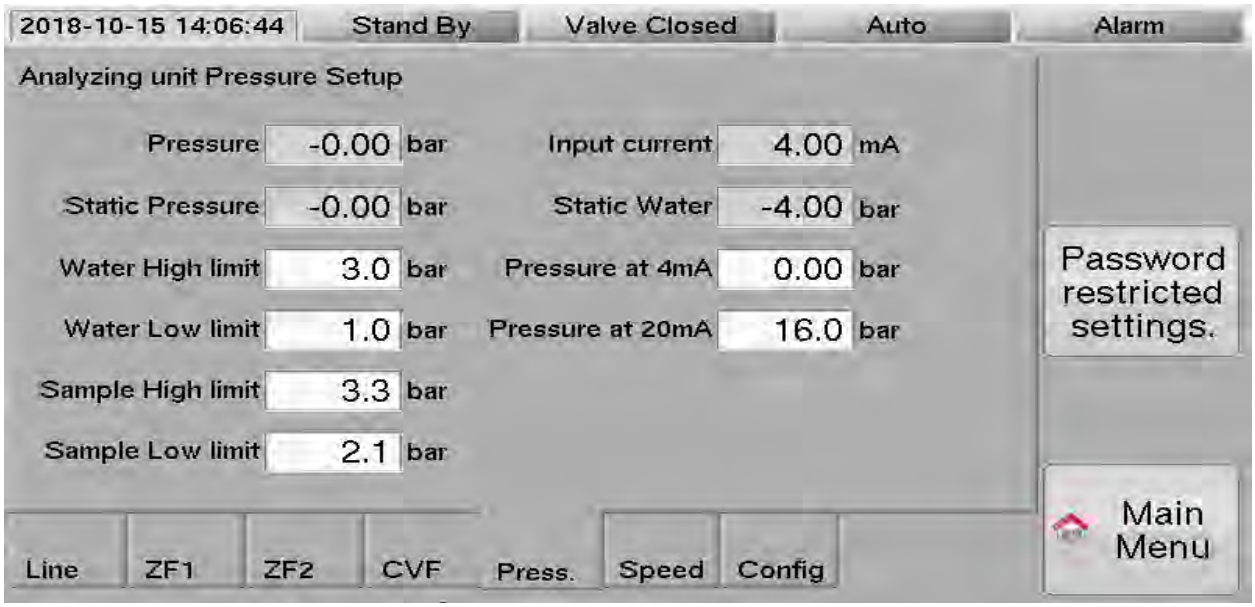
7.8.3. ZF2

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 **24** 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 **69**.

"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:

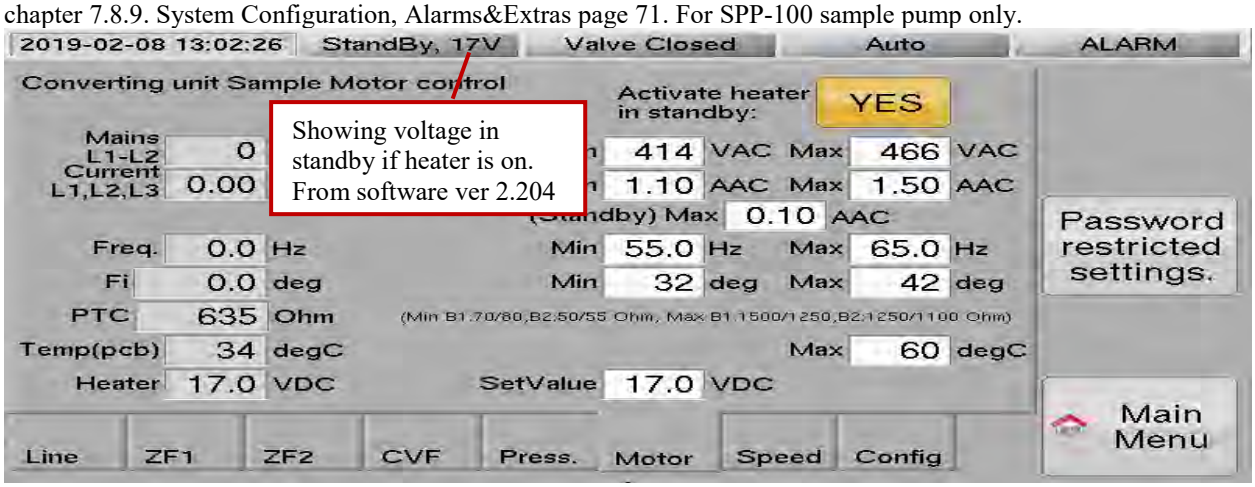
1. Measure the “Pressure” in the analyzing unit. This will be the same pressure as in the overboard line because the inlet and outlet pipes to the overboard line are open.
2. The “Static Pressure” is set to the measured “Pressure”. The “Static Pressure” will not change while the sample pump is running.
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 of 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.

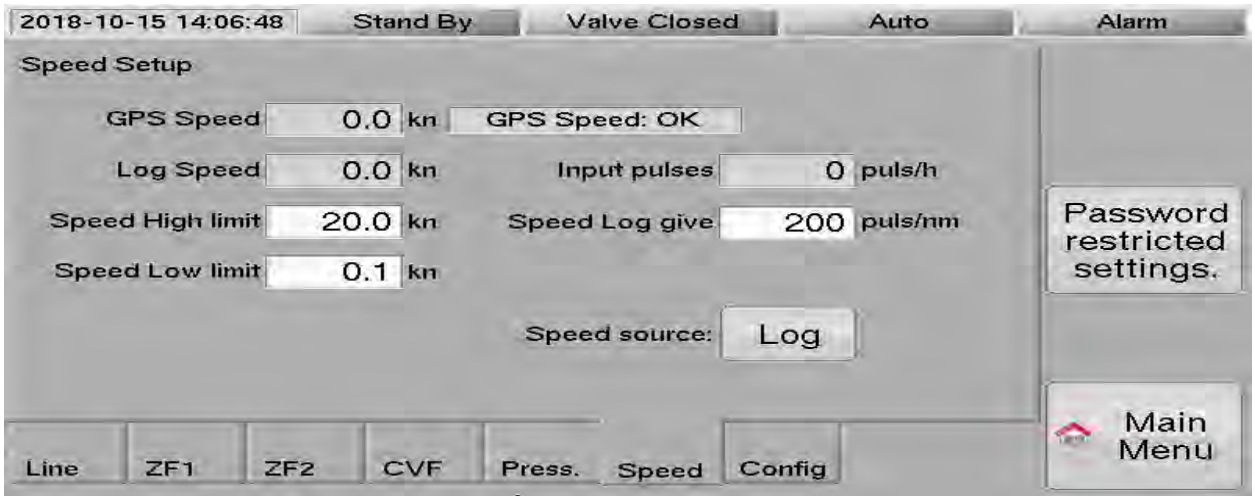
7.8.6. Motor (Optional Extended Converting unit I/O PCB)

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 71. For SPP-100 sample pump only.



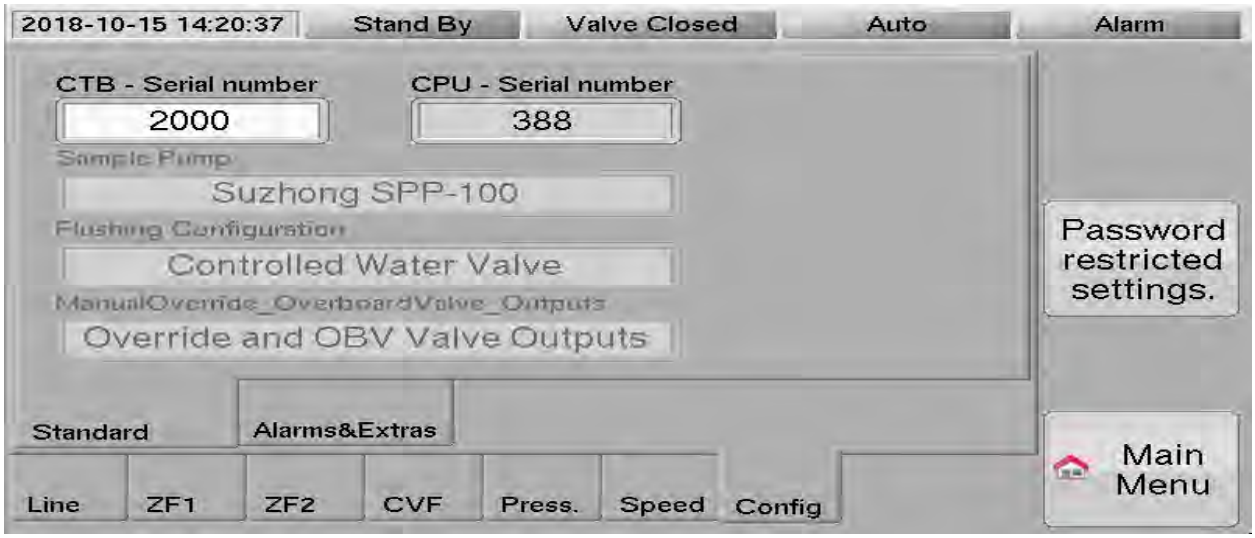
"Activate heater in “StandBy" Output DC voltage between phases L1-L2 while the sample pump is not running. The motor is heated to avoid condensation in the motor.
"Heater" Measured DC voltage between phases L1-L2 to heat the motor while it is not running.
"SetValue" Wanted DC voltage between phases L1-L2 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



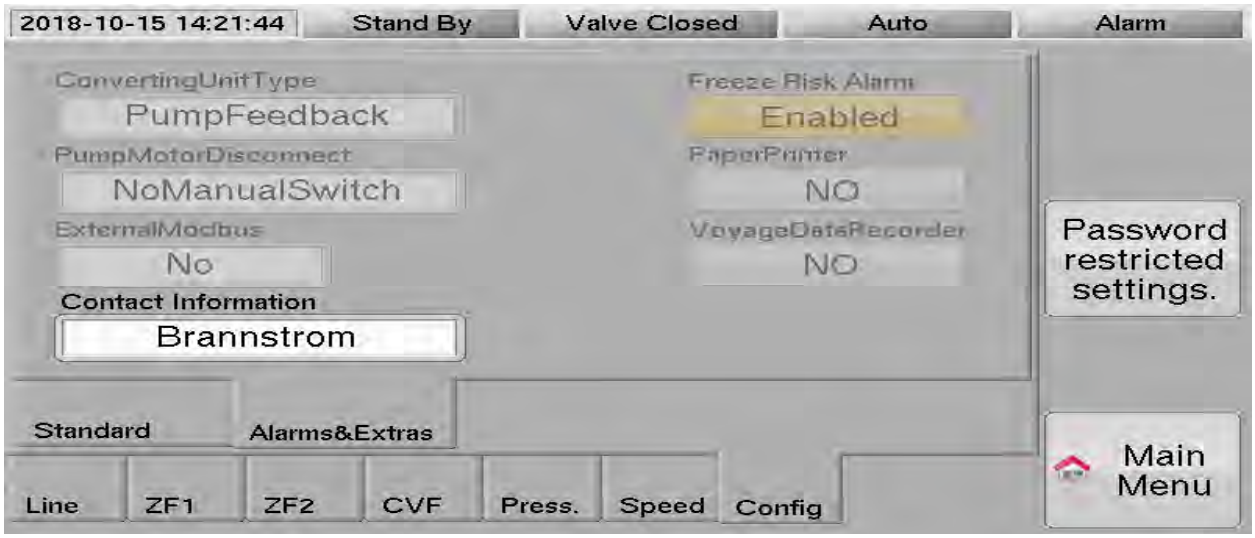
"GPS Speed" Speed indicated by the GPS.
"Log Speed" Speed measured from the speed log.
"Speed High limit" High speed limit.
"Speed Low limit" Low speed limit.
"Input pulses" Measured pulse frequency from the speed log.
"Speed Log give" Speed log pulses per nautical mile.
"Speed source" Selected speed 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 **77**.
"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.

“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 **141**.
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 **142**.
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 **88**.

“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 a manual disconnector switch between the Converting unit and the sample pump motor. The computer unit can monitor the switch position.
The alarm should be deselected or wired in the Converting unit.
Connect to terminals 13, 14 on the Converting unit I/O pcb.

“ManualWithFeedback” The computer unit monitors the switch position and raises an alarm if the switch remains in the wrong position at touch screen timeout (about 30 minutes).

“NoManualSwitch” No disconnector 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”**.

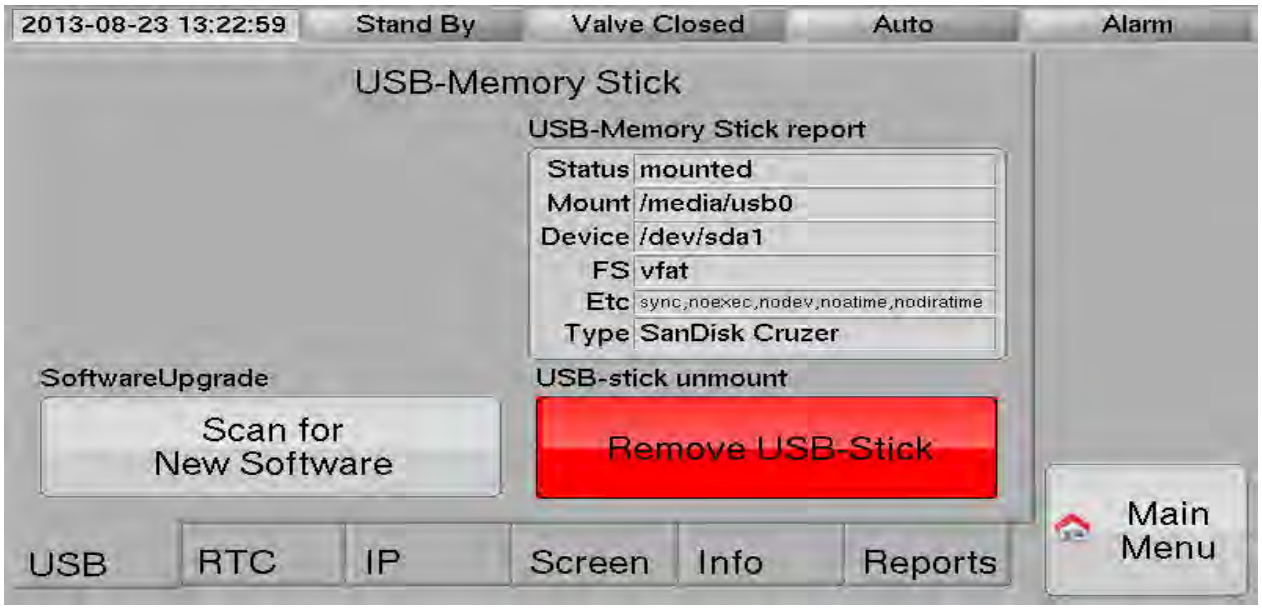
"VoyageDataRecorder" (Option) A NMEA sentence is sent for every line added to “Recoded data”.
This needs a CUIO board of version “L” or later, connect on terminals 41-43.
Setting should normally be **“No”**.
Note! A paper printer cannot be used together with this option.
Messages are sent as "Proprietary Sentences", and their compositions are:
"$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.



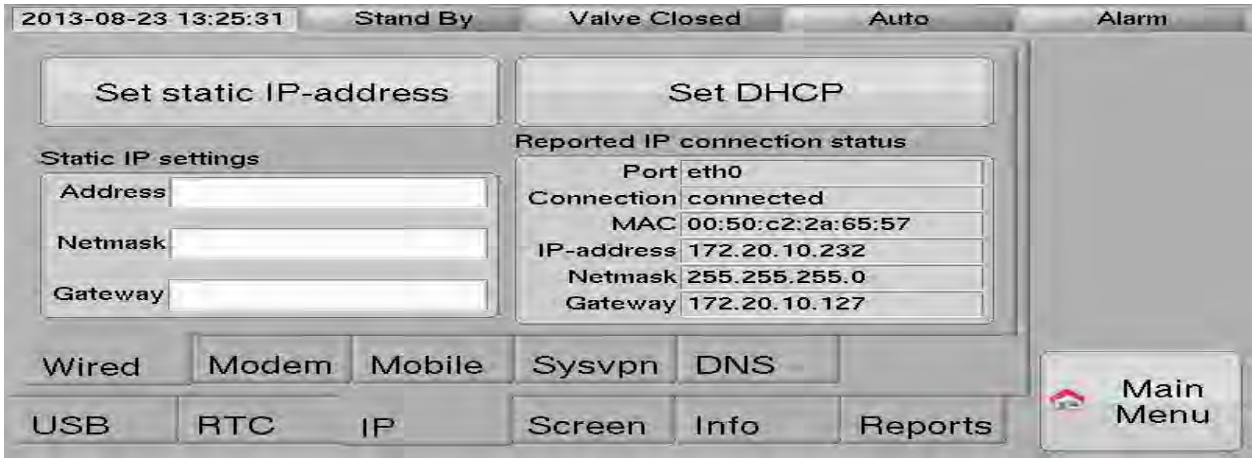
"USB-Memory Stick report"	Indicates if a USB-Memory stick is attached or not on its "Status" line. When a USB-Memory stick is fount the other 3 keys becomes highlighted.
"Scan for New Software"	Used to install new software on the unit. When pressed the root directory of the USB-Memory stick is scanned 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

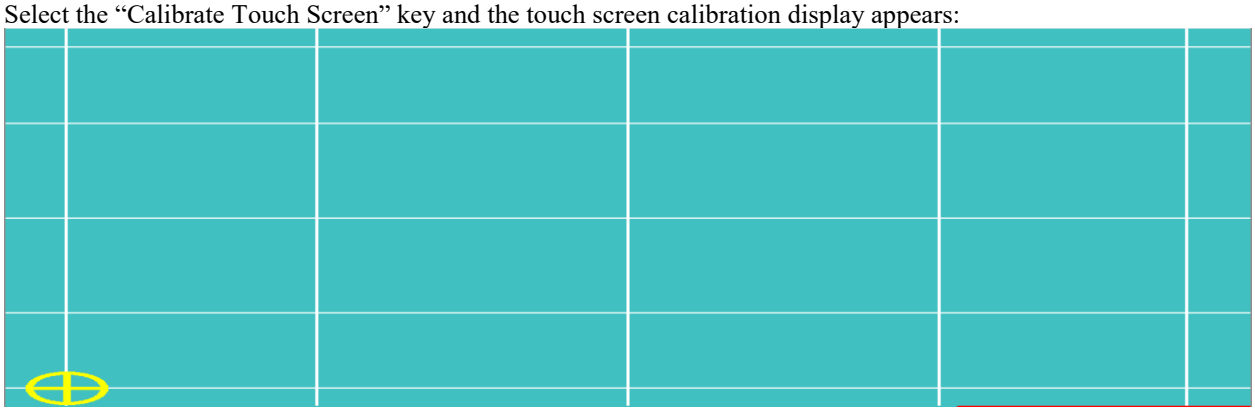
If the unit is connected to the local area network on the vessel it normally by a wired ethernet connection.
One this page a static IP-address or IP-address received through DHCP can be selected.



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 finger tip (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 finger tip 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.

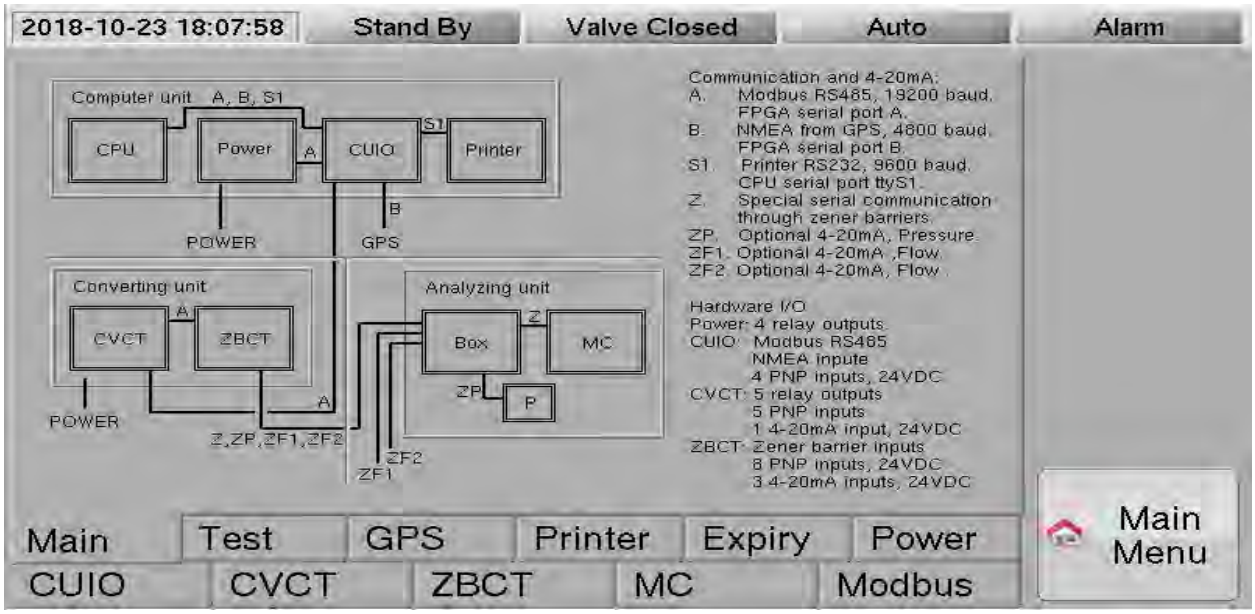
If the calibration is successful the new calibration should be in effect directly after exit from the calibration screen.
In some cases, the unit has to be restarted. Do this by disconnecting power and connecting it back on again.

7.10. System Check

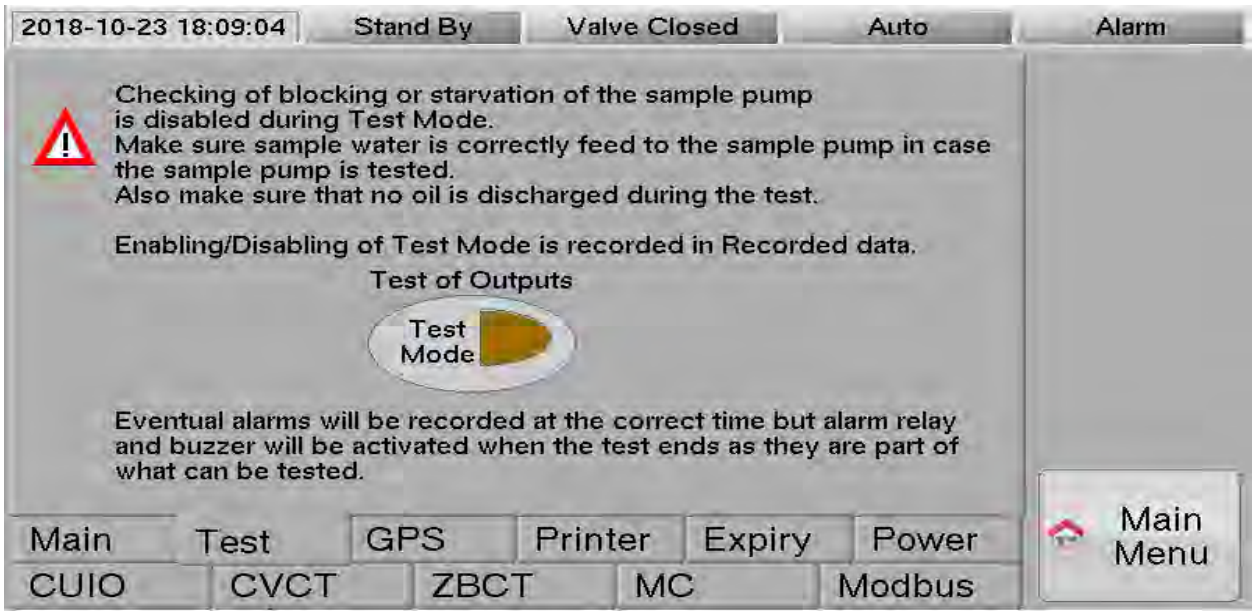
To enter the “System check”-page you should first use: Password: "2" and "Admin".
Status of communication with printed circuit boards in computer, converting unit and analyzing unit.
NMEA (GPS) transmitter data.
Testing of relay output and digital inputs.
Testing of printer port.
Activation and deactivation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

7.10.1. Main

Overview of printed circuit boards in the system.



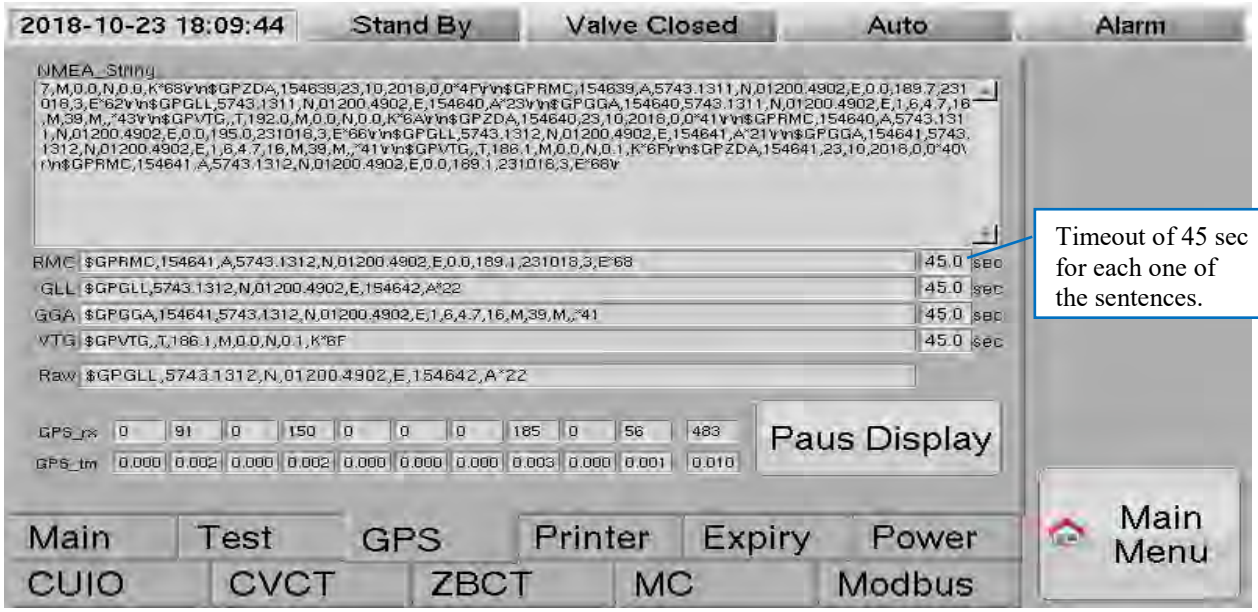
7.10.2. Test



"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)

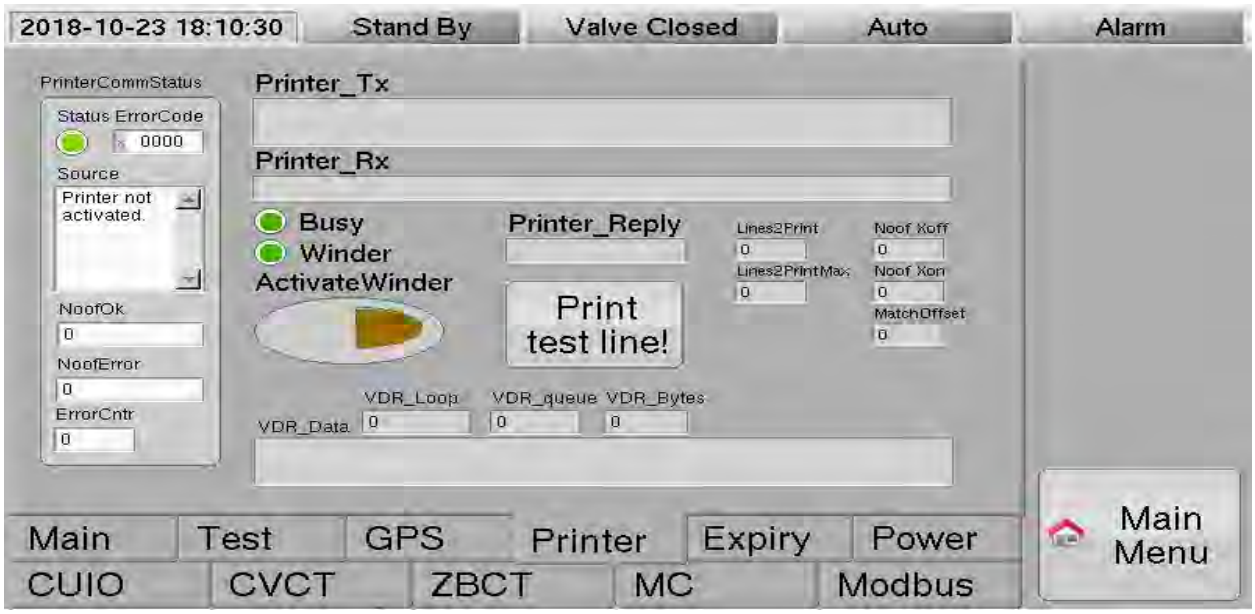
Display of the transmitted NMEA sentences from the GPS. Any of the sentences RMC, GLL or GGA must be received to get the ships GPS position. If the ship speed is taken from the GPS the RMC or VTG sentences must be received.



"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 **98**.



"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)

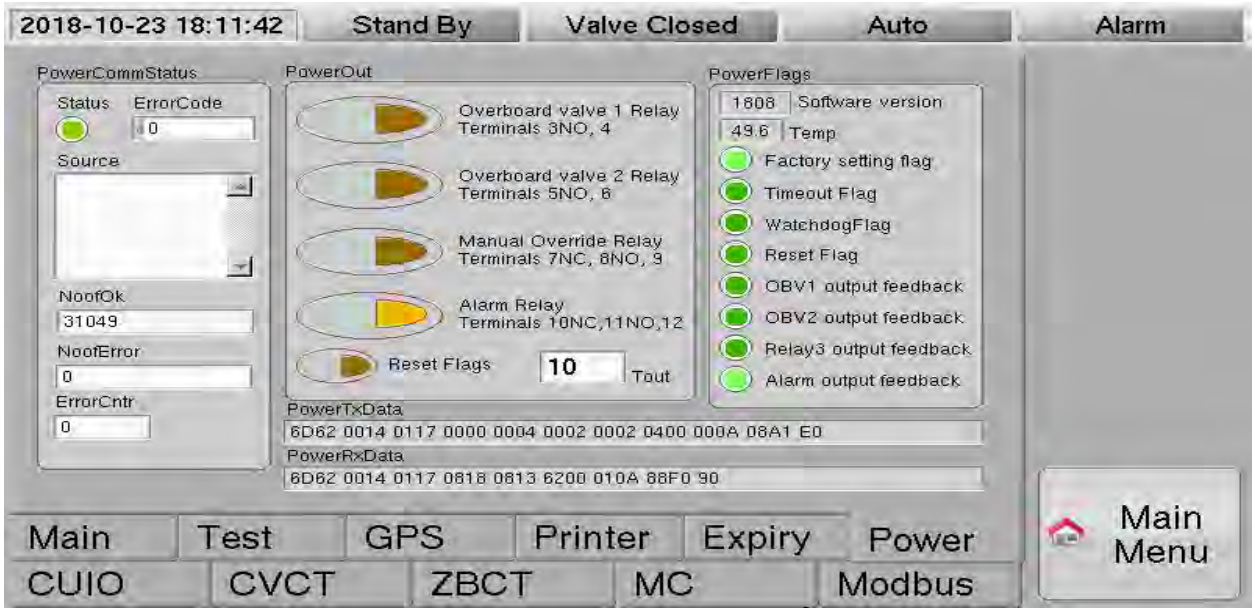
A trial period of a number of days, normally 30 or 60, can be activated.
When the trial period has expired the system can no longer be started to discharge the slop.
The status of an enabled trial period is also displayed at the bottom of the “Main Menu”.
The number of days, hours, minutes and seconds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

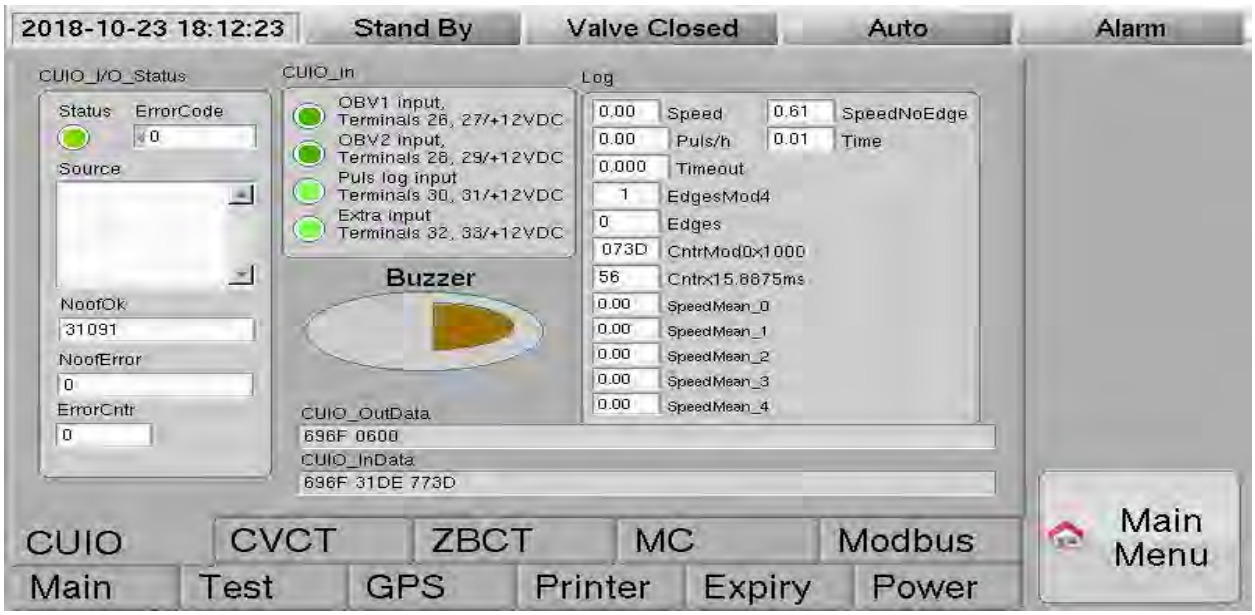
The power unit in the computer unit.
Item **d1** drawing **CTB10001p sheet 3, Computer Unit with open door** page **98**.



"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 **98**.



"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.

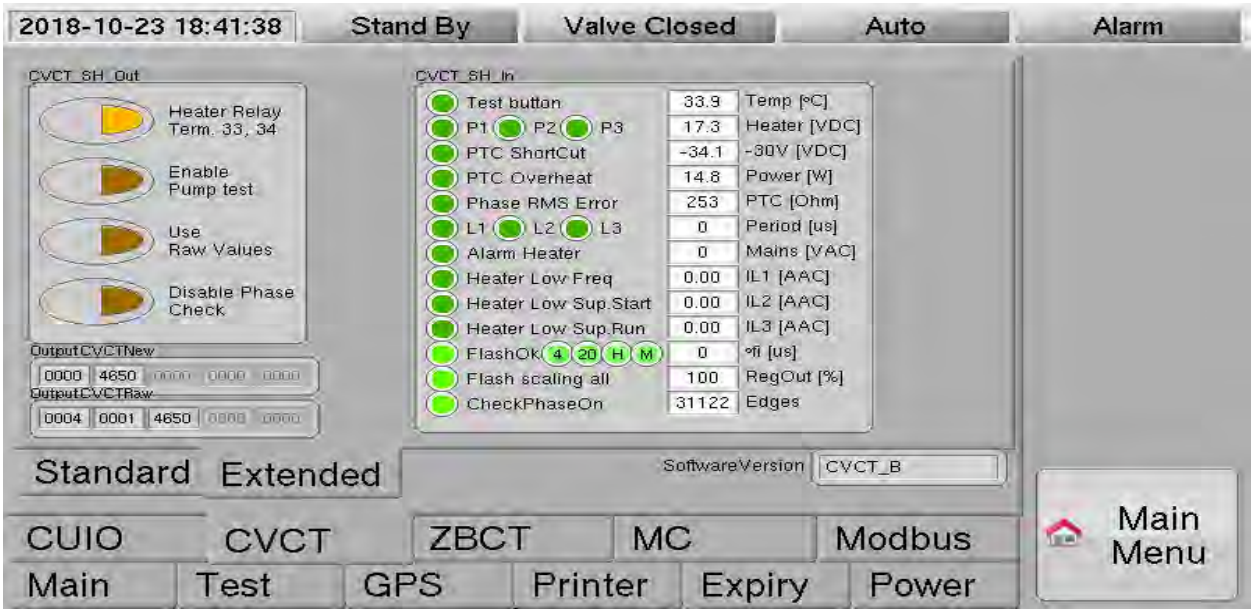
7.10.8. CVCT/Standard (Converting unit I/O PCB)

The Input/Output printed circuit board (PCB) in the converting unit (CVCT).
Item **d5** drawing **CTB10003 sheet 3 of 4, Converting Unit** page **102**.

"CVCT_CommStatus"	Communication status with the CVCT PCB.
"CVCT_Out"	Relay outputs of the CVCT PCB. Refer to Chapter **5. Start/Stop procedure** page **38** 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)

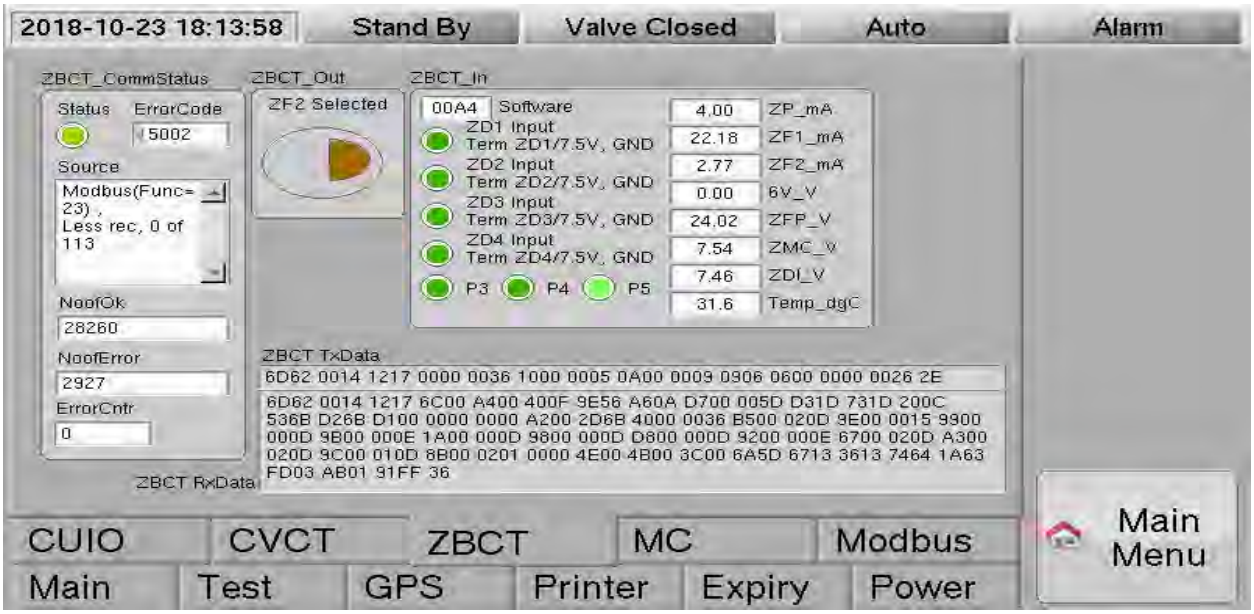
The Extended Input/Output printed circuit board (PCB) in the converting unit (CVCT).



"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)

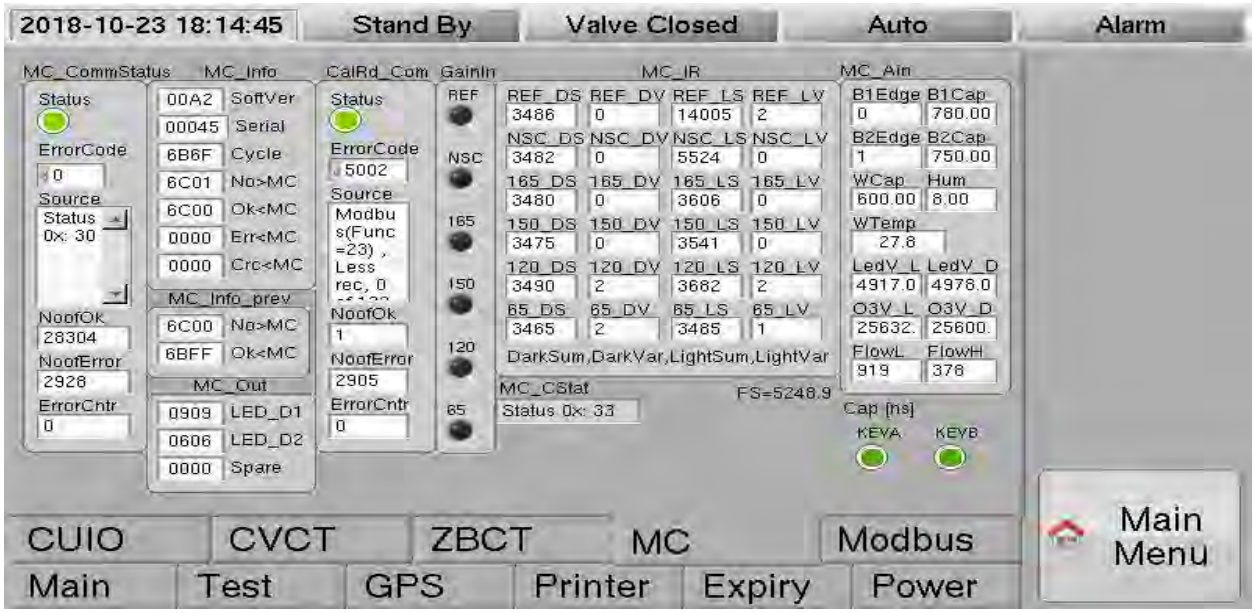
The Zener Barrier printed circuit board (PCB) in the converting unit (ZBCT).
Item **d6** drawing **CTB10003 sheet 3 of 4, Converting Unit** page **102**.



"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)

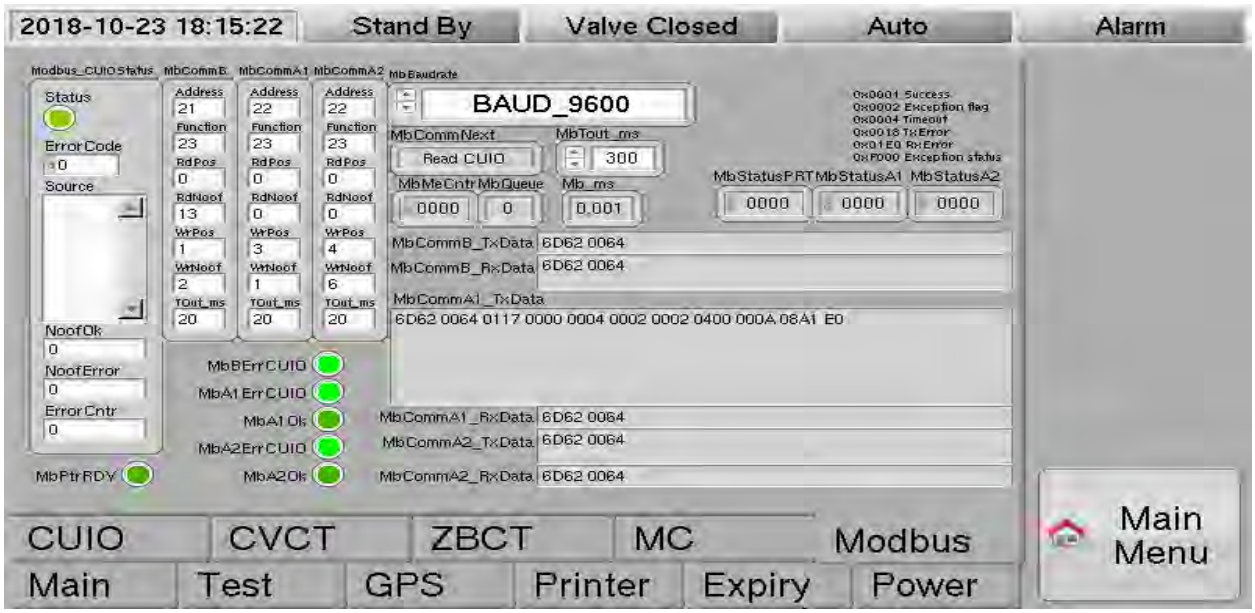
Readings from the measuring cell. The cell is connected to the Zener Barrier PCB.



"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)

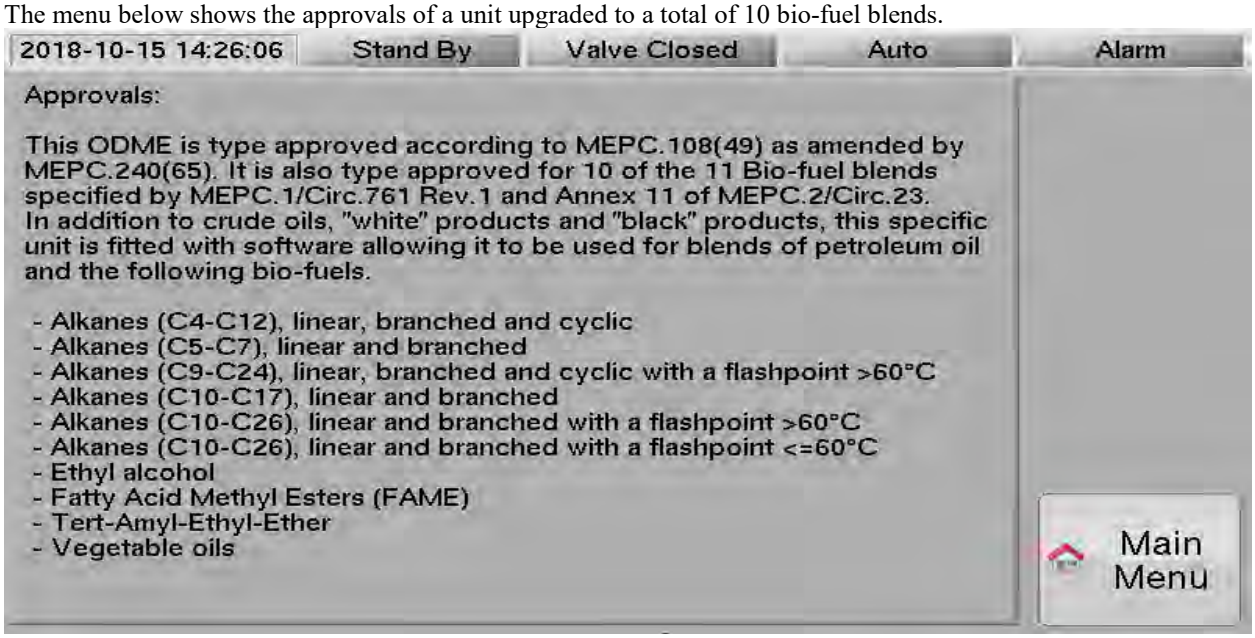
Modbus RTU communication over an RS485 channel on the CUIO PCB in the Computer unit. Intended for communication with the Cargo Control system. This option is not further described in this manual.



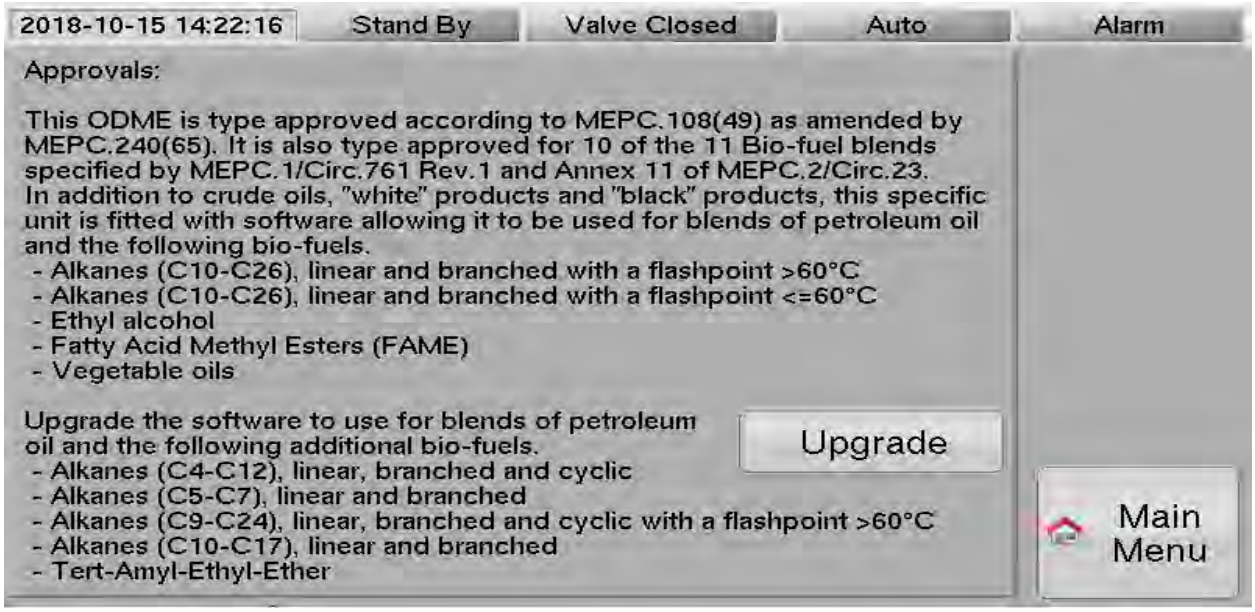
7.11. Approvals

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 serious malfunction of either the Computer unit or the Converting unit, disconnect power supply to the 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.
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 Disconnector Switch is ON
75 Alarm - Pump Disconnector Switch is OFF

8.3. System file errors

The unit cannot run with one of these alarms remaining.

"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 **47**.
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 **9** and chapter **8.11. Indications on PCB's**, page **90** for locating PCB's (Printed Circuit Boards) in text below.
For light emitting diode indications, see chapter **8.11. Indications on PCB's** page **90.**

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 **53.**

"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 **91**

"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 **71**.
For light emitting diode indications, see chapter **8.11.2. Converting unit I/O PCB indications** page **90.**
Keep the Converting unit powerless 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 **91**

"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 **76.**

"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 **67** 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 **70**

"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.
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.
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 **53.**

"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 **47.**

"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.

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 outlet side of the analyzing unit.
“RUNNING” mode is stopped.
This alarm is also displayed with a popup window indicating all pressures.
See chapter **7.8.5. Pressure**, page **69** and **7.8.8. System Configuration, Standard,** page **71.**

"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.
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 **117**.
“RUNNING” mode is stopped.
This alarm is also displayed with a popup window indicating all pressures.
See chapter **7.8.5. Pressure**, page **69** and **7.8.8. System Configuration, Standard,** page **71.**

"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 **69** and **7.8.8. System Configuration, Standard,** page **71.**

"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 **69** and **7.8.8. System Configuration, Standard,** page **71.**

"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.
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 **93**.
"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 **71**.
"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 **53.**
However, the printer can be deselected in the Setup menu. See chapter **7.8.8. System Configuration,** Standard page **71**

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.

"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 **70**.
"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 **70**.

"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 make the Converting unit powerless 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 **71** and
drawing **CTB110627.1el, internal cable diagram for electrical sample pump motor** page **141**.
It is recommended to monitor this contactor feedback.
Keep the Converting unit powerless 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 **71** and
drawing **CTB110627.1el, internal cable diagram for electrical sample pump motor** page **141**.
It is recommended to monitor this contactor feedback.
Keep the Converting unit powerless 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 **39**.

"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 Disconnector Switch is ON"

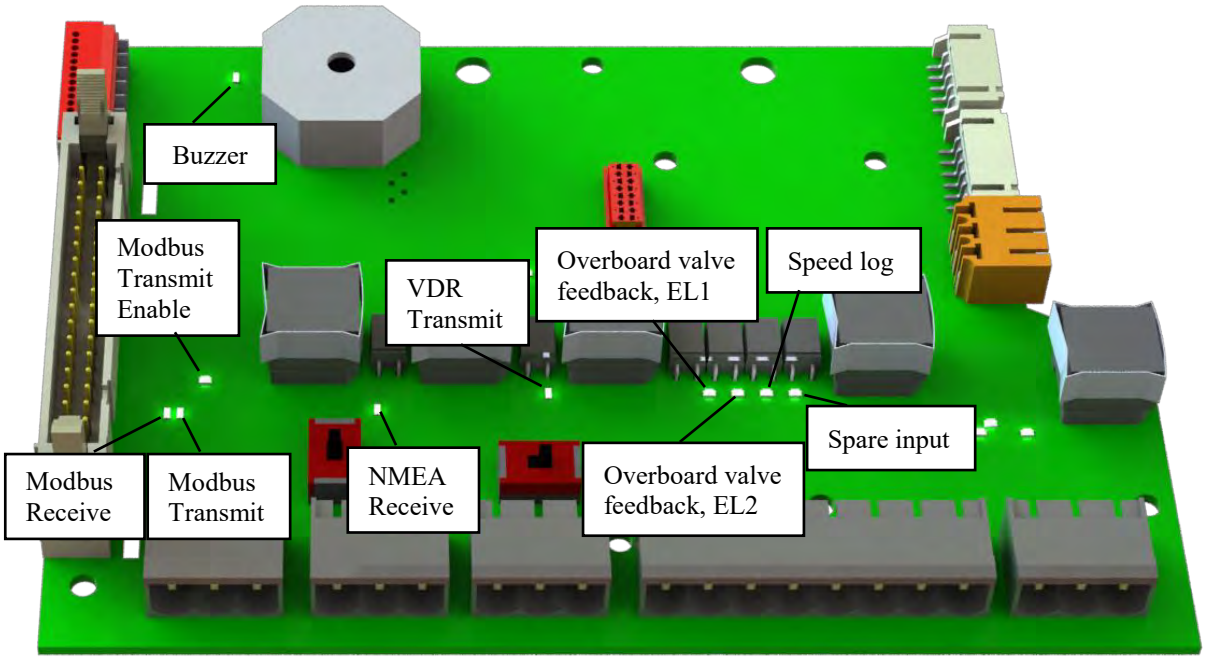
Raised in "StandBy" mode if the disconnector feedback indicates the switch in "ON" position.
The feedback contact from the disconnector switch contactor is open.
The alarm will be activated at every touch screen timeout (about 30 minutes).
See chapter **7.8.9. System Configuration, Alarms&Extras** page **71**.
Connect disconnector switch feedback to terminals 13, 14 on the Converting unit I/O pcb.
Set the disconnector switch to "OFF" when the unit is not in use.

"75 Alarm – Pump Disconnector Switch is OFF"

Raised in "RUNNING" mode if the disconnector feedback indicates the switch in "OFF" position.
The feedback contact from the disconnector switch contactor is closed.
See chapter **7.8.9. System Configuration, Alarms&Extras** page **71**.
Connect disconnector switch feedback to terminals 13, 14 on the Converting unit I/O pcb.
Set the disconnector switch to "ON" when the unit is in use.

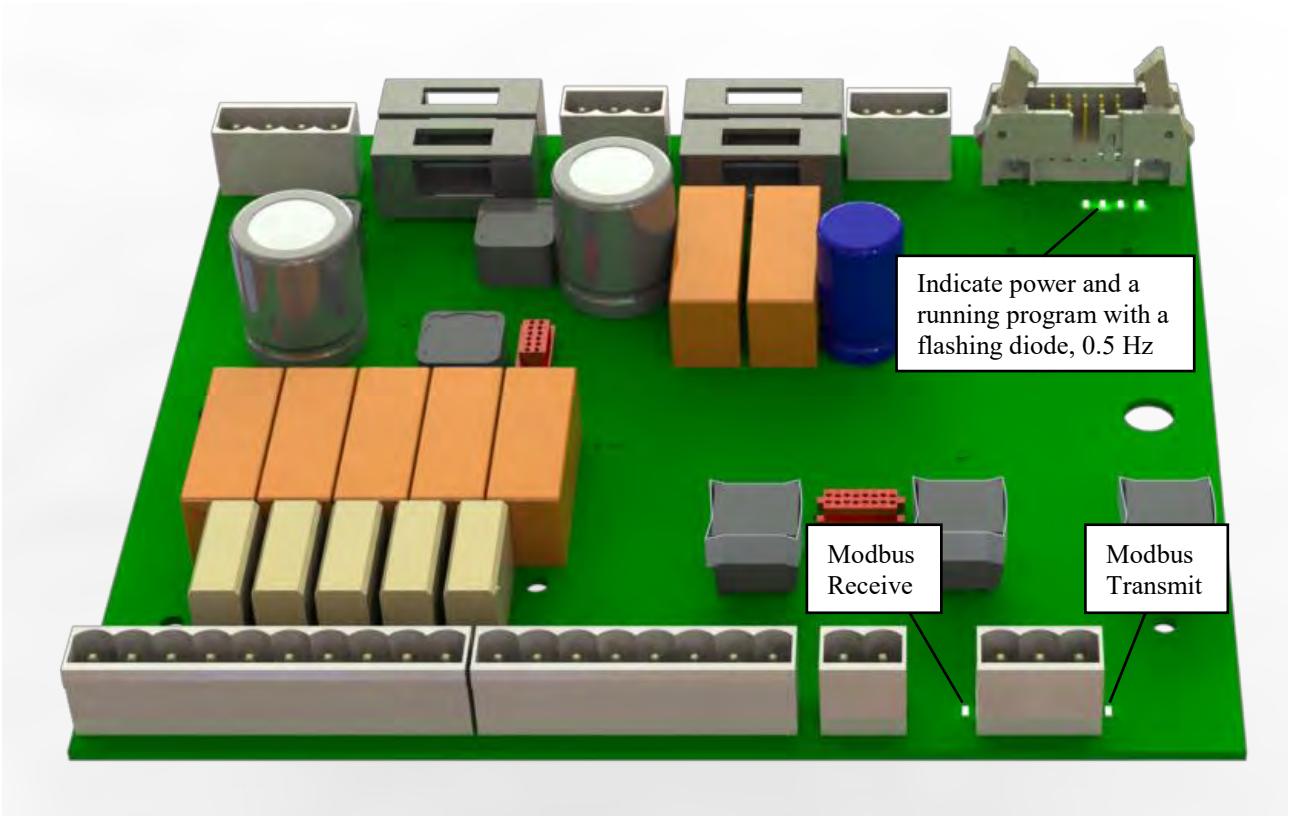
8.11. Indications on PCB's

8.11.1. Computer unit I/O PCB indications



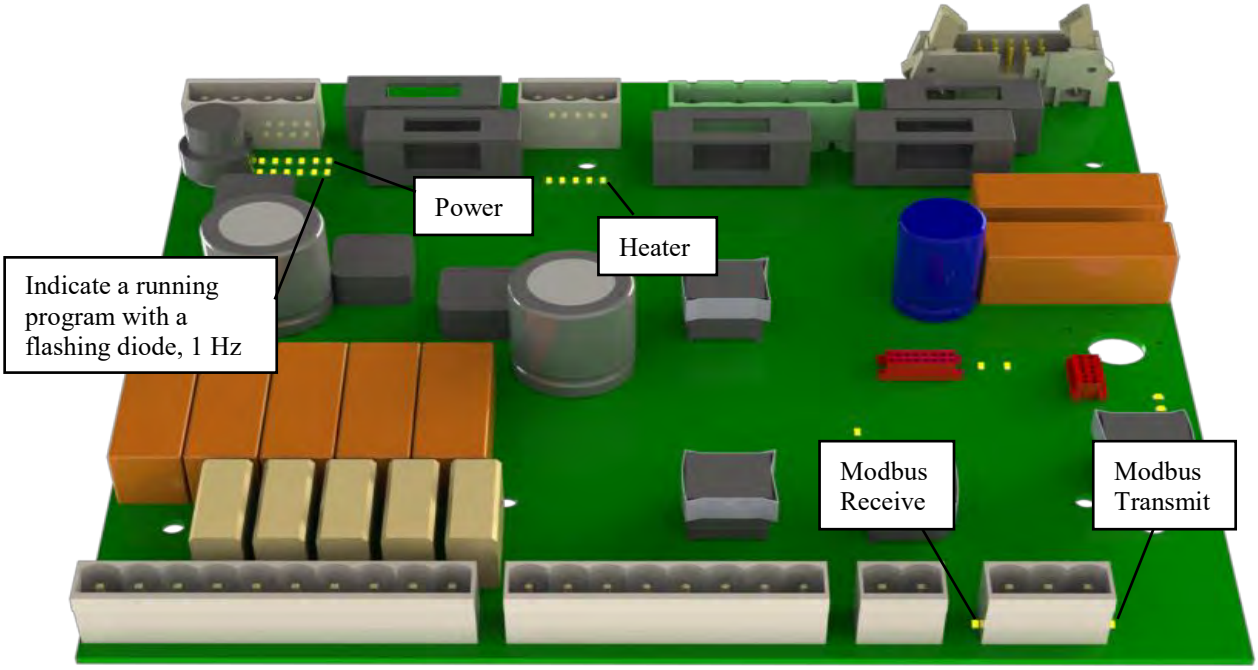
PCB located in the Computer unit, see **CTB10001p sheet 3, Computer Unit with open door** page **98**, d5.

8.11.2. Converting unit I/O PCB indications



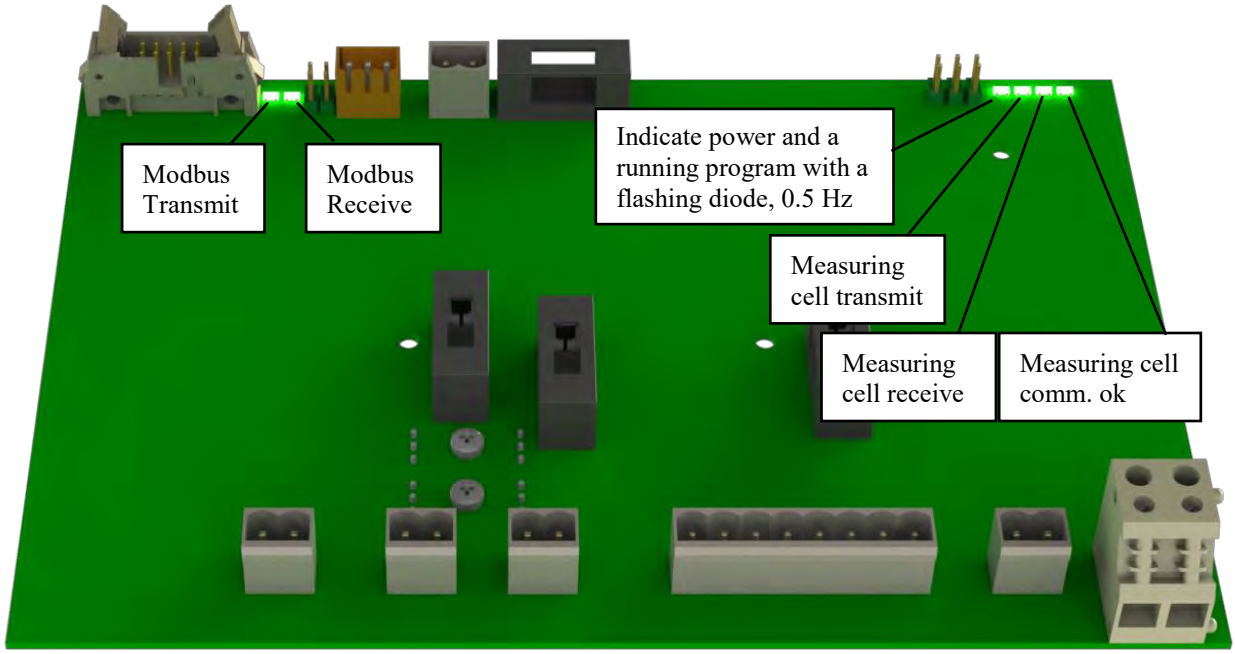
PCB located in the Converting unit, see **CTB10003 sheet 3 of 4, Converting Unit** page **102**, d5.

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 **103**, d5.

8.11.4. Zener barrier PCB indications



PCB located in the Converting unit, see **CTB10003 sheet 3 of 4, Converting Unit** page **102**, 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 **98**, 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 **73**
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 **47**

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 **45** and chapter **7.5. USB** page **56.**

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 **45** and chapter **7.5. USB** page **56.**

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 **39** 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 **39**.
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 **93**.
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 to store "Recorded data" on a USB-memory stick. See chapter **7.5.1. USB-Memory stick** page **56**.

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 conditions.
5. Check the sample pump:
   If sample pump SPP-100 with Ex motor:
   See **Sample pump SPP-100 with Explosion proof electric motor** page **12.**
   1. Check the setting of the sample pump. In chapter **7.8.8. System Configuration, Standard** page **71** verify that the setting of property **"Sample Pump"** is **"Suzhong SPP-100".**
   2. Refer to makers MAINTENANCE part in chapter **12.8.1. Elprom instructions** page **201**

   If sample pump is bulkhead mounted:
   See **Sample pump Nikuni 32MED22/Matre P06 for Bulkhead mounting** page **12**
   1. Check the setting of the sample pump. In chapter **7.8.8. System Configuration, Standard** page **71** 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 **93**

   If sample pump with air motor:
   See **Sample pump Speck Y-2951 with Air driven Gast motor** page **12**.
   1. Check that all air supply valves to the air motor are closed.
   2. Refer to makers MAINTENANCE part in chapter **12.9. Sample Pump, Speck pump with Gast air motor** page **228**.
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 **71** and the setting of the property **"ConvertingUnitType"** is **"PumpFeedback".**
7. In case of computer or converting unit malfunction:
   See chapter **8.1. Malfunction of Computer/Converting unit** page **82.**

9.5. Verification of accuracy and access to restricted parts

User access to 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 **129**.

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 Clock Wise until it is in right position.
See chapter **10.5. Nikuni Sample pump for Bulkhead mounting** page **121**
or chapter **10.6. Matre Sample pump for Bulkhead mounting** page **124**.

9.8. Spare parts

9.8.1. Computer Unit

- Computer CPU PCB — **CTB10001p sheet 3, Computer Unit with open door** page **98**, item d6.
- LCD screen
- Touch panel
- Power supply unit — **CTB10001p sheet 3, Computer Unit with open door** page **98**, d1
- Computer unit I/O PCB — **CTB10001p sheet 3, Computer Unit with open door** page **98**, d5
- Paper printer (optional) — **CTB10001p sheet 3, Computer Unit with open door** page **98**, d2
- Paper rewinder (optional) — **CTB10001p sheet 3, Computer Unit with open door** page **98**, d3

9.8.2. Converting Unit

- Converting Unit PCB — **CTB10003 sheet 3 of 4, Converting Unit** page **102**, d5
- Zener Barrier PCB — **CTB10003 sheet 3 of 4, Converting Unit** page **102**, d6
  See chapter **4.9. Zener Barrier Instructions and Replacement** page **25**
- Pump relay — **CTB10003 sheet 3 of 4, Converting Unit** page **102**, d2
- Overcurrent relay — See current limits for different Sample pumps below.
- Transformer — **CTB10003 sheet 3 of 4, Converting Unit** page **102**, d4

9.8.3. Analyzing Unit

- Measuring Cell — **CTB10010 sheet 5 of 5, Analyzing unit with air motor sample pump** page **118**,d2
  See chapter **4.10. Measuring Cell Instructions and Replacement** page **30**
- Pressure transmitter — **CTB10010 sheet 5 of 5, Analyzing unit with air motor sample pump** page **118**,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 **12.8.1. Elprom instructions** page **201.***

- Seal kit for sample pump.
- Overcurrent relay, 1-1.6A — **CTB10003 sheet 3 of 4, Converting Unit** page **102**, 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 **102**, 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 **102**, 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 **118**,d6
- Seal kit for sample pump.

9.8.5. Fuses

Power Supply Unit, see drawing **CTB10001p sheet 3, Computer Unit with open door** page **98, 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 **102, 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 **103, 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 **102, d6.**
- Fuse F5, 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 **25**.

9.9. Recommended Spare parts

- 1 set of fuses:
  1 pc T315mA, 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 **94**.
  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 **92.**

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.
Paper roll diameter: max 50 mm.

Cleaning Brush

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

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 **231**.

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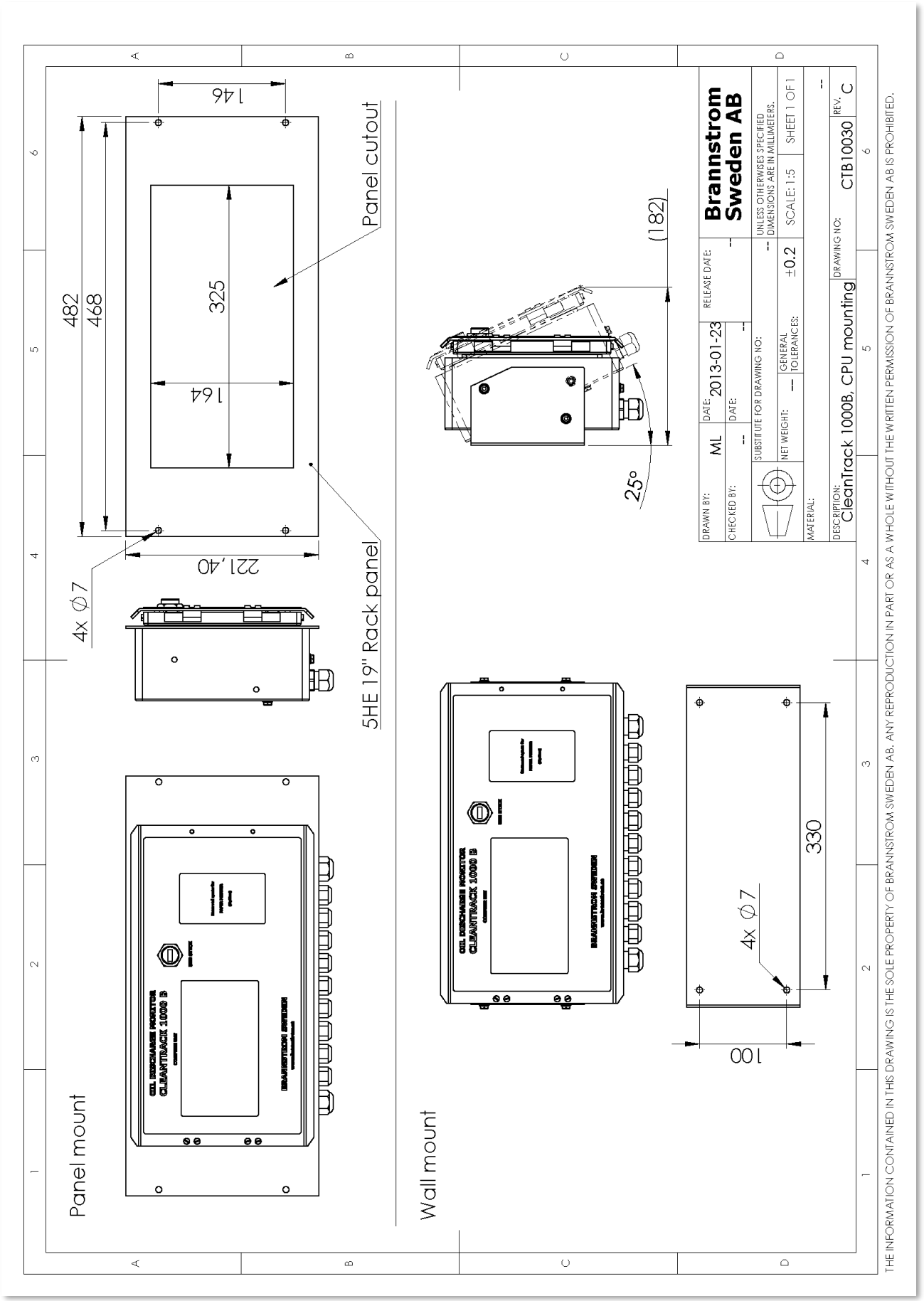
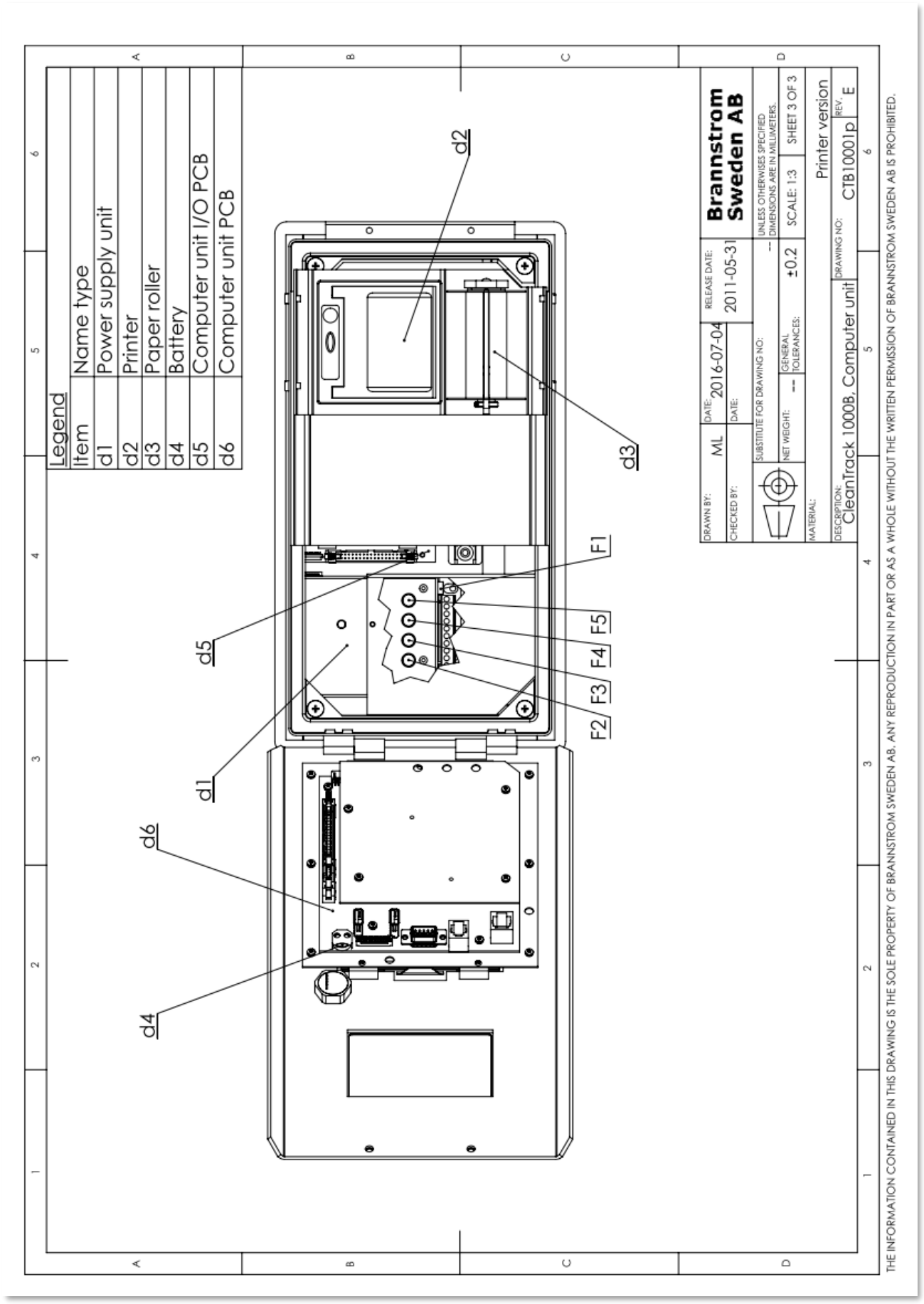
10.1. Computer Unit

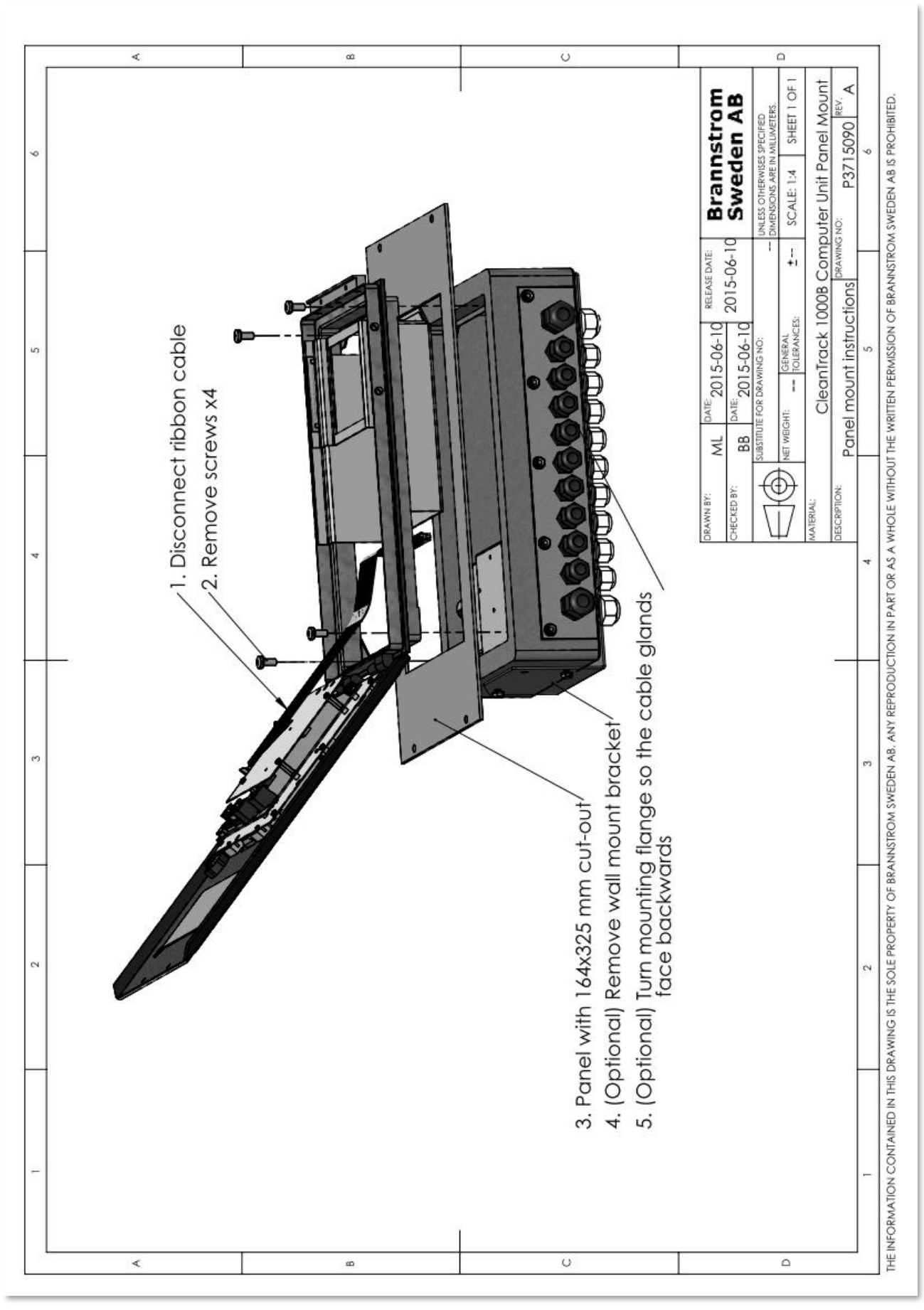
Drawing: CTB10030 sheet 1, Computer Unit mounting



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

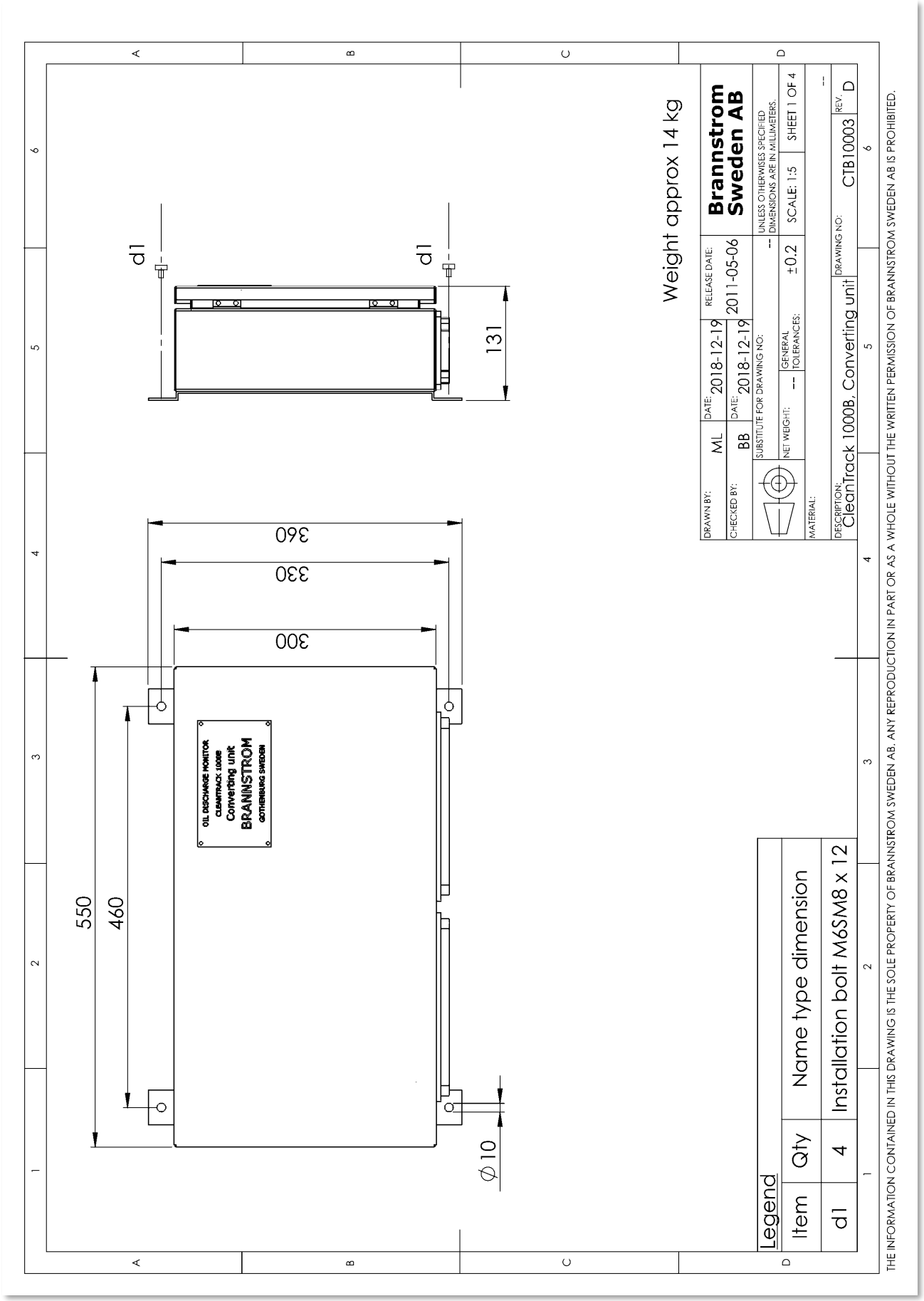


Drawing: P3715090 sheet 1, Computer Unit panel mount instructions.

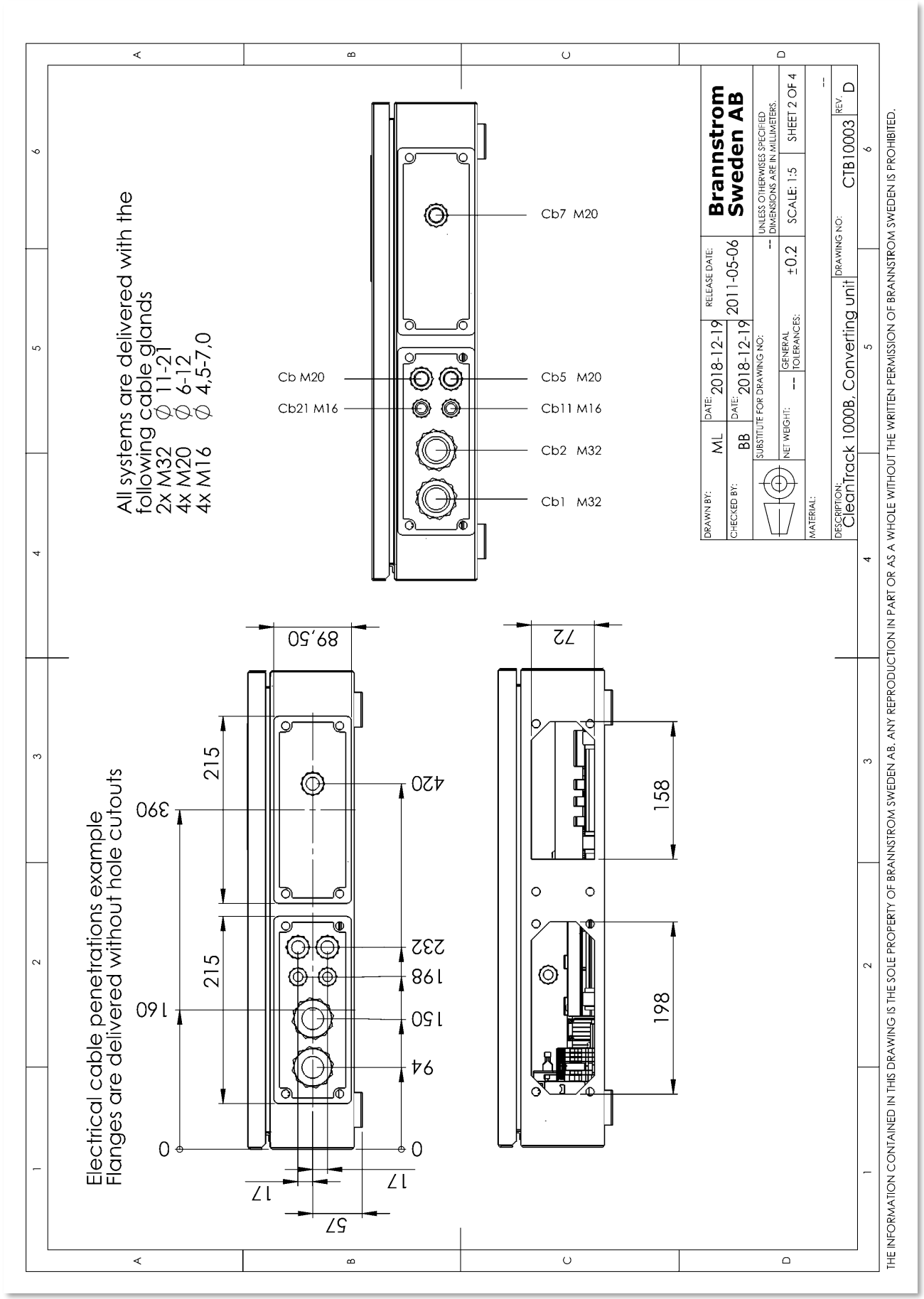


10.2. Converting Unit

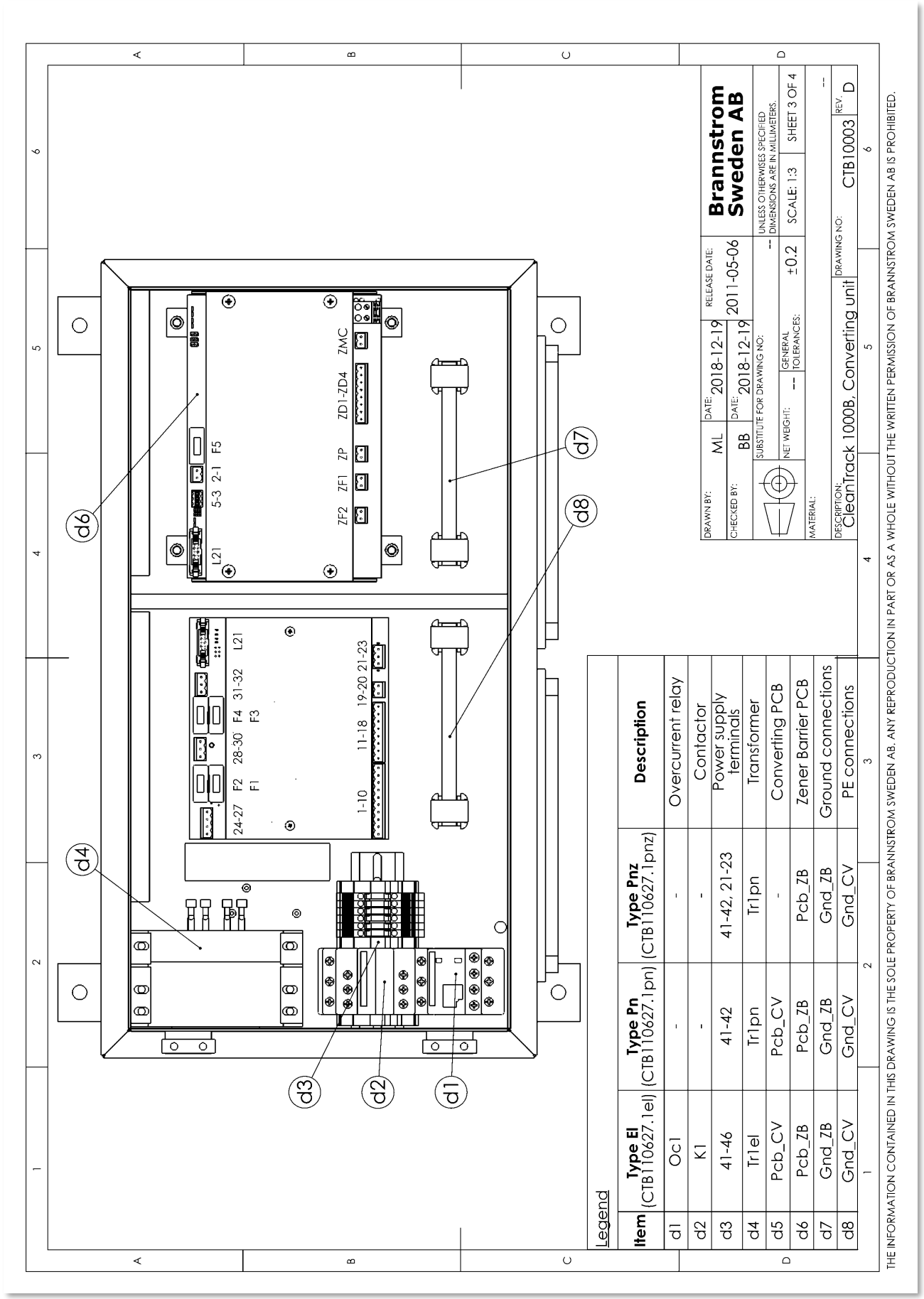
Drawing: CTB10003 sheet 1 of 4, Converting Unit.



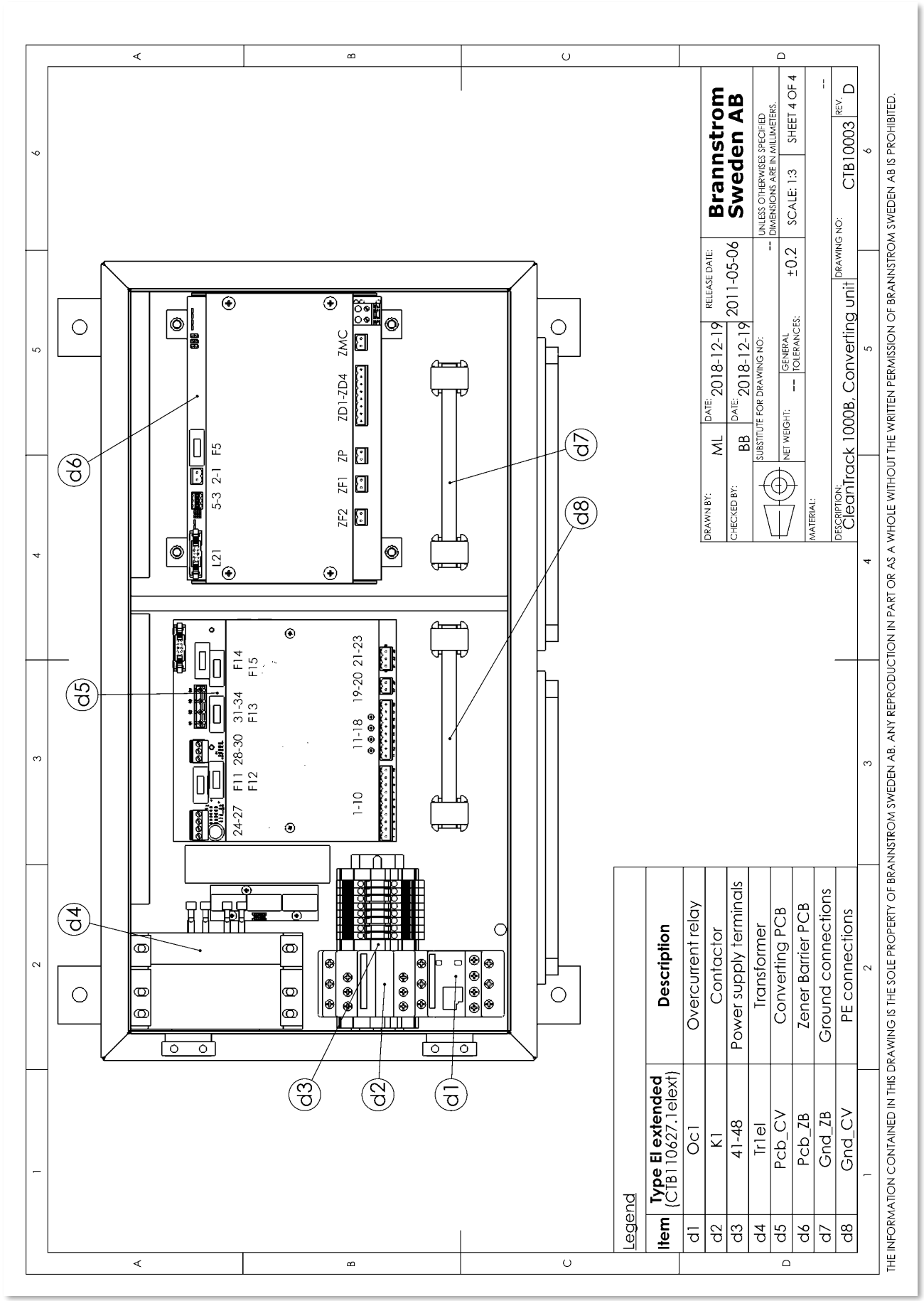
Drawing: CTB10003 sheet 2 of 4, Converting Unit.



Drawing: CTB10003 sheet 3 of 4, Converting Unit.



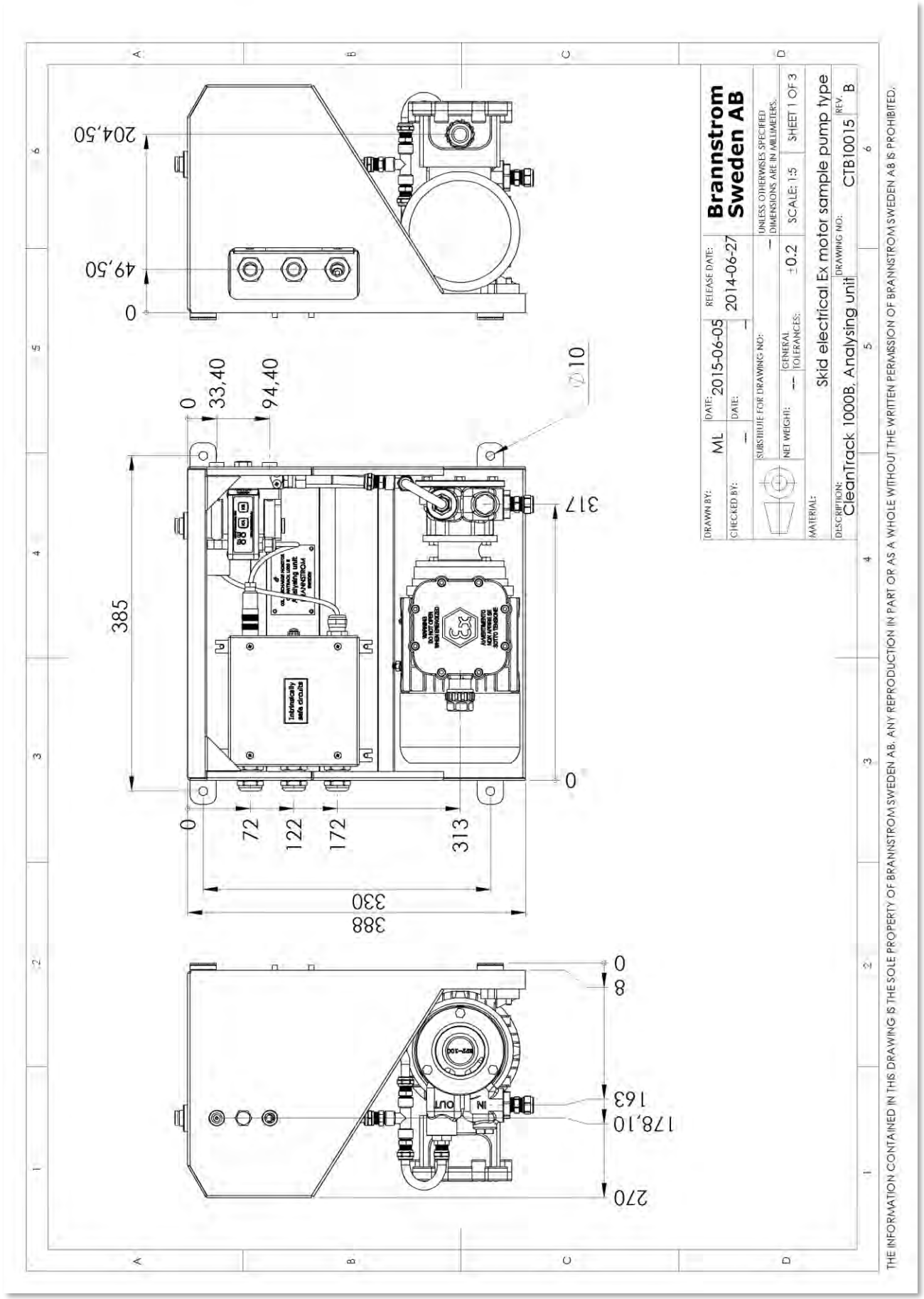
Drawing: CTB10003 sheet 4 of 4, Converting Unit.



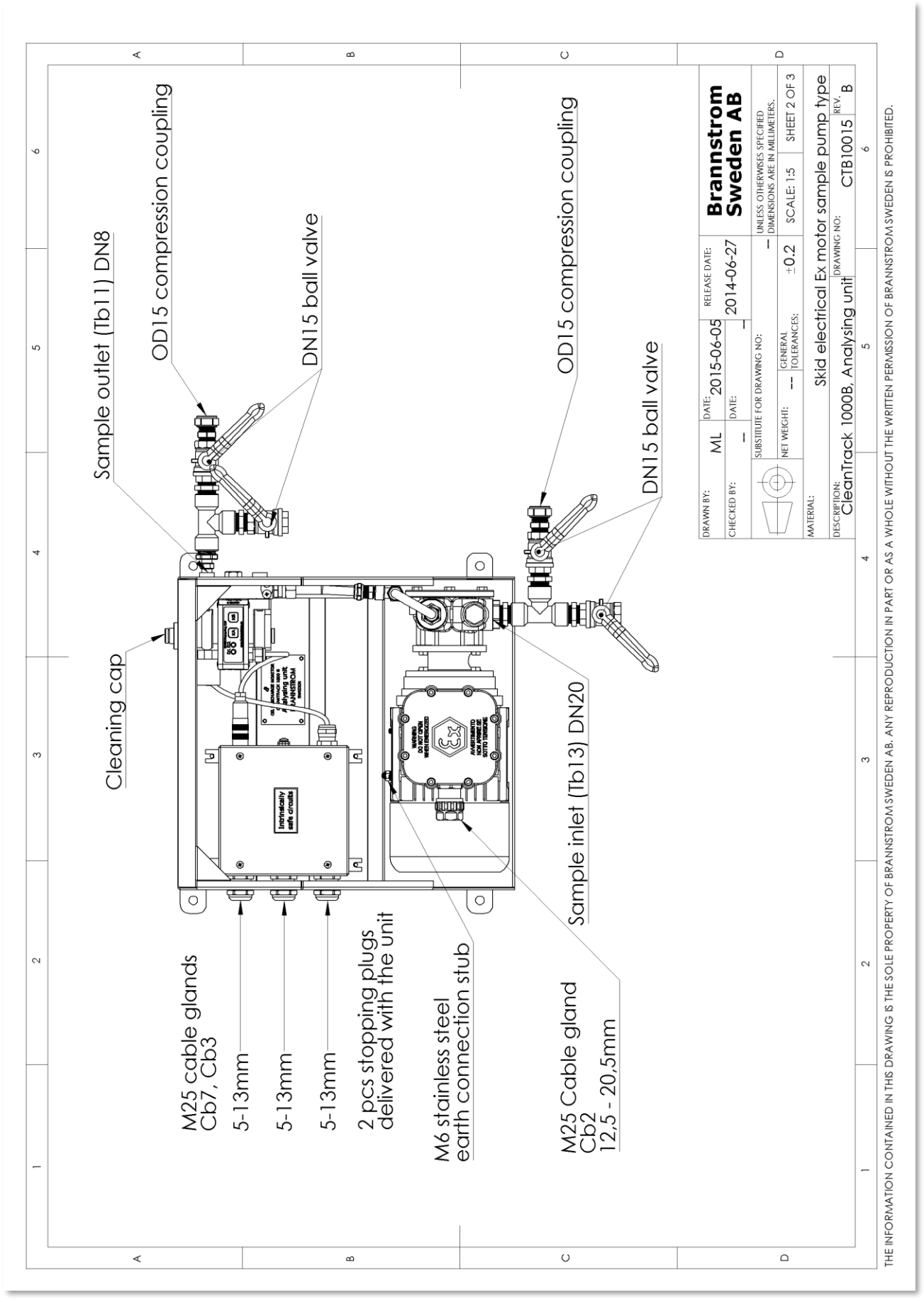
10.3. Analyzing Unit

10.3.1. Analyzing Unit skid with Ex. motor Sample pump

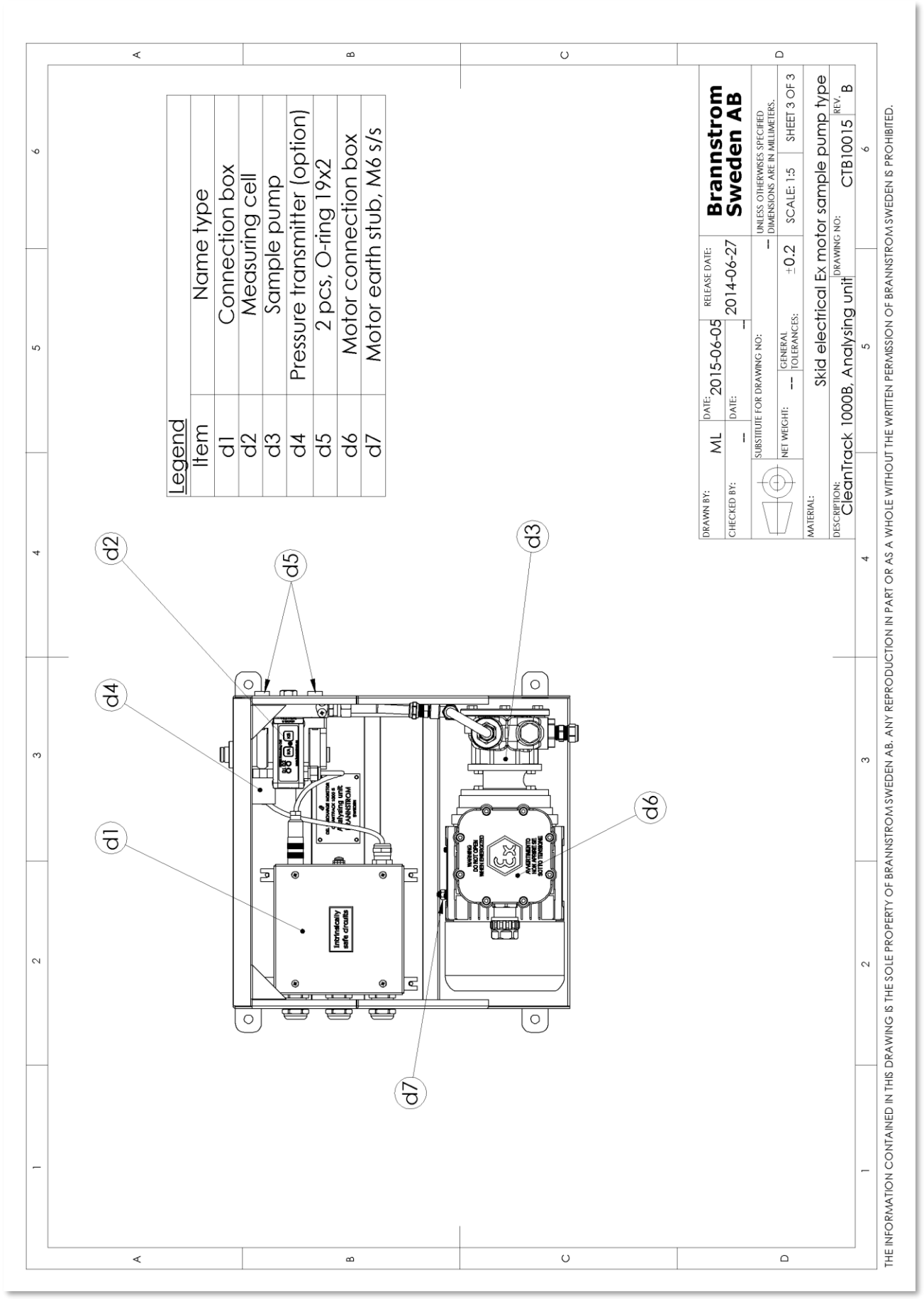
Drawing: CTB10015 sheet 1 of 3, Analyzing unit skid with electrical Ex. motor sample pump.



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

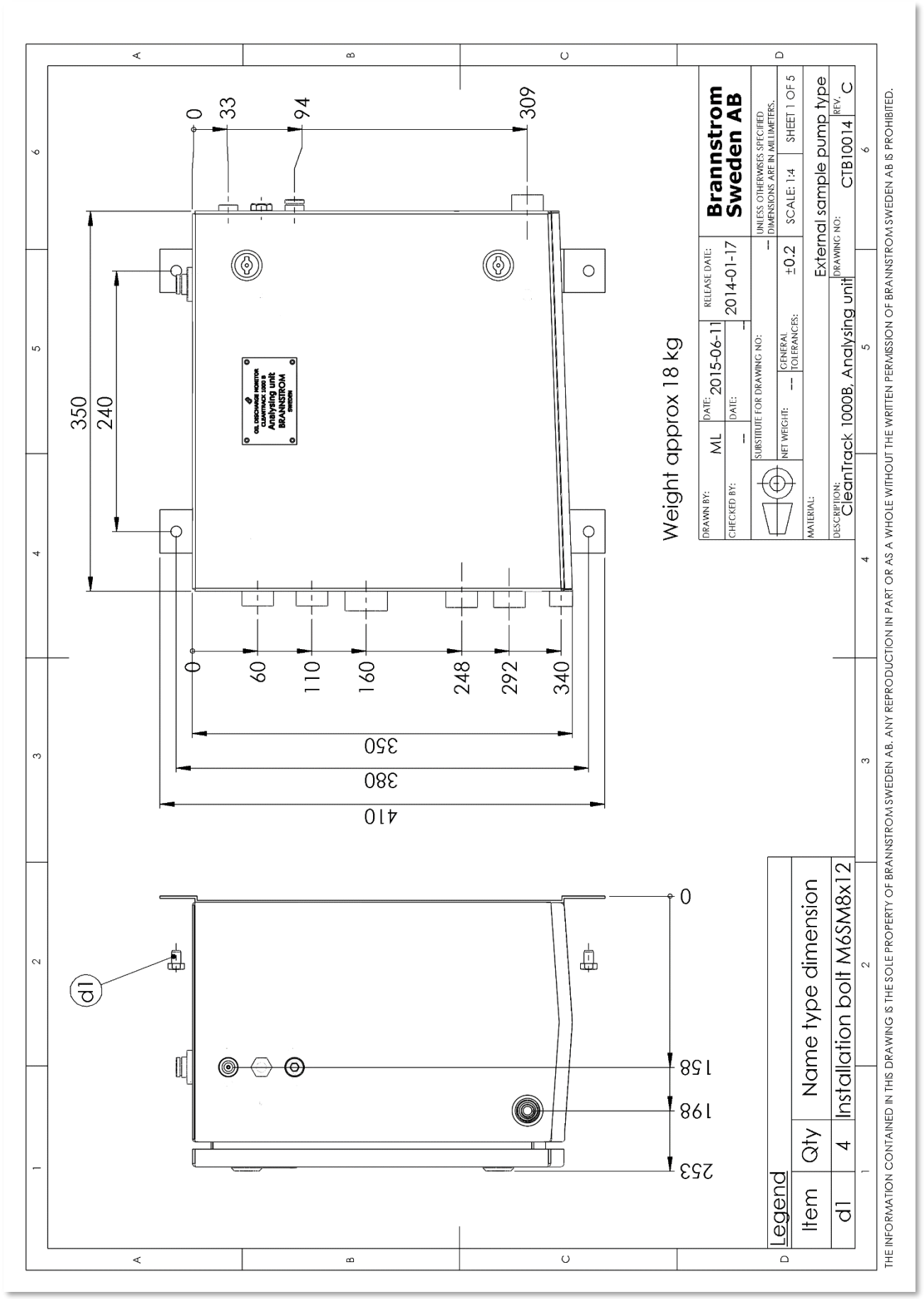


Drawing: CTB10015 sheet 3 of 3, Analyzing unit skid with electrical Ex. motor sample pump.

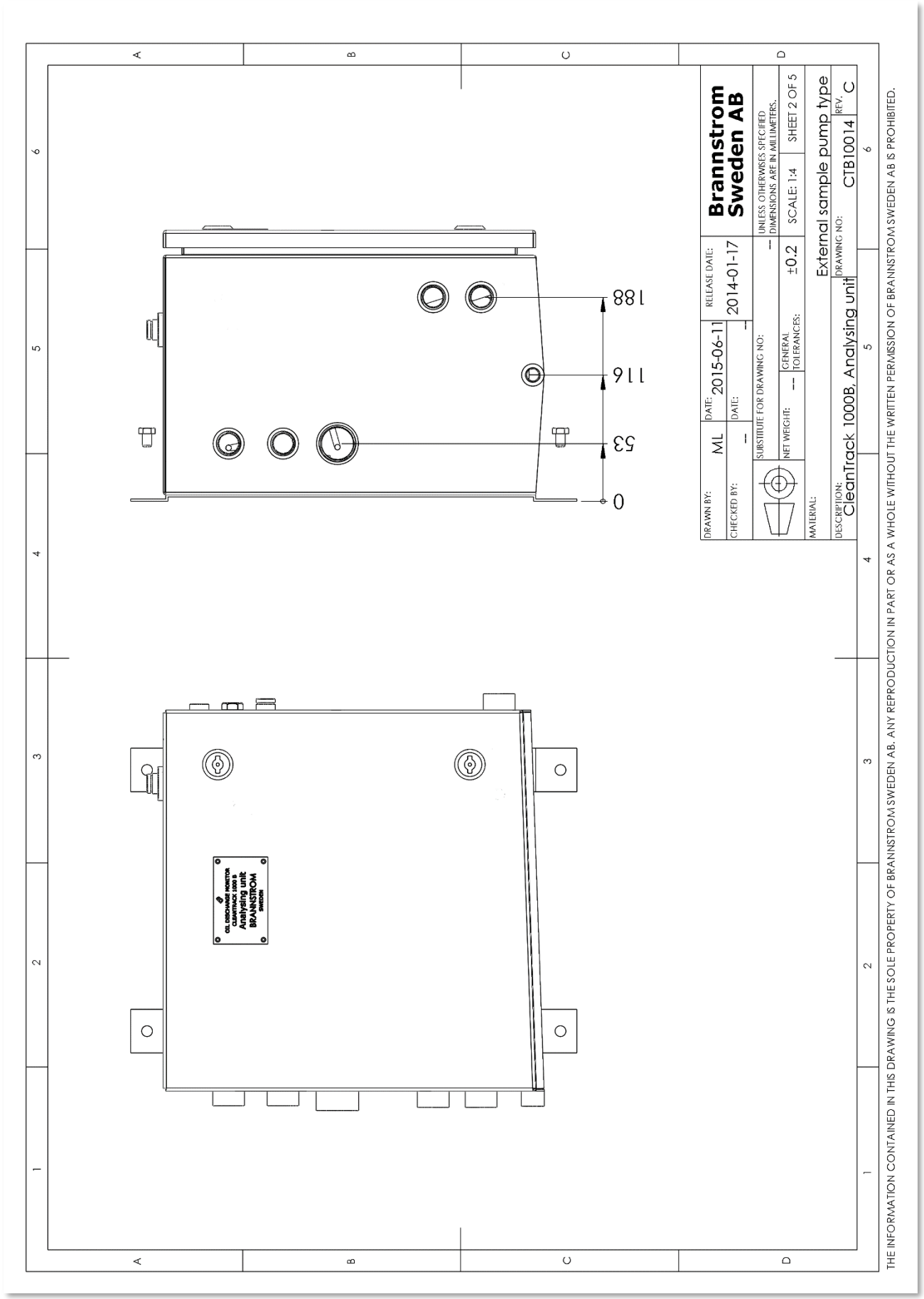


10.3.2. Analyzing Unit with external Sample pump

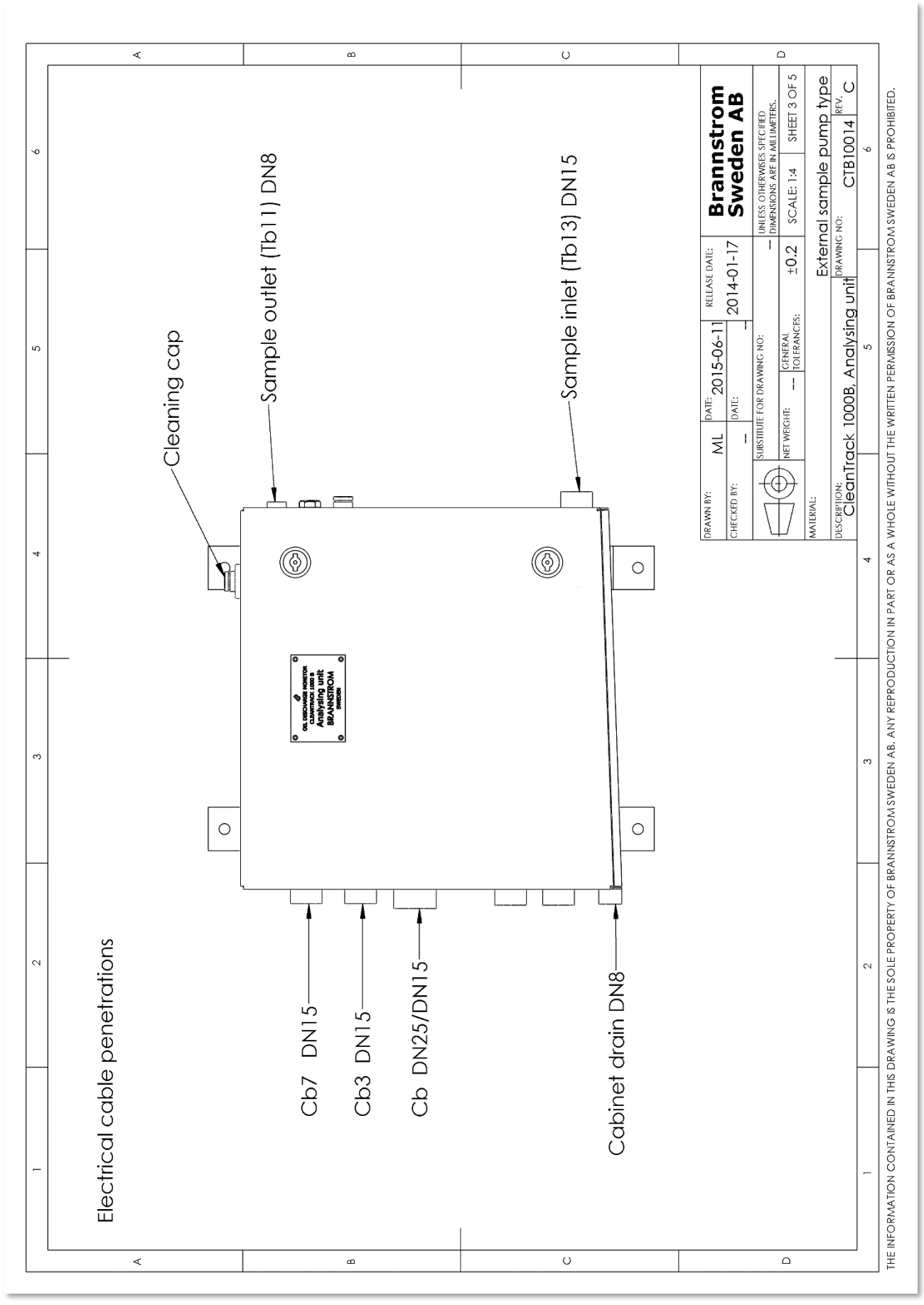
Drawing: CTB10014 sheet 1 of 5, Analyzing unit with external sample pump.



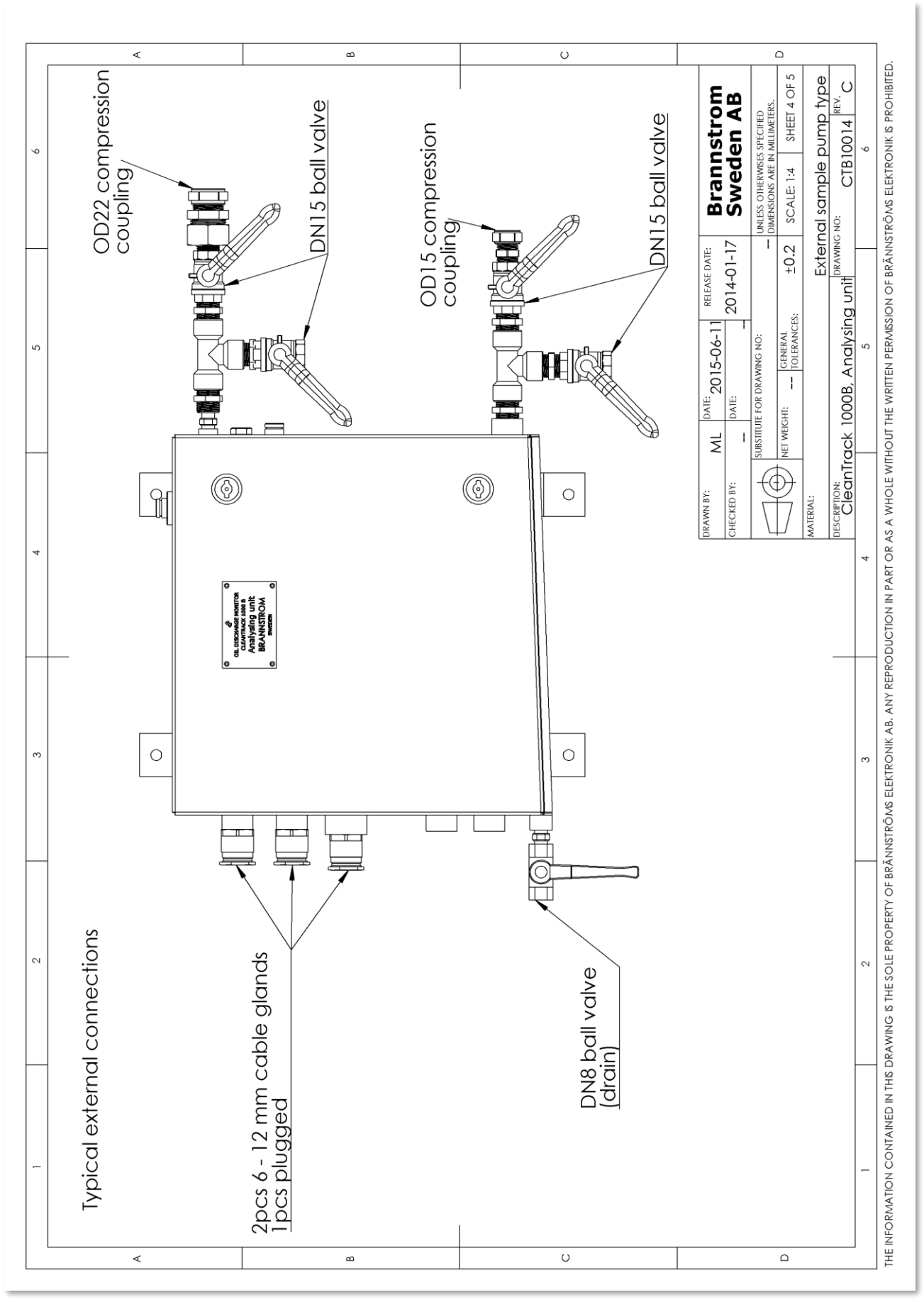
Drawing: CTB10014 sheet 2 of 5, Analyzing unit with external sample pump.



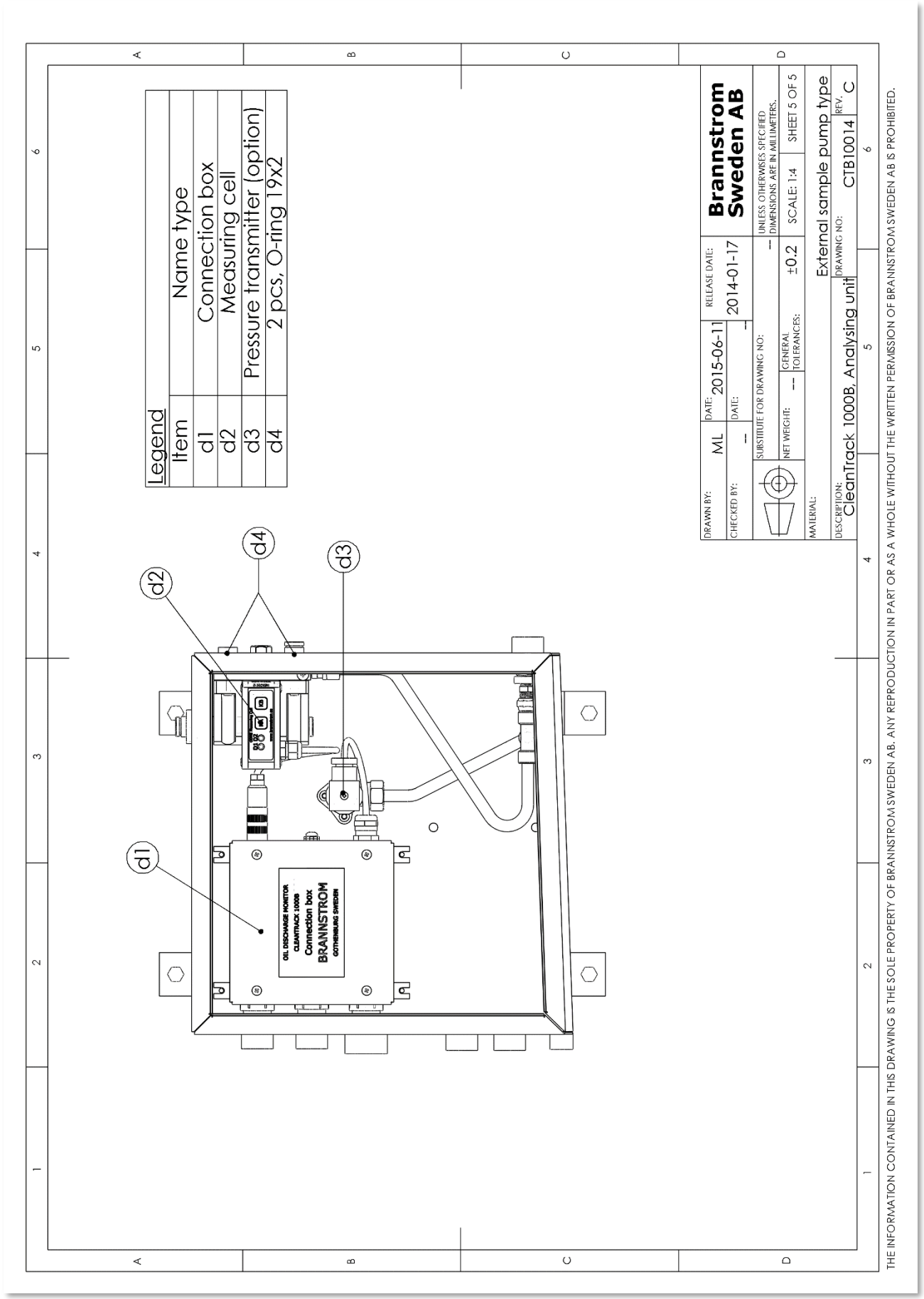
Drawing: CTB10014 sheet 3 of 5, Analyzing unit with external sample pump.



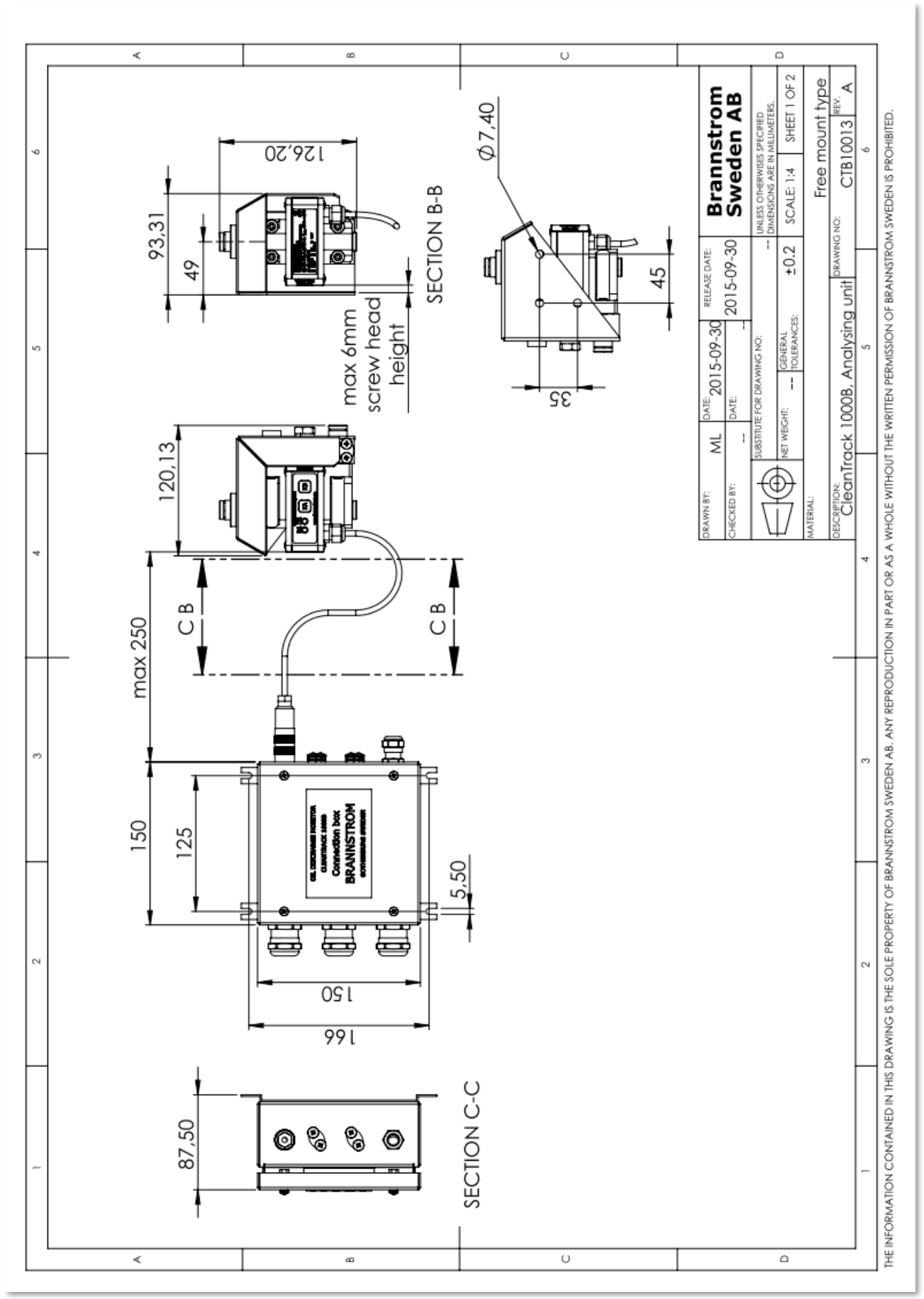
Drawing: CTB10014 sheet 4 of 5, Analyzing unit with external sample pump.

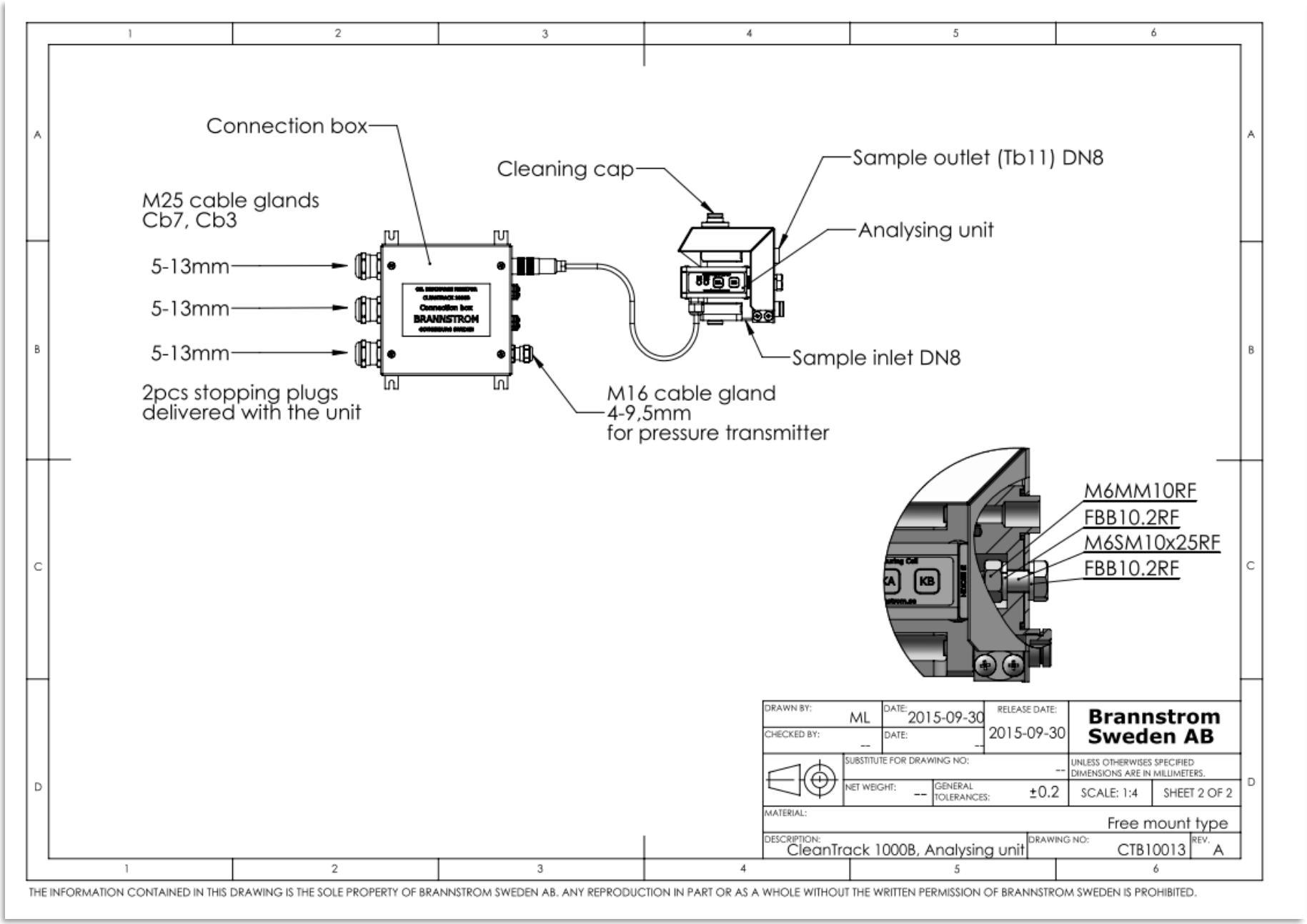


Drawing: CTB10014 sheet 5 of 5, Analyzing unit with external sample pump.



10.3.3. Analyzing Unit with Freestanding items for External Sample pump




Connection box
Cleaning cap
Sample outlet (Tb11) DN8
M25 cable glands
Cb7, Cb3
Analysing unit
5-13mm
5-13mm
5-13mm
Connection box
BRANNSTROM
Sample inlet DN8
2pcs stopping plugs
delivered with the unit
M16 cable gland
4-9,5mm
for pressure transmitter
M6MM10RF
FBB10.2RF
M6SM10x25RF
FBB10.2RF
DRAWN BY: ML
DATE: 2015-09-30
RELEASE DATE: 2015-09-30
CHECKED BY: --
DATE: --
Brannstrom Sweden AB
SUBSTITUTE FOR DRAWING NO: --
UNLESS OTHERWISES SPECIFIED DIMENSIONS ARE IN MILLIMETERS.
NET WEIGHT: --
GENERAL TOLERANCES: ±0.2
SCALE: 1:4
SHEET 2 OF 2
MATERIAL:
Free mount type
DESCRIPTION: CleanTrack 1000B, Analysing unit
DRAWING NO: CTB10013
REV. A
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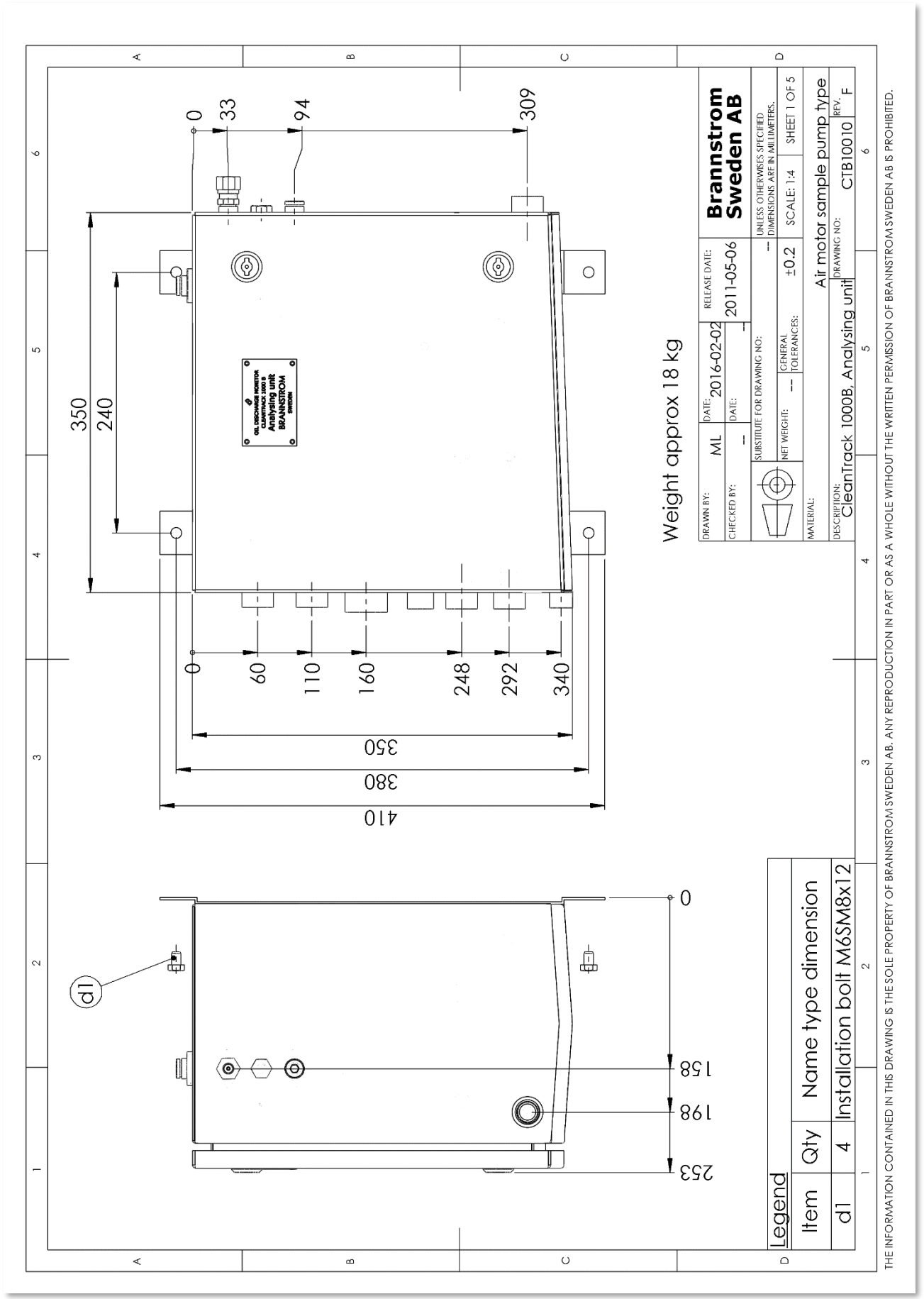
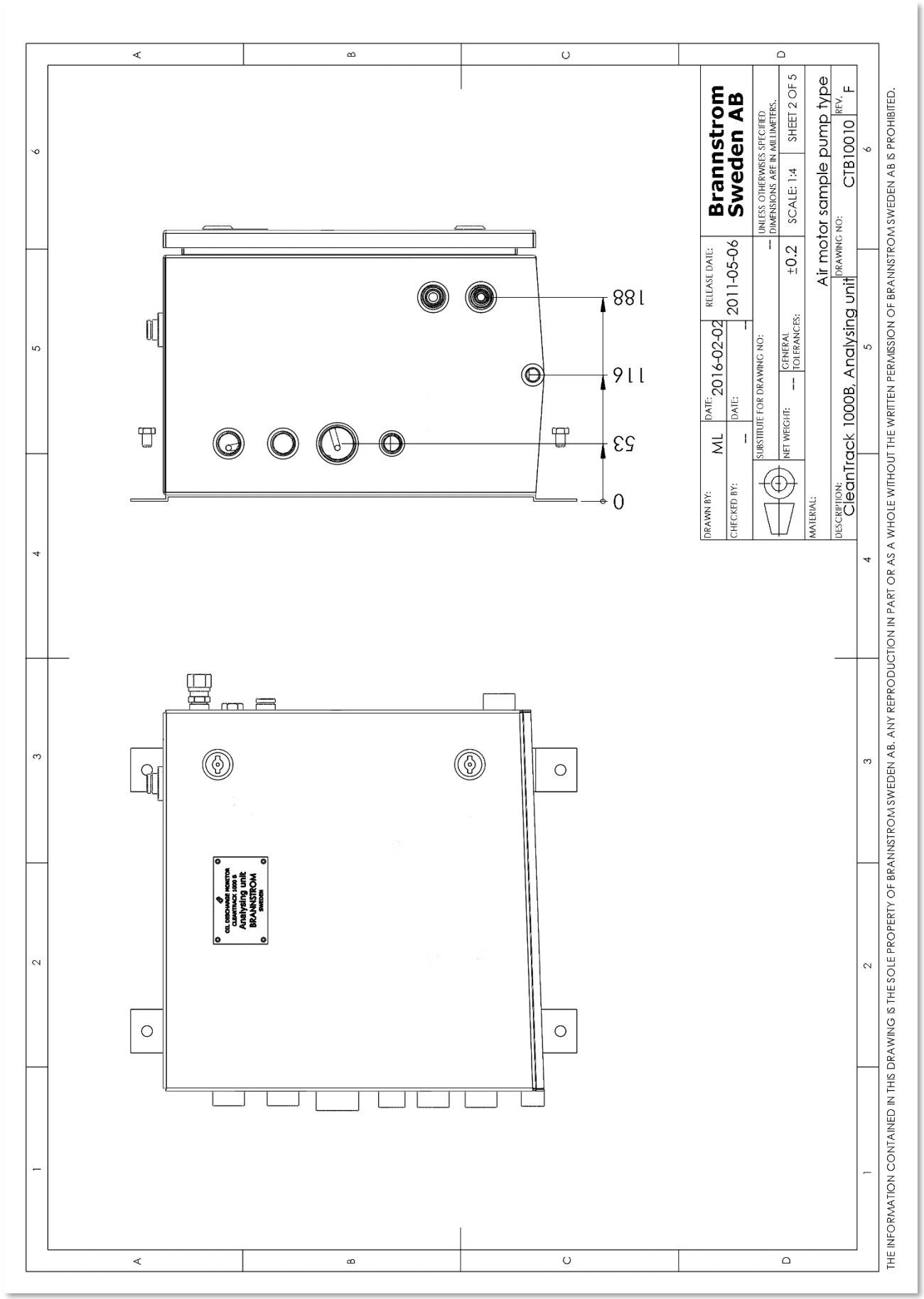
10.3.4. Analyzing Unit with Air motor Sample pump

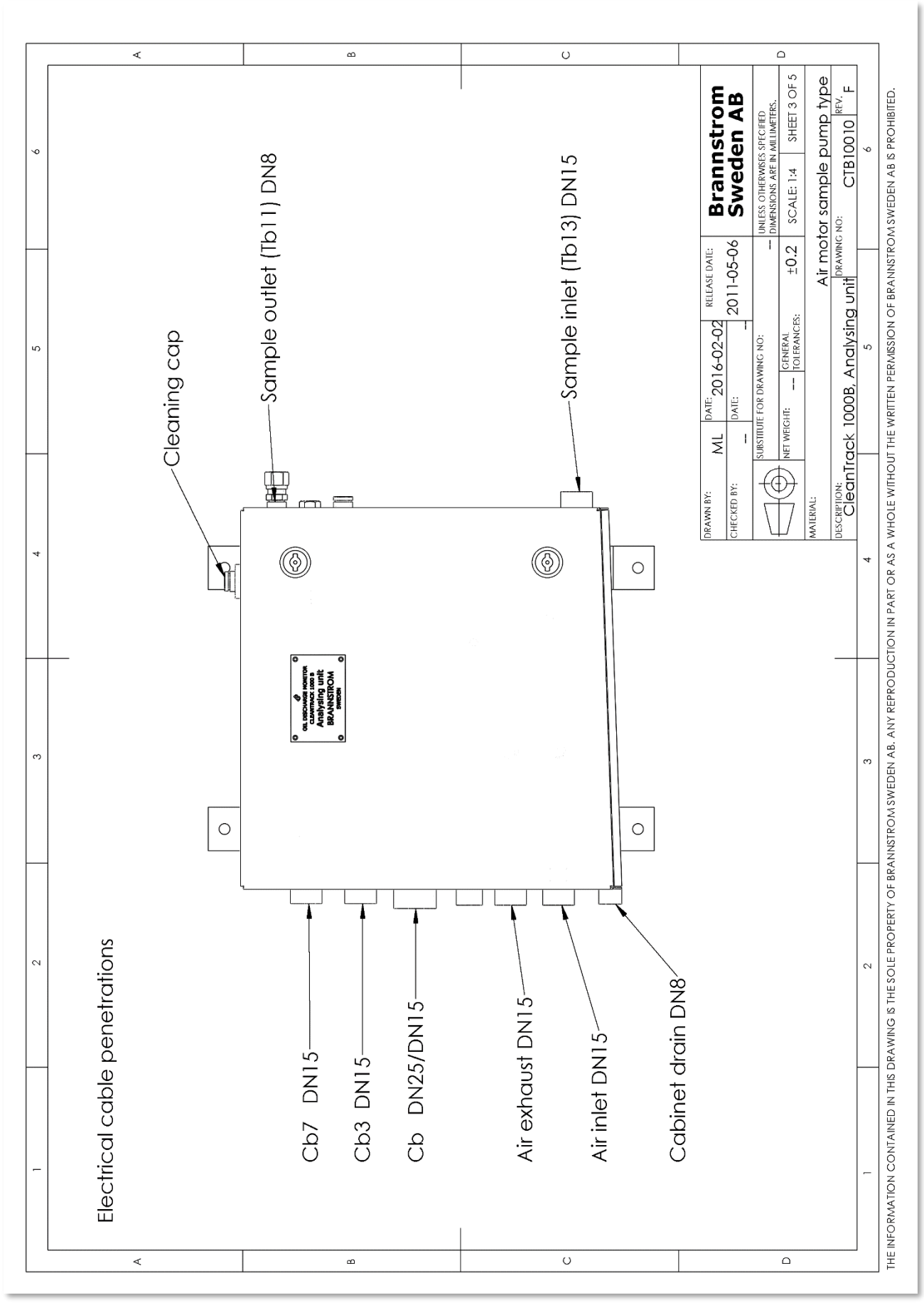
Drawing: CTB10010 sheet 1 of 5, Analyzing unit with air motor sample pump.



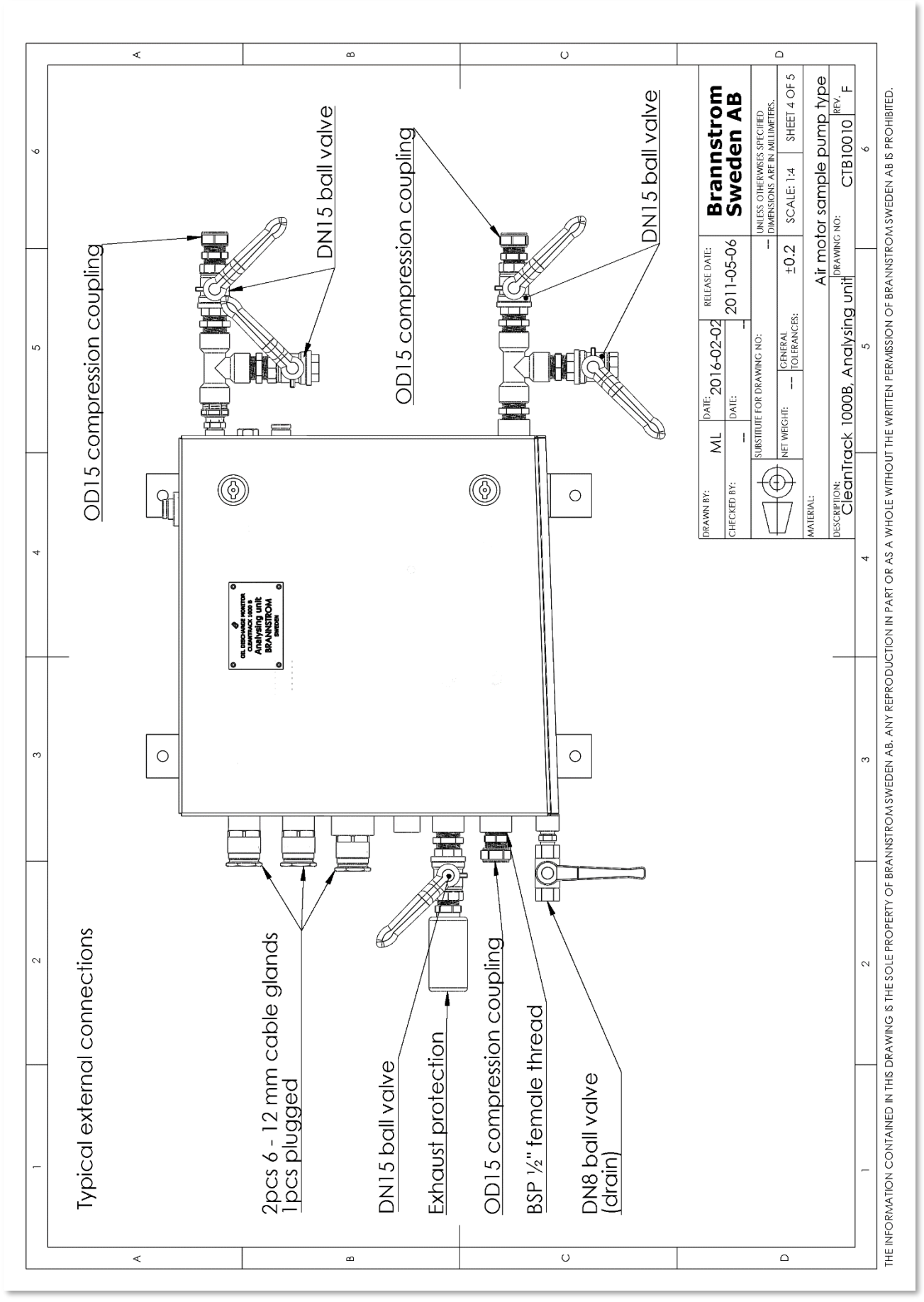
Drawing: CTB10010 sheet 2 of 5, Analyzing unit with air motor sample pump.



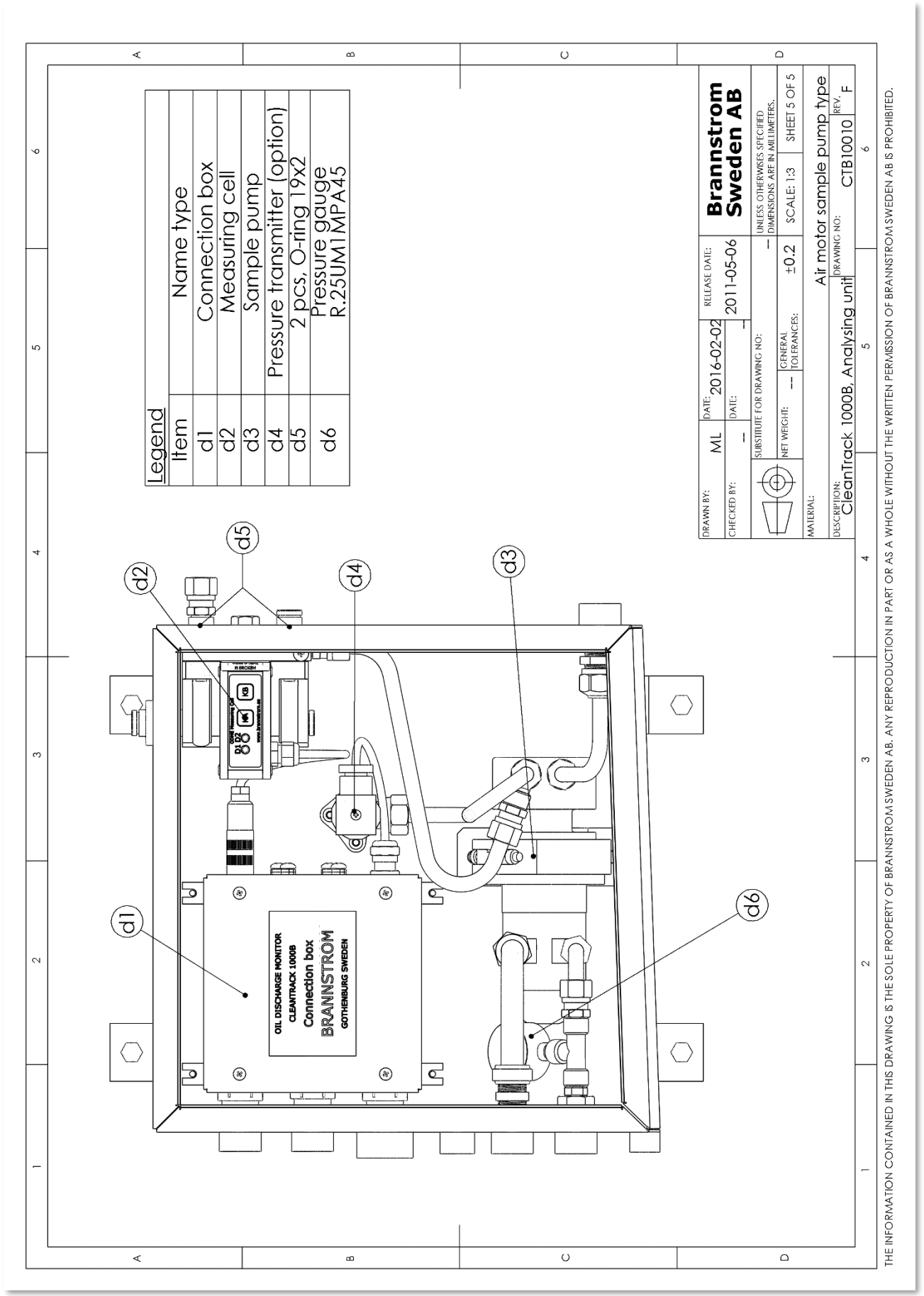
Drawing: CTB10010 sheet 3 of 5, Analyzing unit with air motor sample pump.



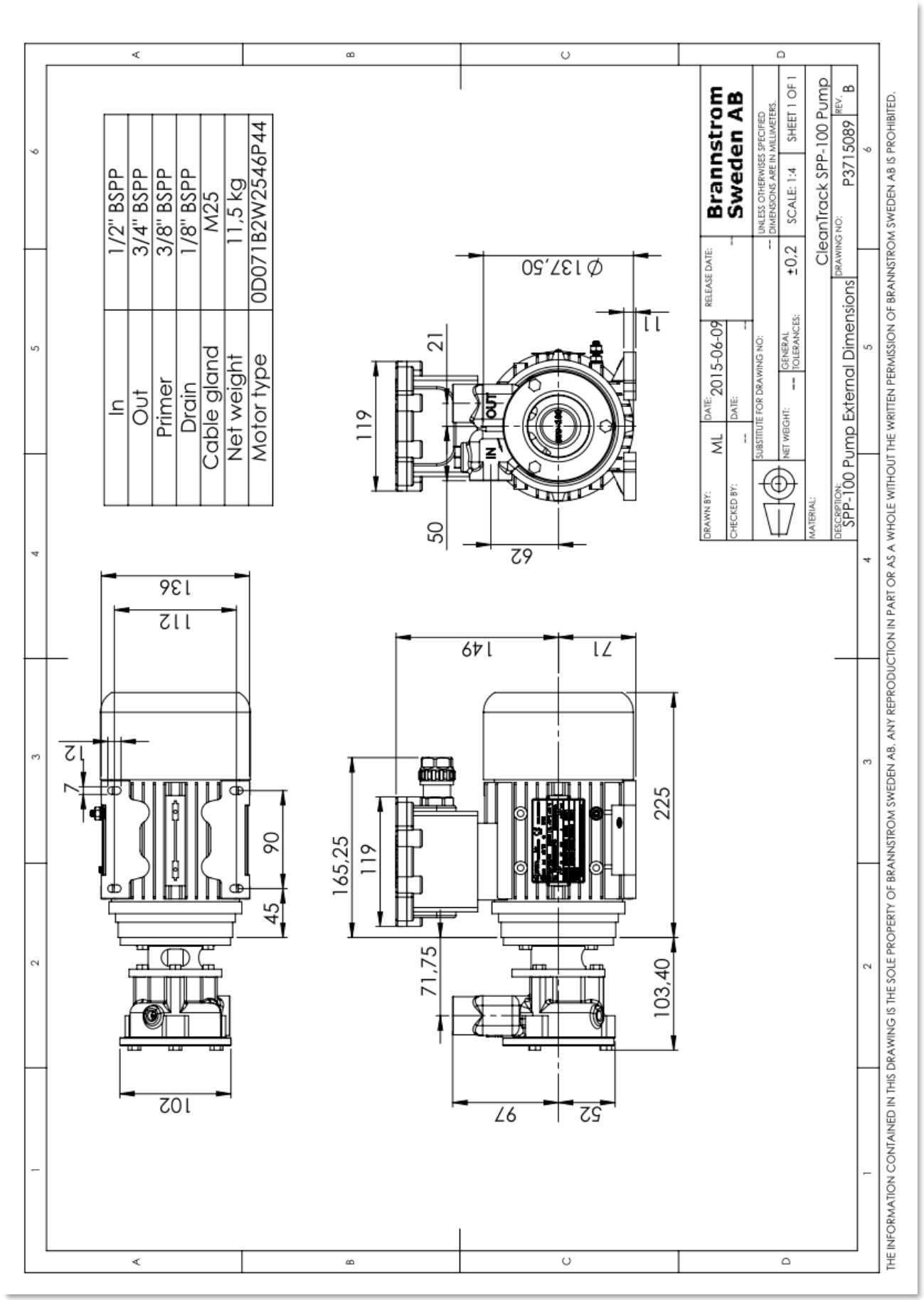
Drawing: CTB10010 sheet 4 of 5, Analyzing unit with air motor sample pump.



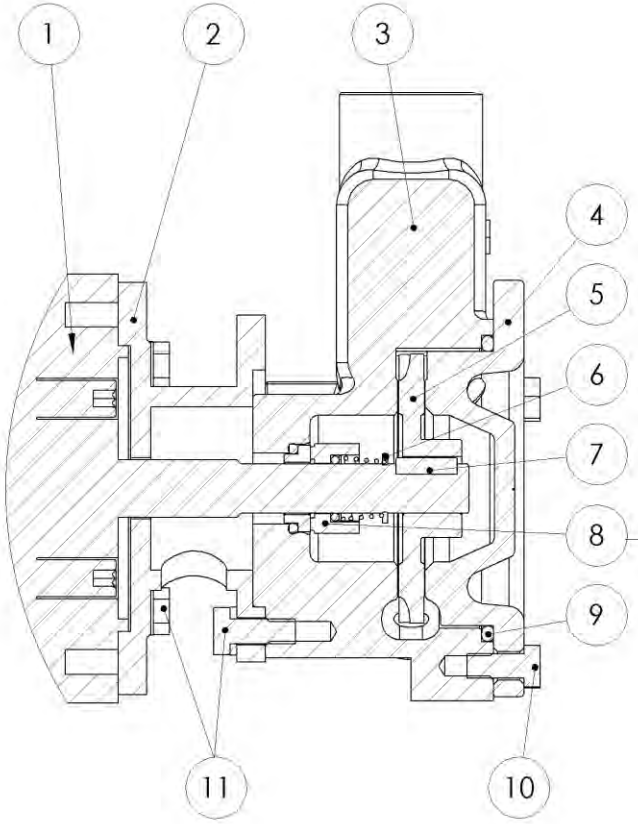
Drawing: CTB10010 sheet 5 of 5, Analyzing unit with air motor sample pump.



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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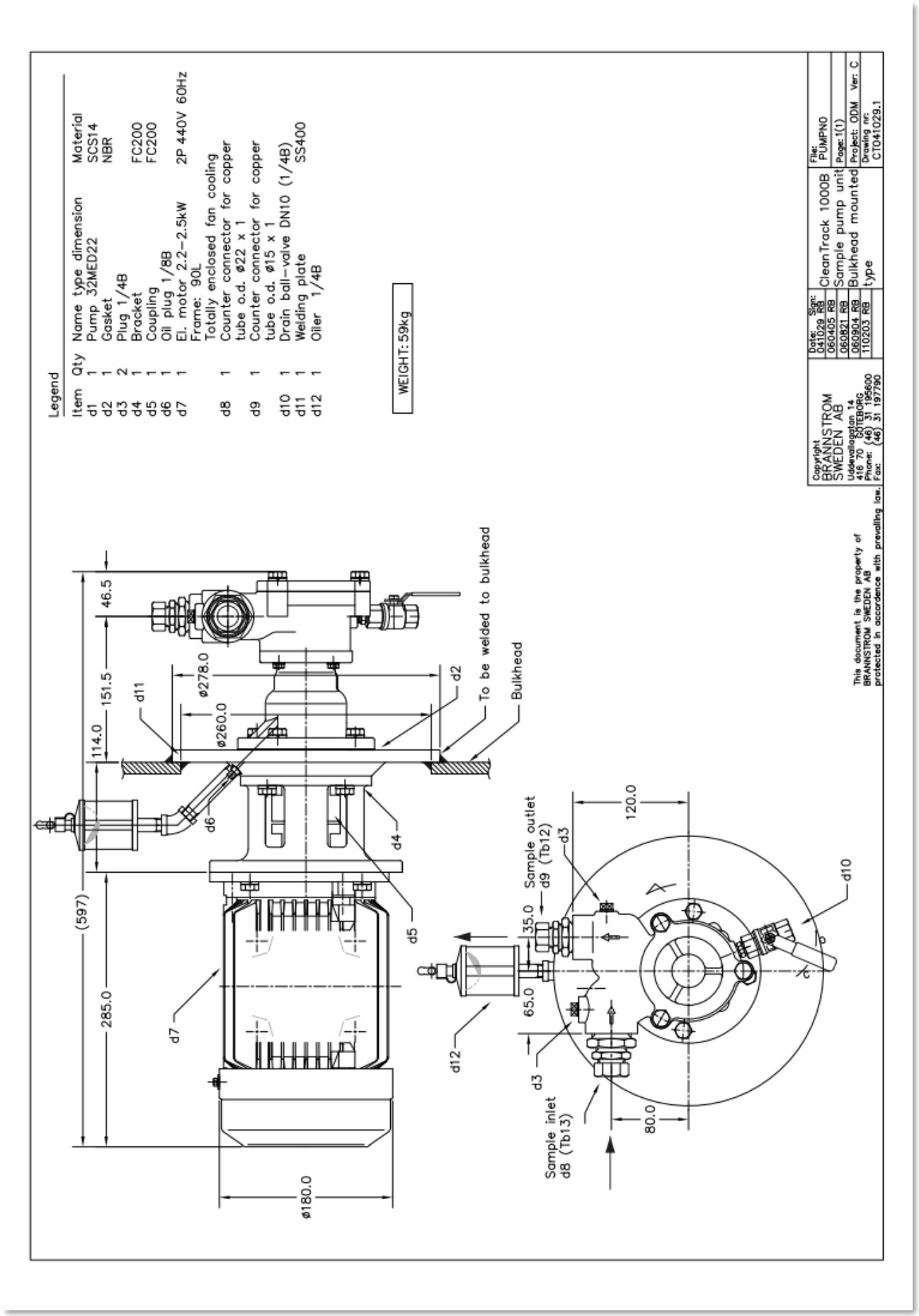
CHECKED BY: BB	DATE: 2017-08-30				
	SUBSTITUTE FOR DRAWING NO: –		UNLESS OTHERWISES SPECIFIED DIMENSIONS ARE IN MILLIMETERS.		
	NET WEIGHT: --	GENERAL TOLERANCES: ± –	SCALE: 2:3	SHEET 1 OF 1	
MATERIAL: –					
DESCRIPTION: Suzhong SPP-100 Section View		DRAWING NO: P3714073	REV. C		

10.5. Nikuni Sample pump for Bulkhead mounting

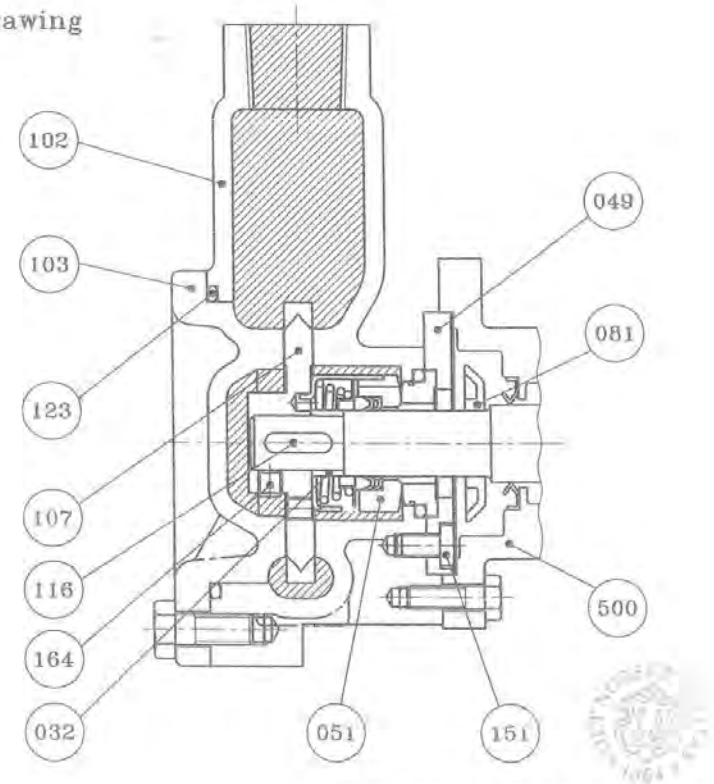
Drawing: CT041029.1, Nikuni Bulkhead Sample pump.



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)

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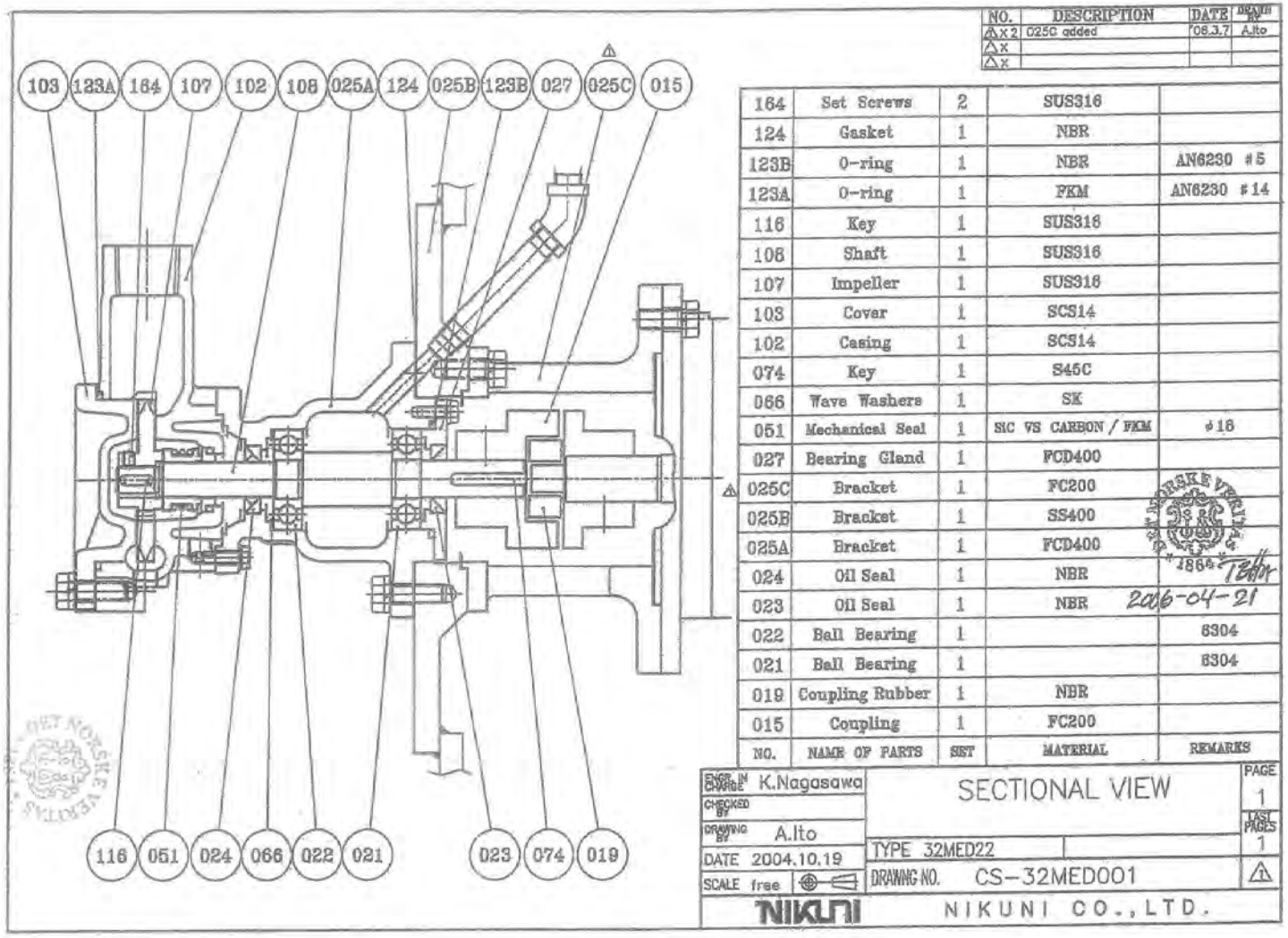


NO.	DESCRIPTION	DATE	DRAWN BY
△x2	025C added	'08.3.7	A.Ito
△x			
△x			

NO.	NAME OF PARTS	SET	MATERIAL	REMARKS
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	

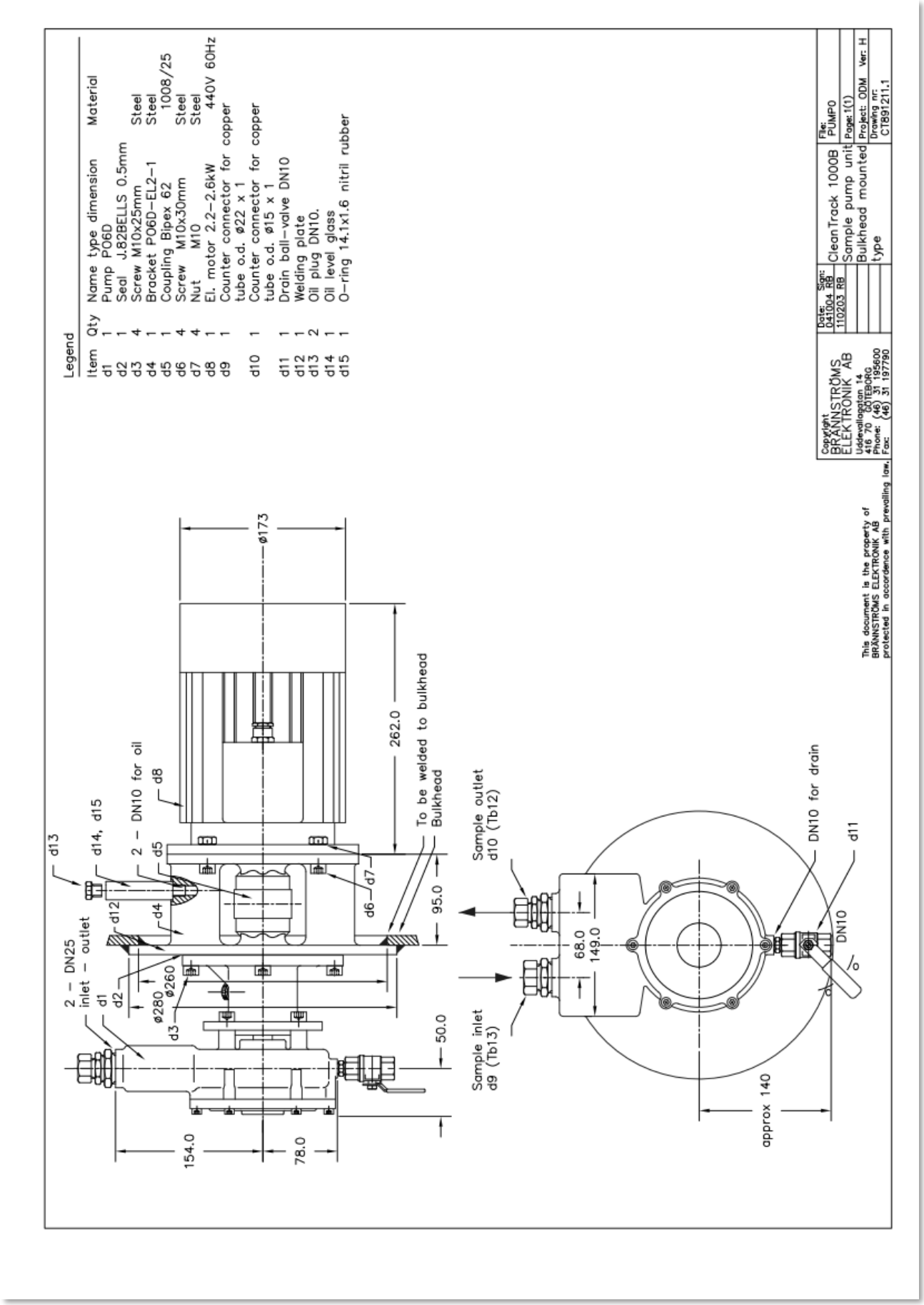
DET NORSKE VERITAS
1864
2006-04-21

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		

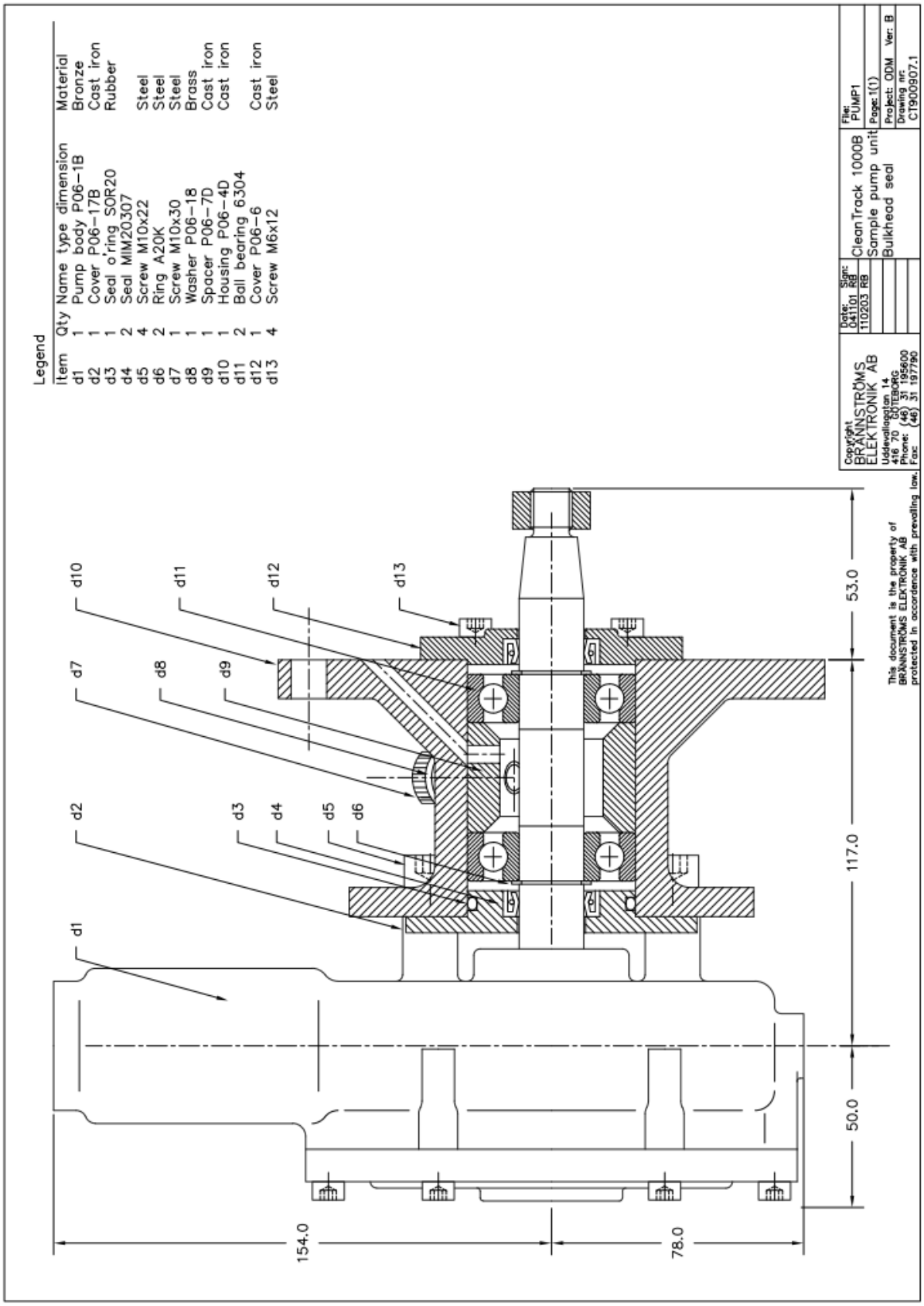
NIKUNI NIKUNI CO., LTD.

10.6. Matre Sample pump for Bulkhead mounting

Drawing: CT891211.1, Matre Bulkhead Sample pump.

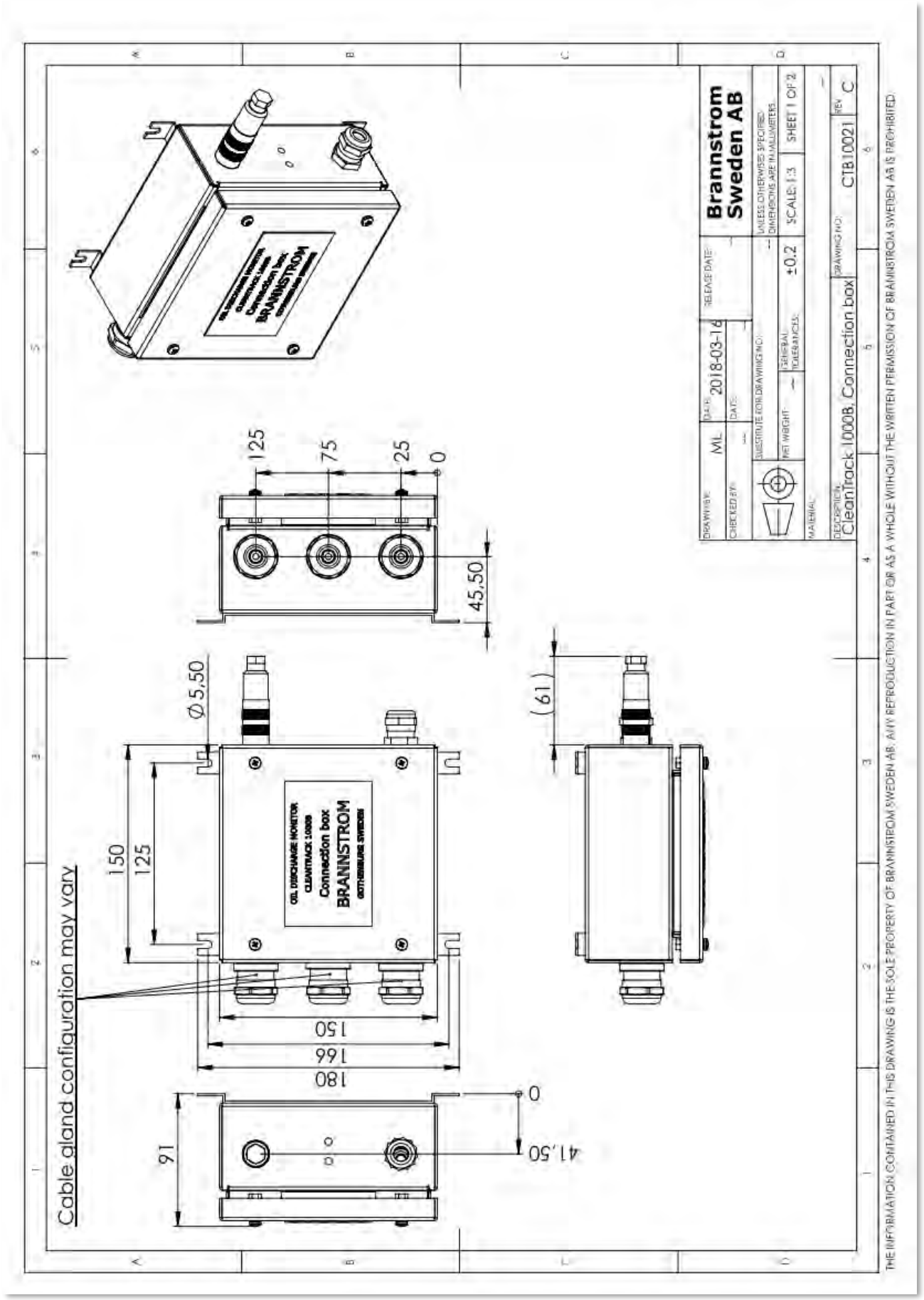


Drawing: CT900907.1, Matre Bulkhead Sample pump.

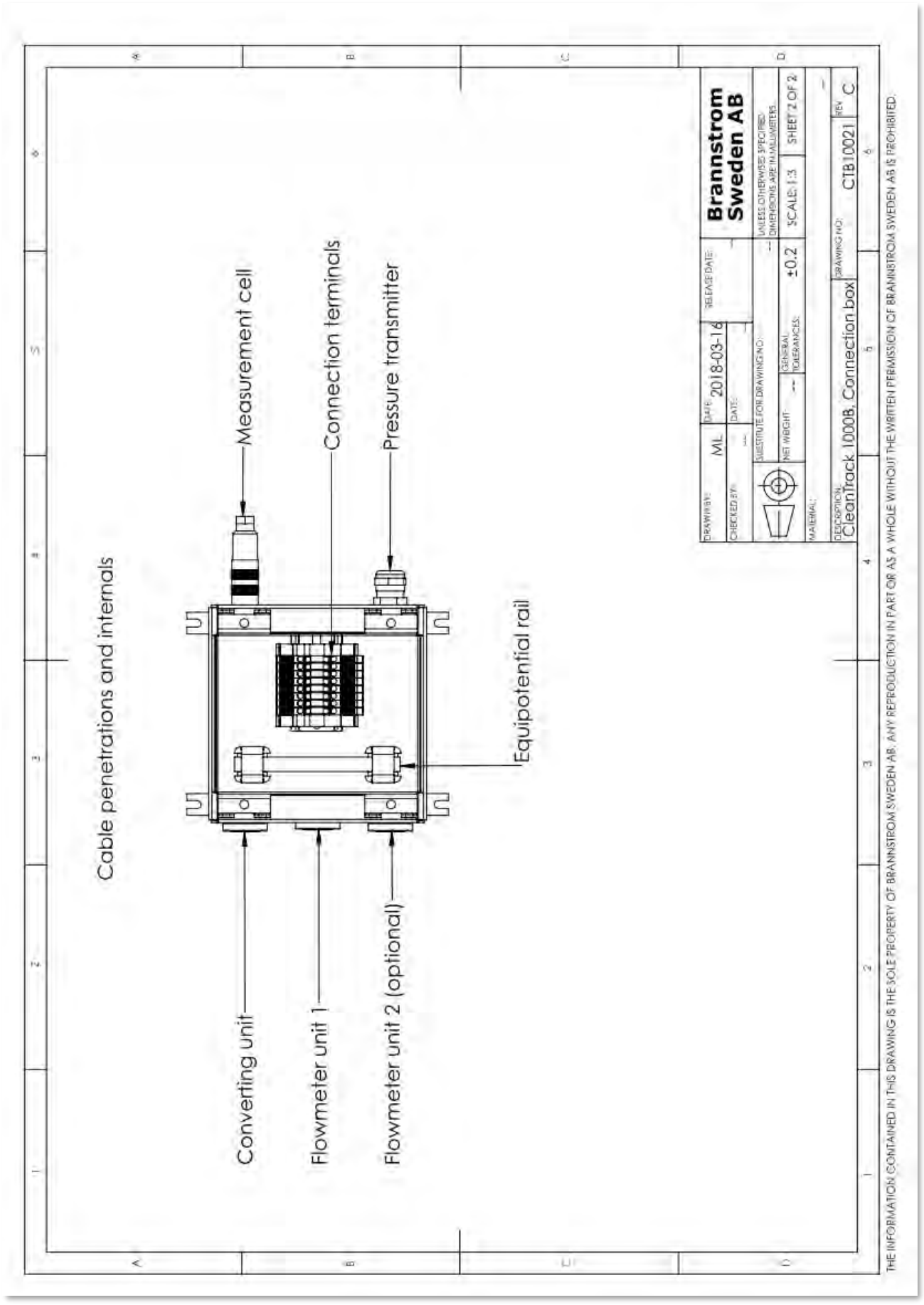


10.7. Connection box

Drawing: CTB10021 sheet 1 of 2, Connection box.



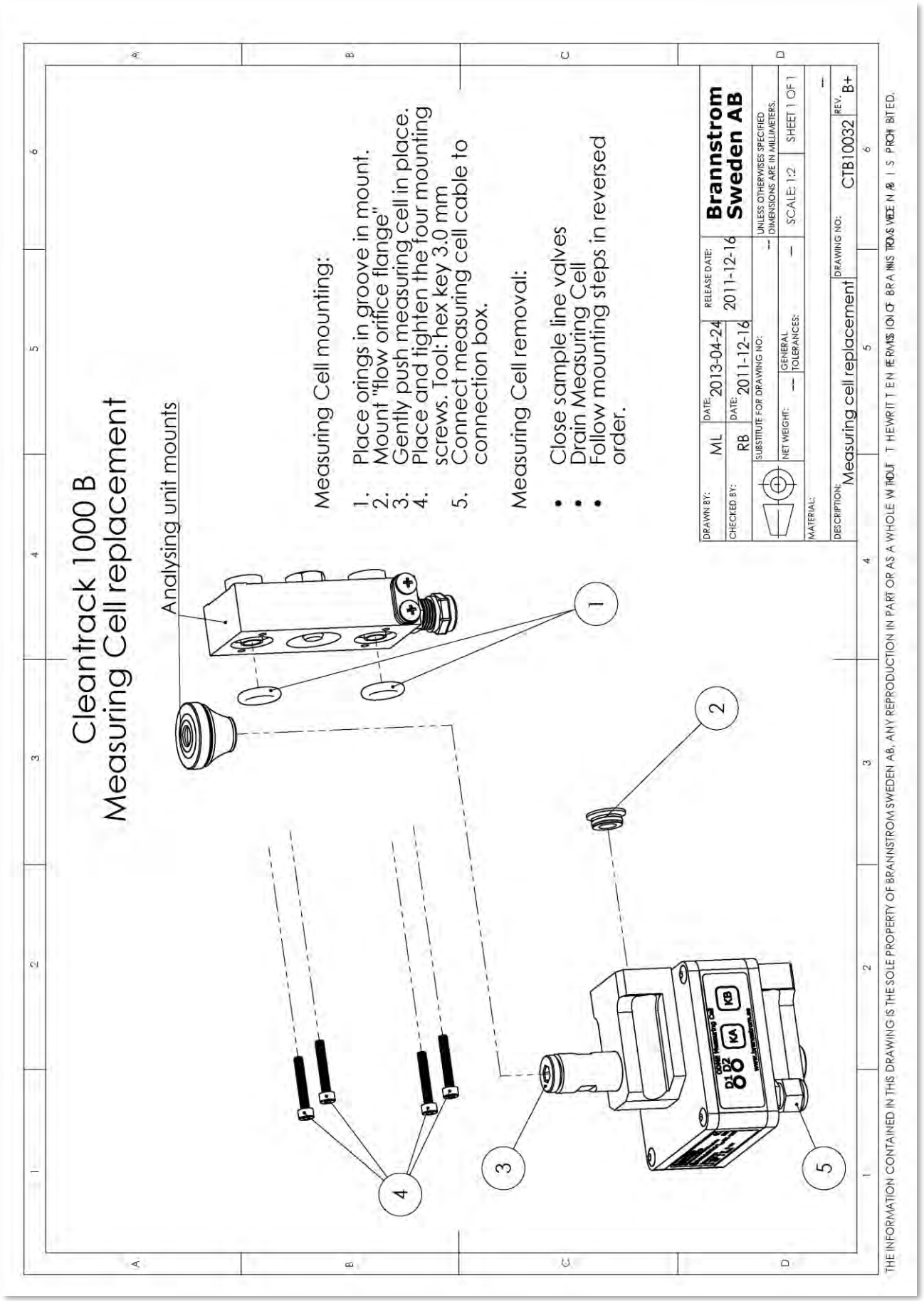
Drawing: CTB10021 sheet 2 of 2, Connection box



10.8. Measuring Cell replacement

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

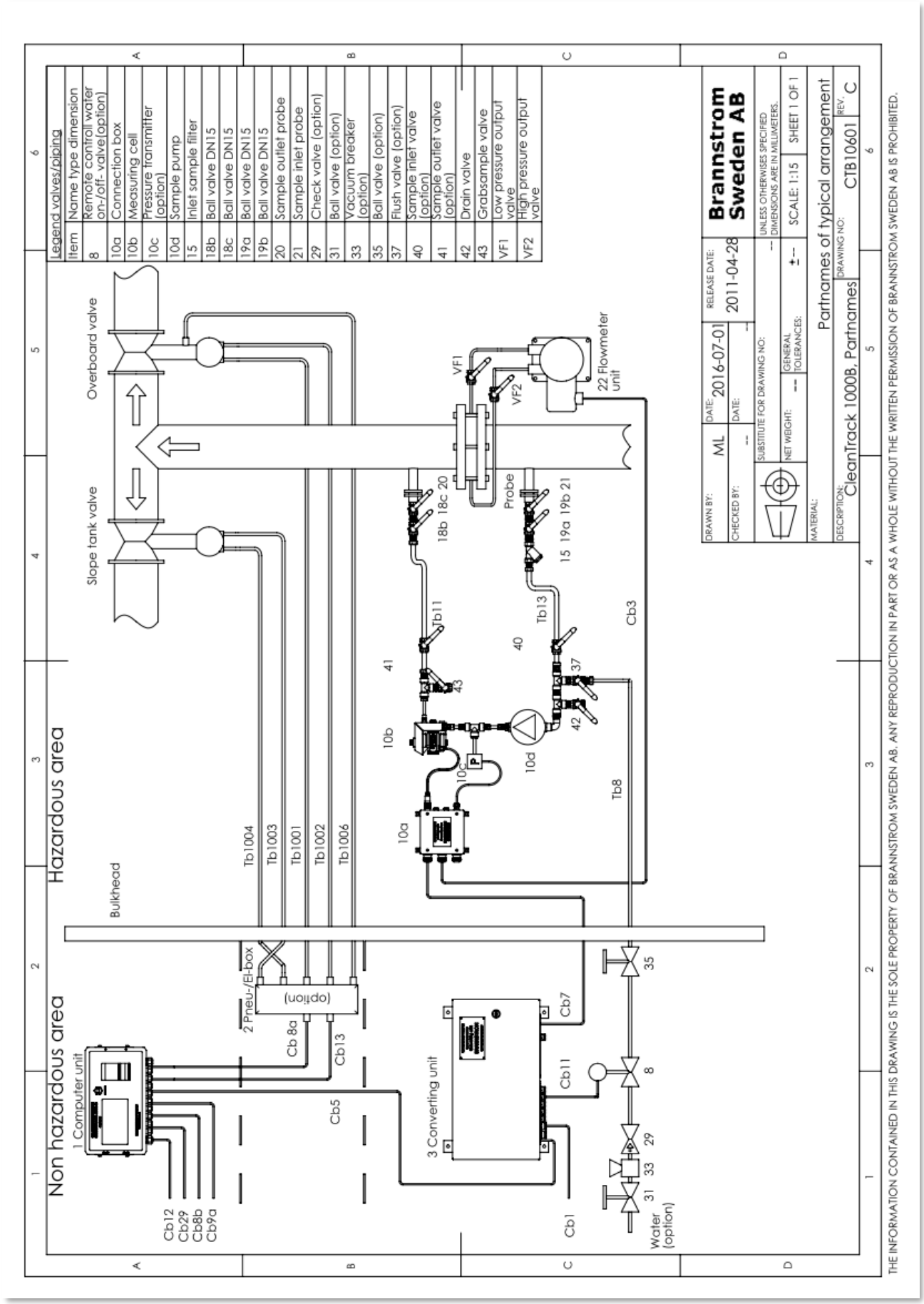
For replacement instructions, see chapter **4.10. Measuring Cell Instructions and Replacement** page **30.**



10.9. GA-plans

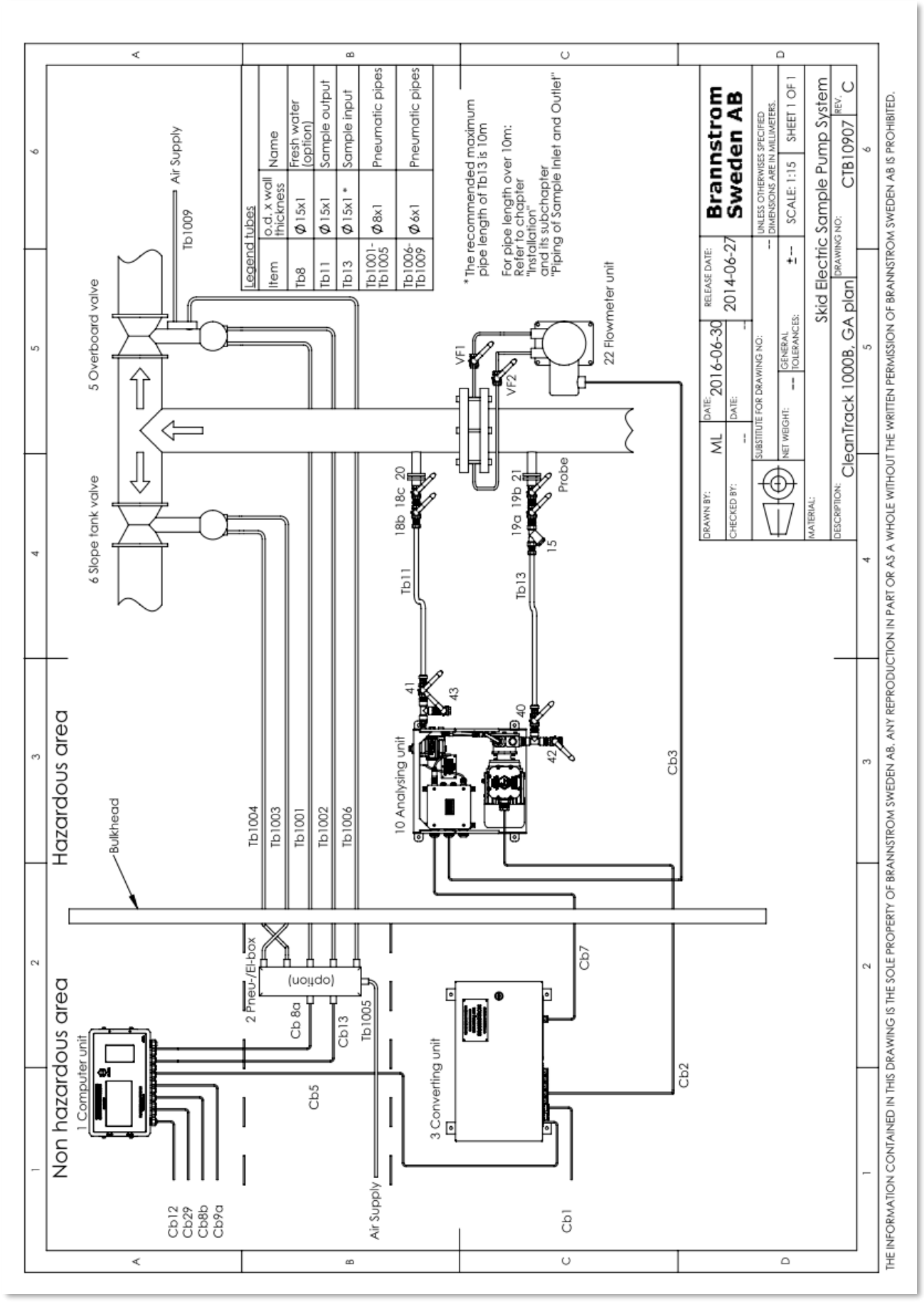
10.9.1. Partnames of typical arrangement

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

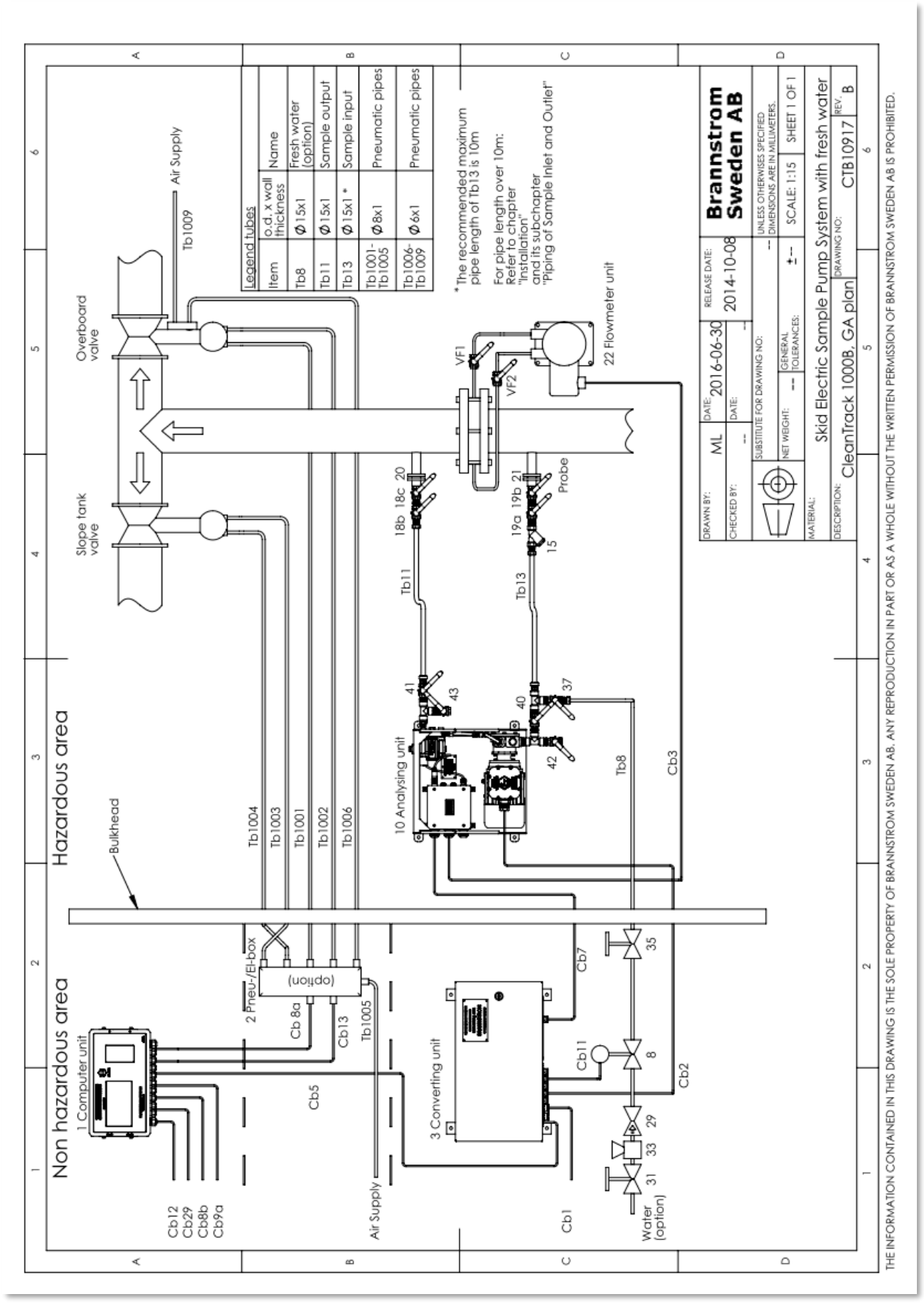


10.9.2. GA-plan with Ex. motor Sample pump

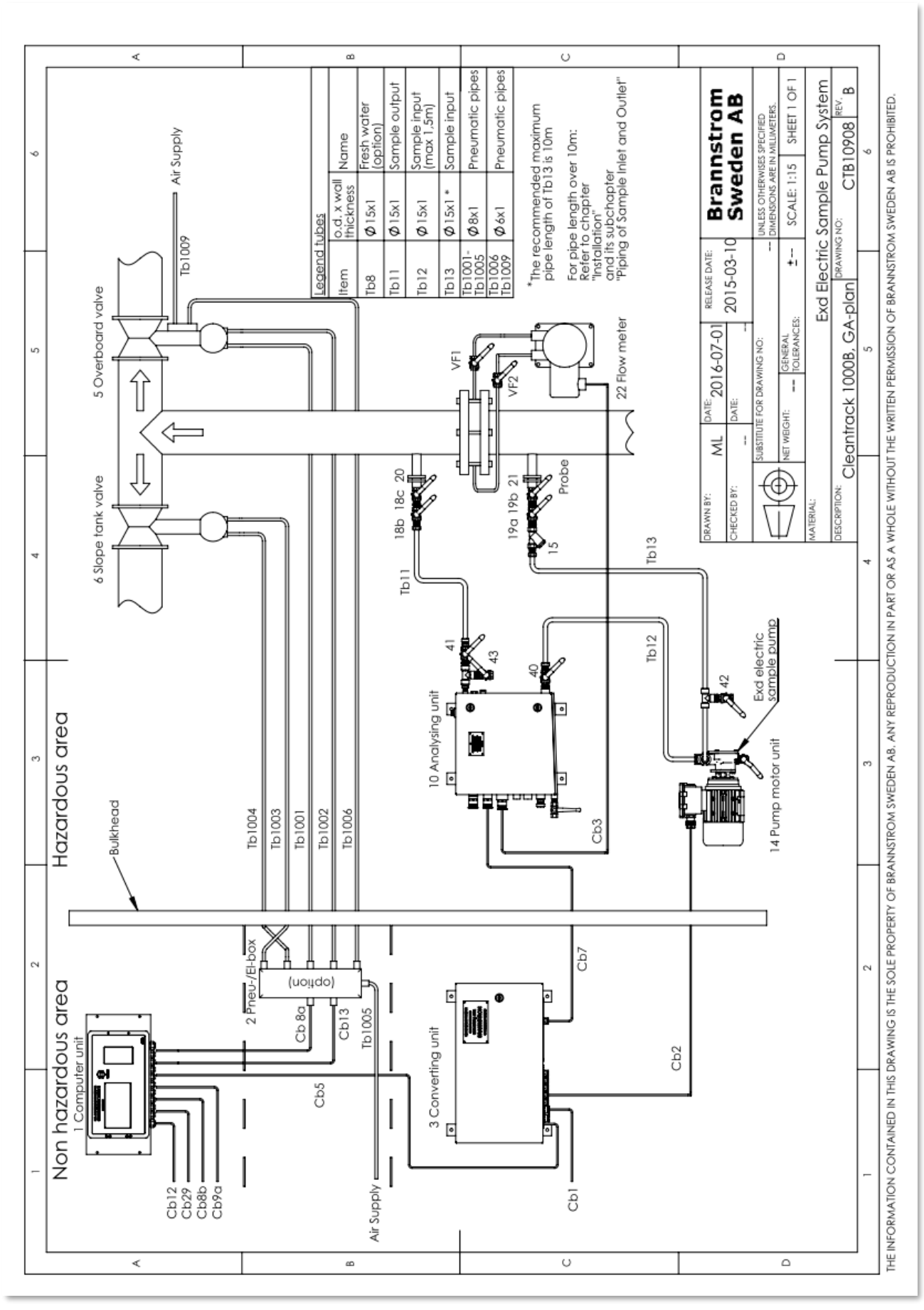
Drawing: CTB10907 sheet 1 of 1, GA-plan with skid Ex. motor sample pump.



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

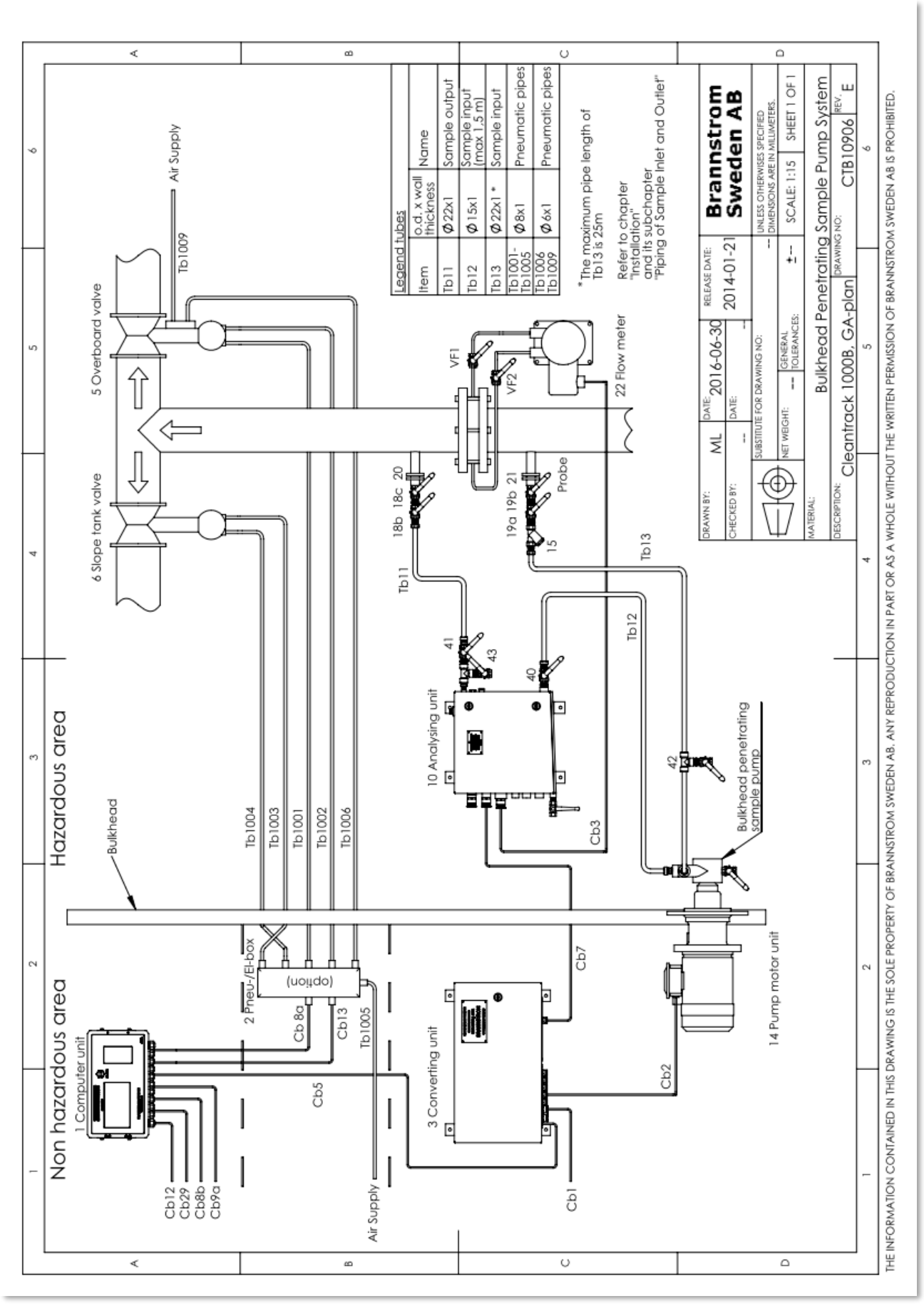


Drawing: CTB10908 sheet 1of 1, GA plan with free standing Ex. Motor sample pump.

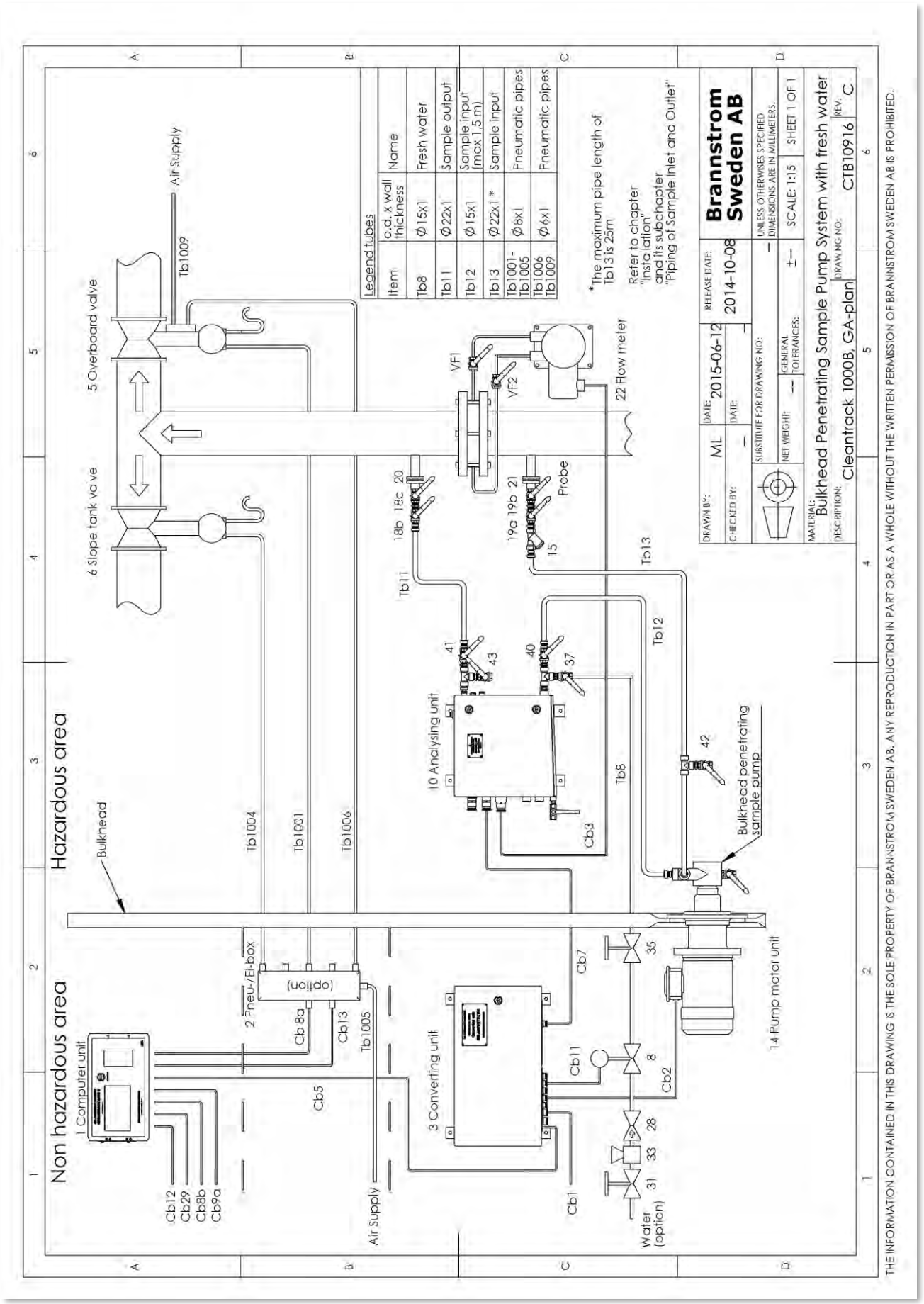


10.9.3. GA-plan with bulkhead penetrating Sample pump

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

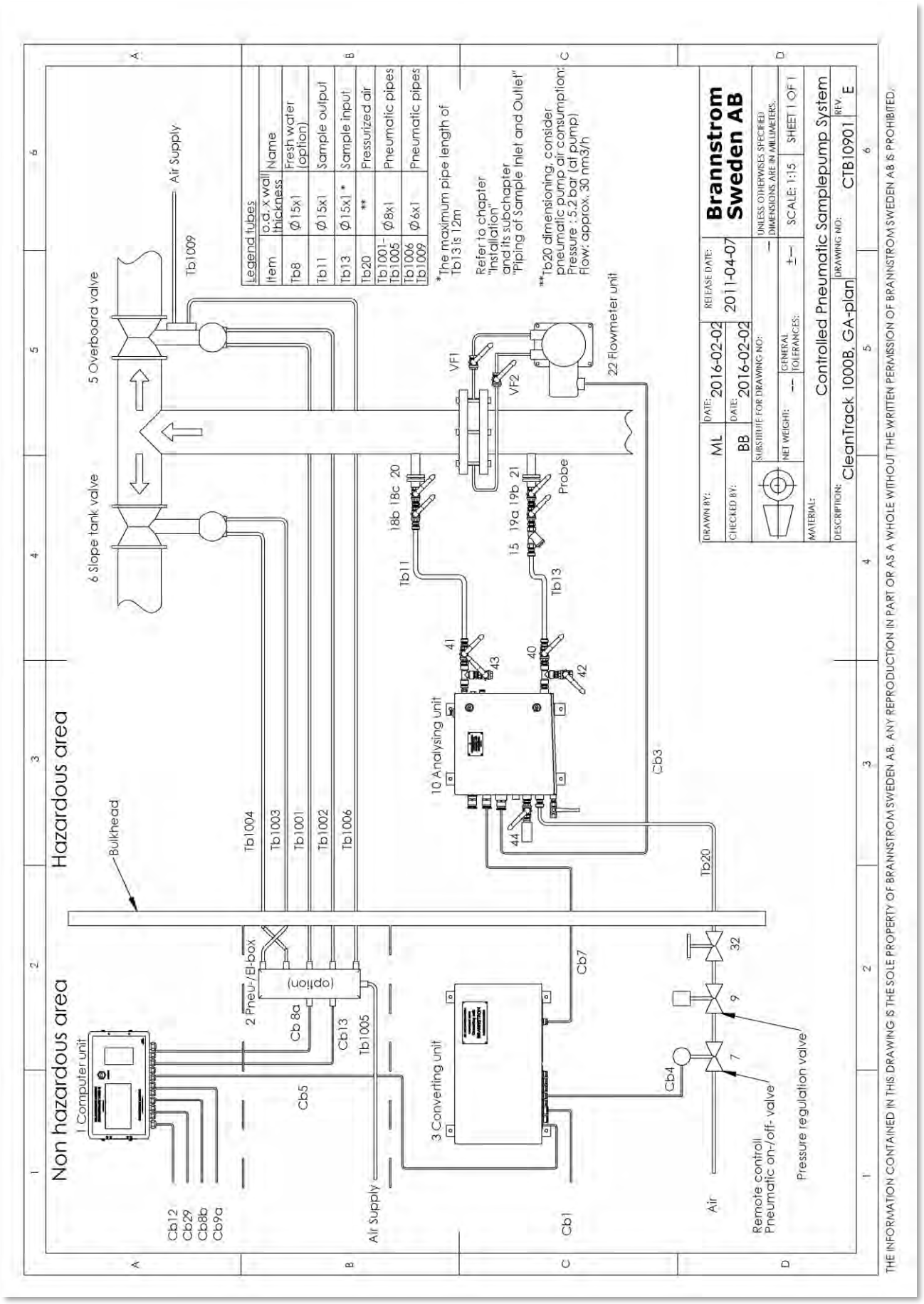


Drawing: CTB10916 sheet 1 of 1, GA-plan with bulkhead penetrating Sample pump and flushing.

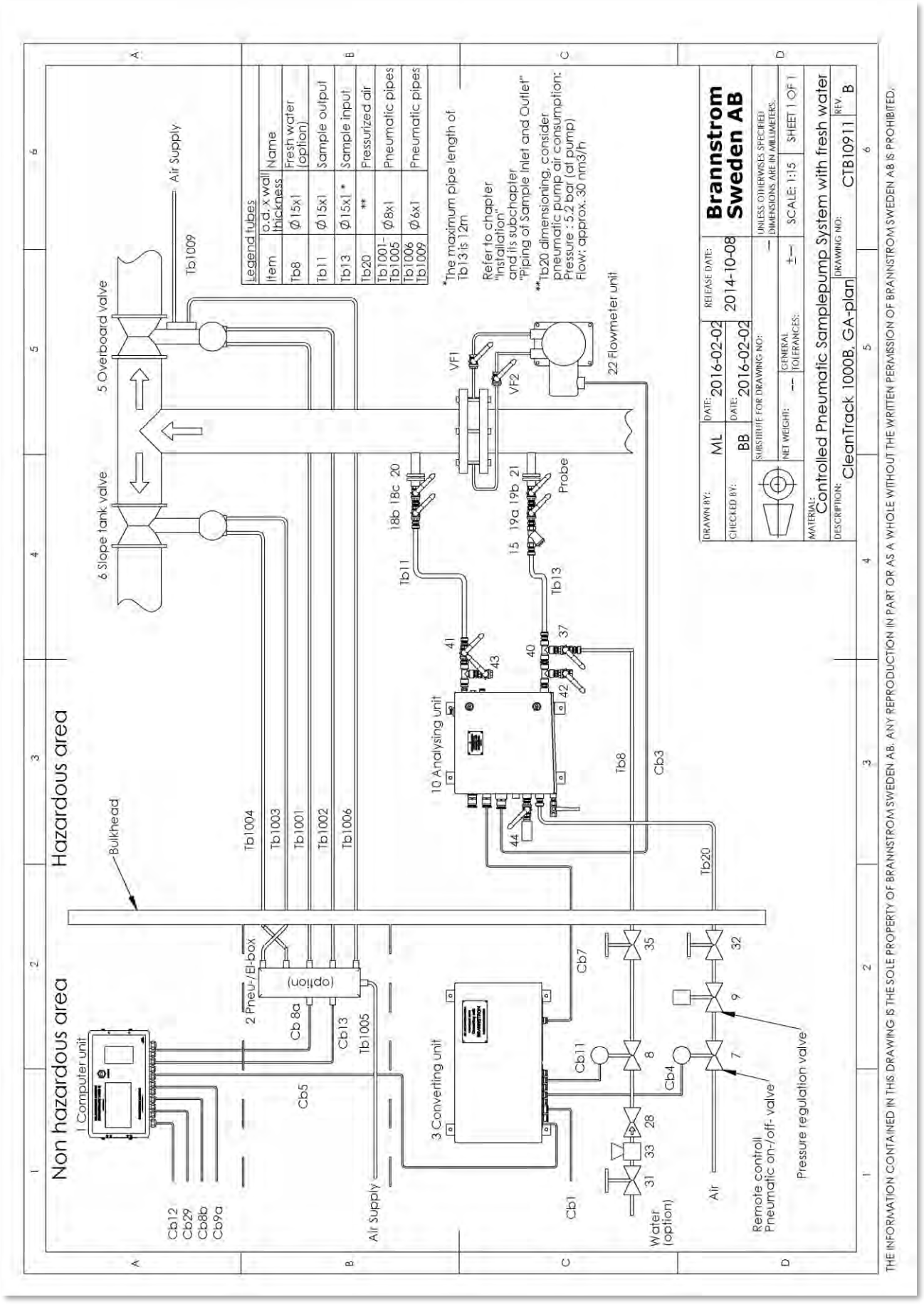


10.9.4. GA-plan with Air motor Sample pump

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

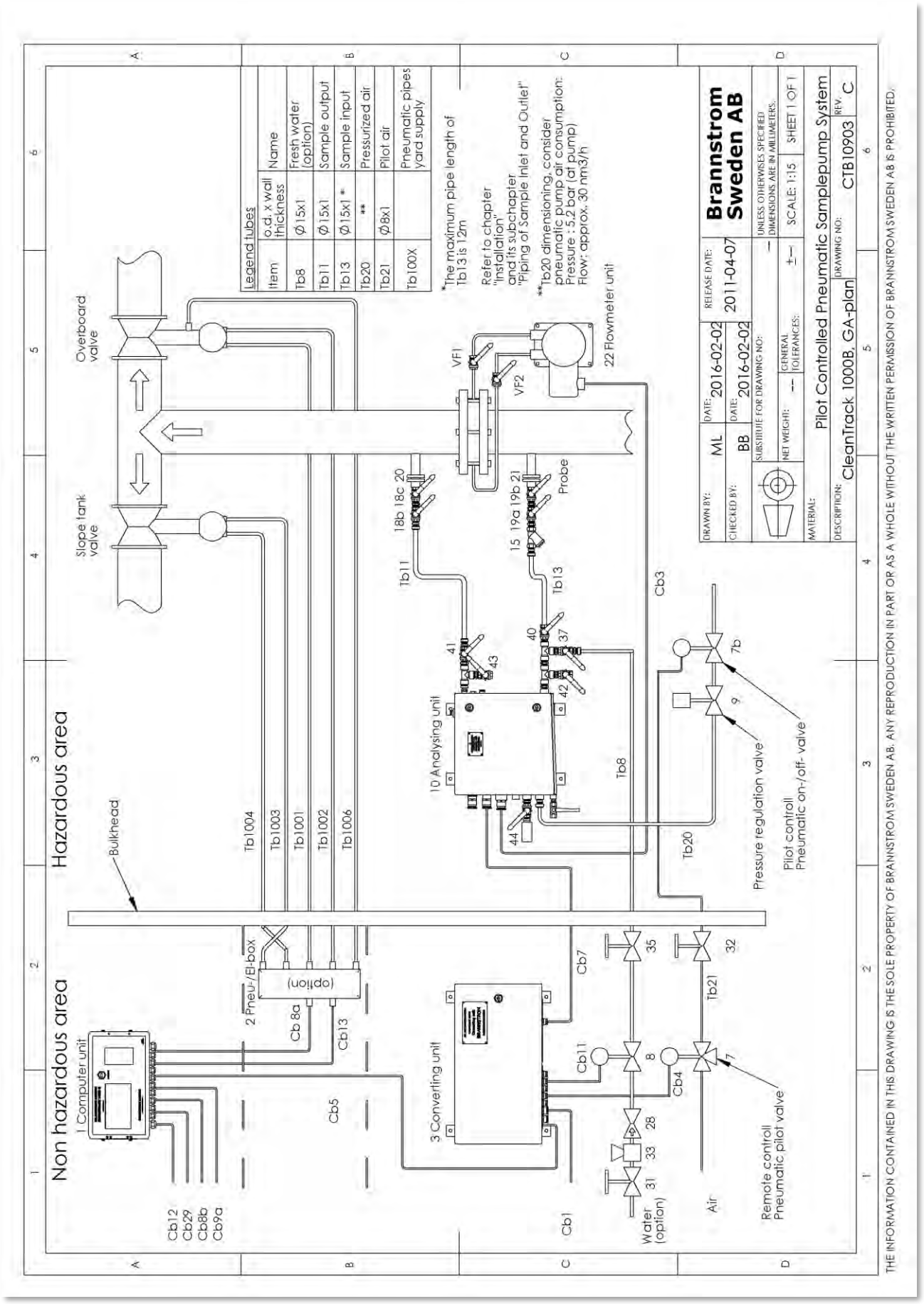


Drawing: CTB10911 sheet 1 of 1, GA-plan with air motor Sample pump and flushing.



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

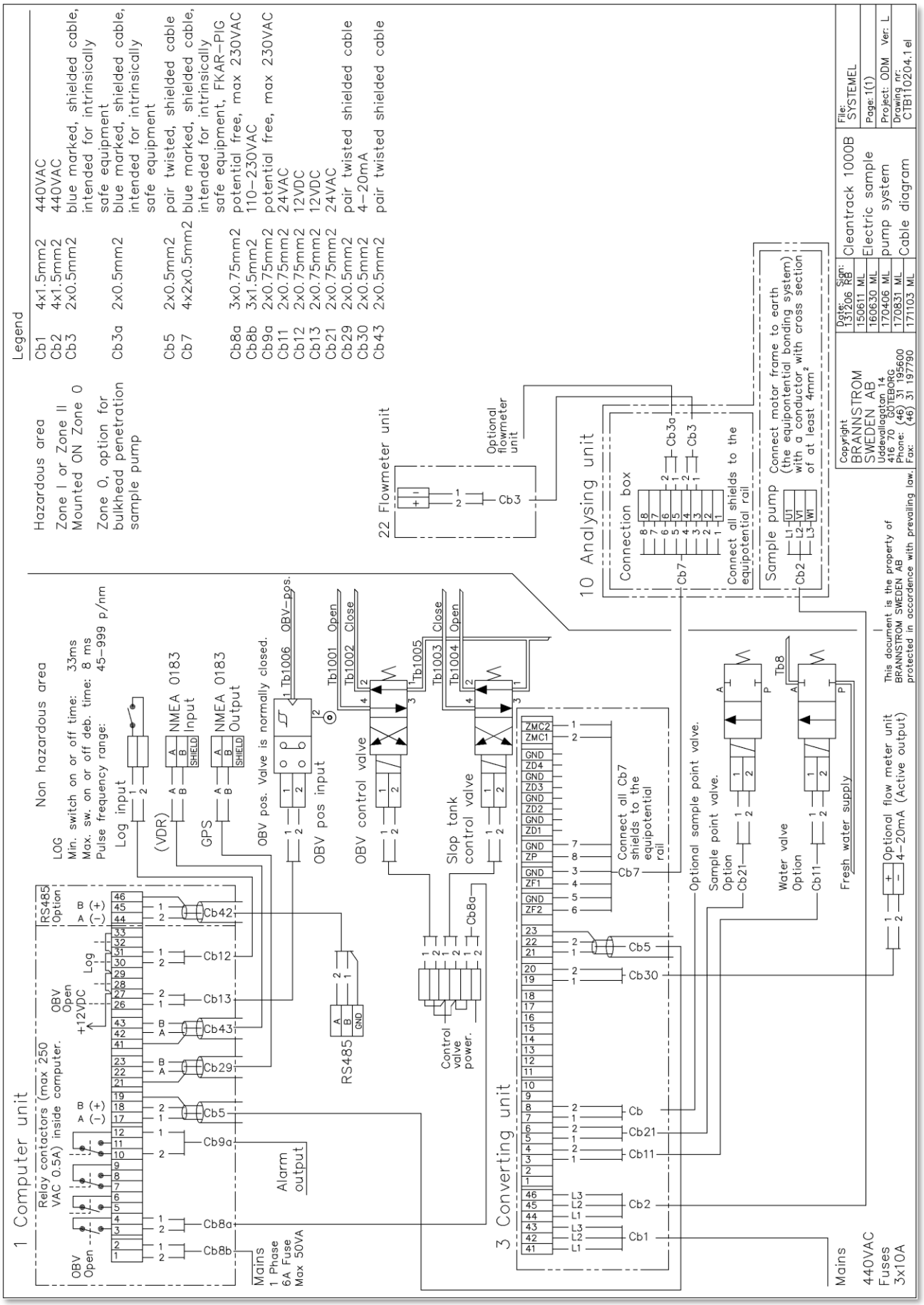
Drawing: CTB10903 sheet 1 of 1, GA-plan with pilot-controlled air motor sample pump.



10.10. Electrical

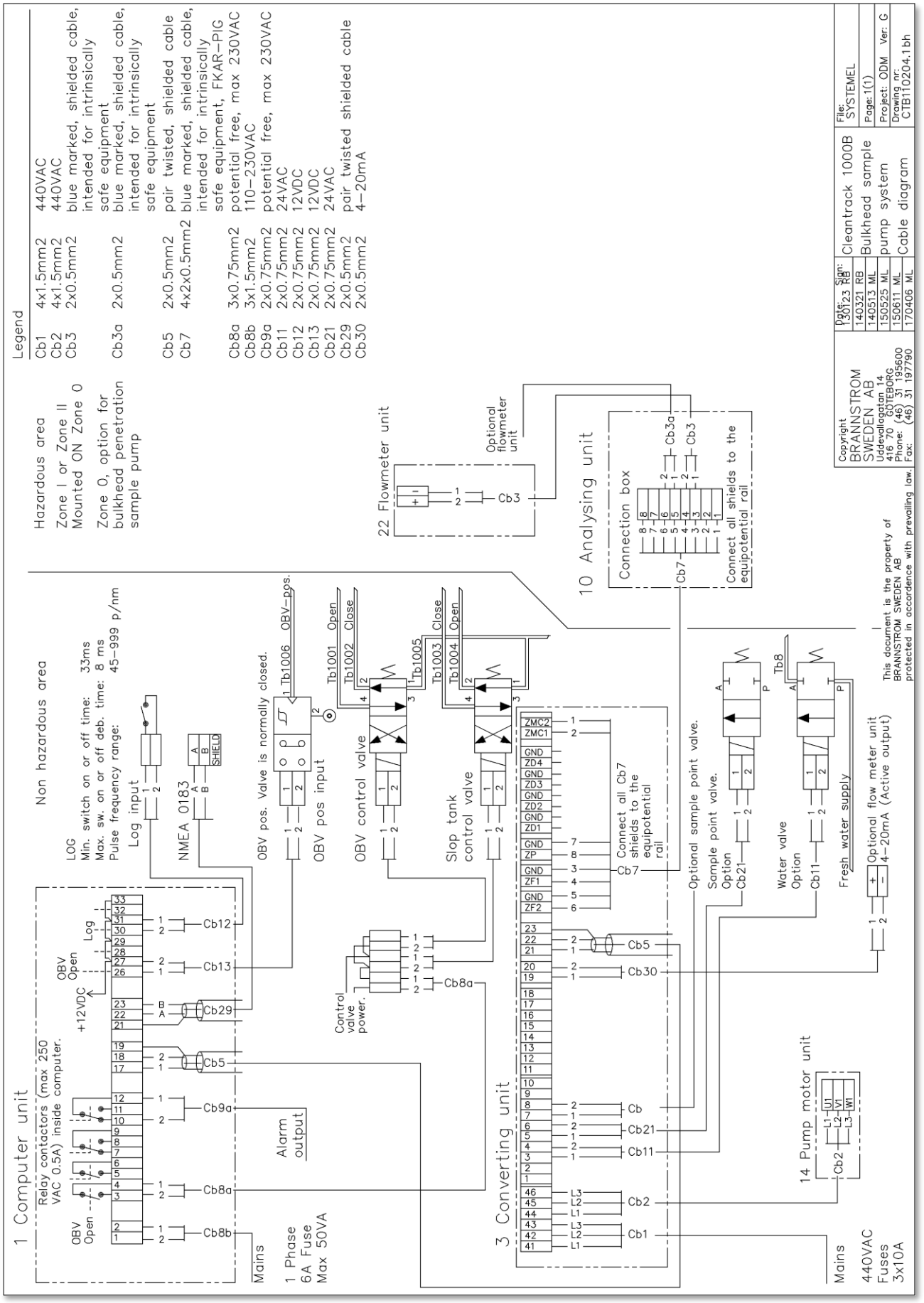
10.10.1. Electrical cable diagram for electrical Ex. motor sample pump

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



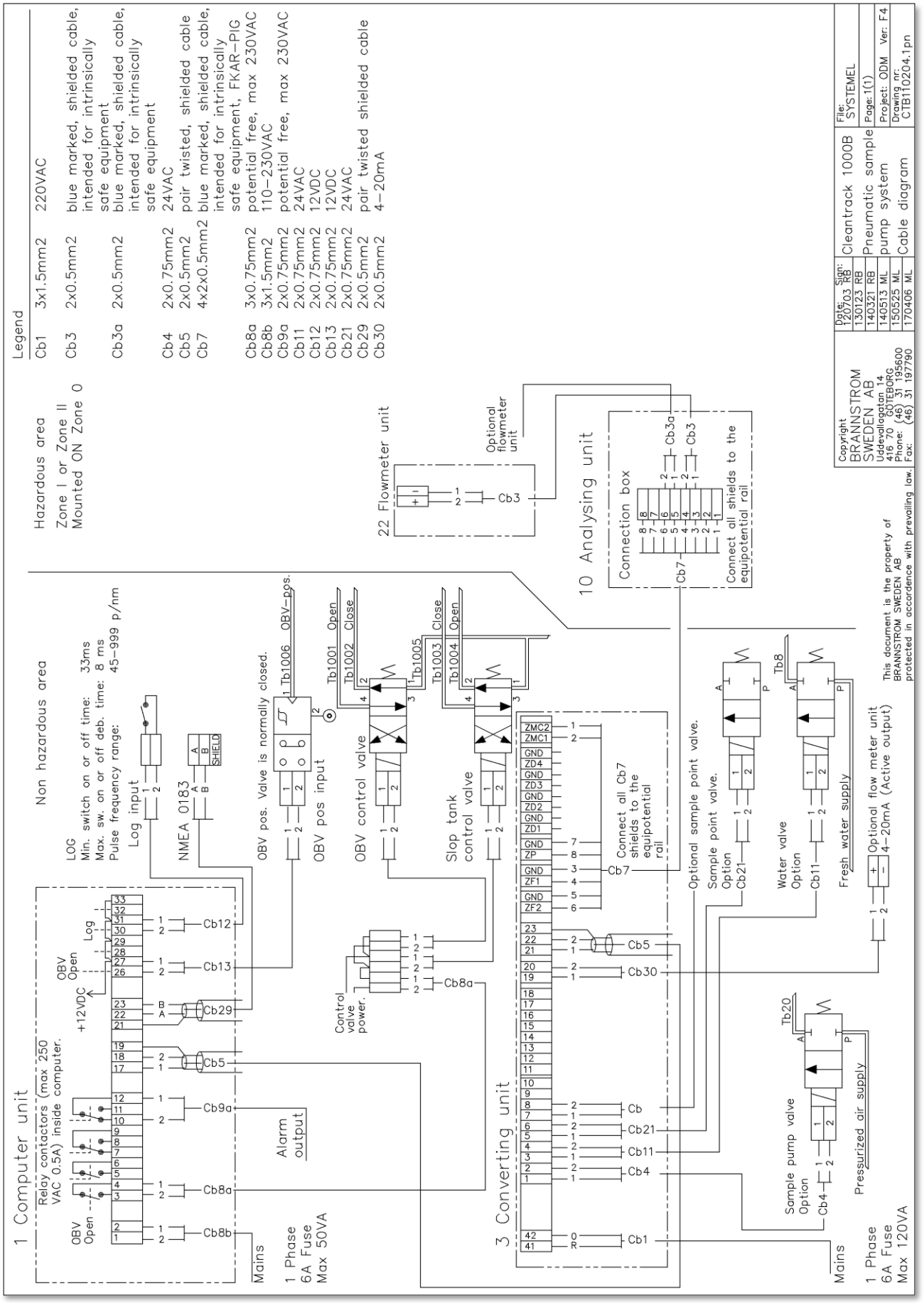
10.10.2. Electrical cable diagram for bulkhead mounted sample pump

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



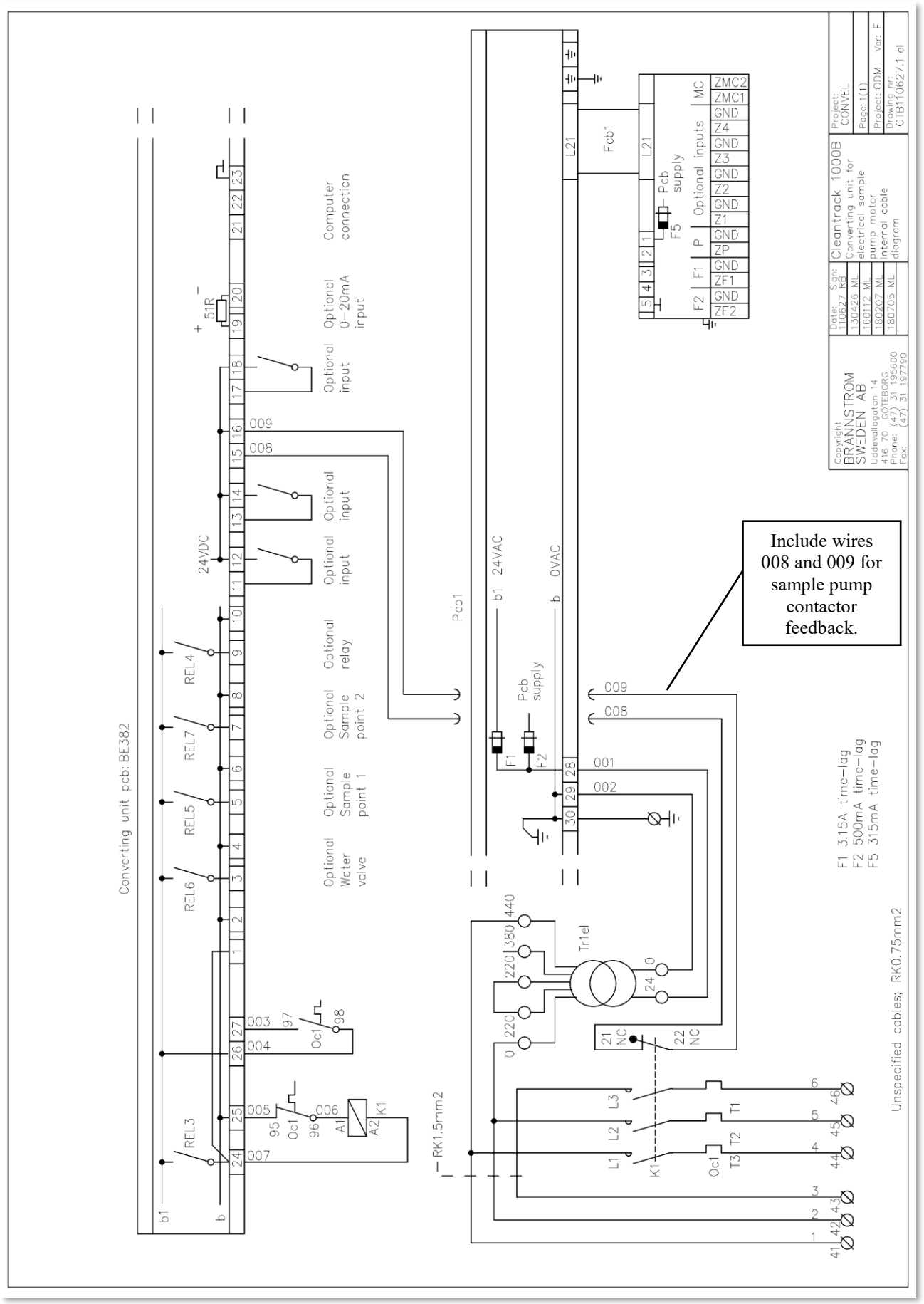
10.10.3. Electrical cable diagram for air motor sample pump

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



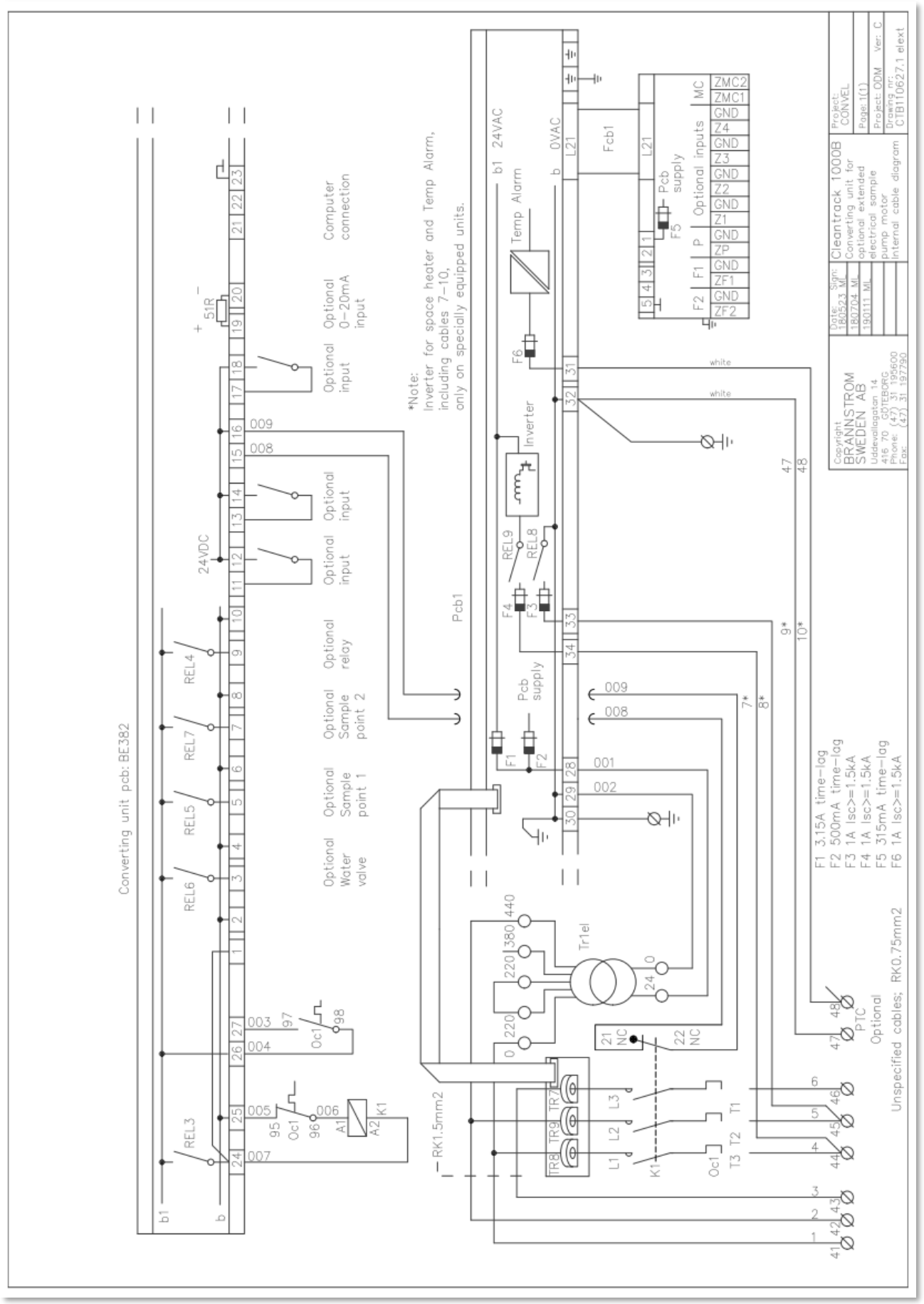
10.10.4. Internal cable diagram for electrical sample pump motor

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)

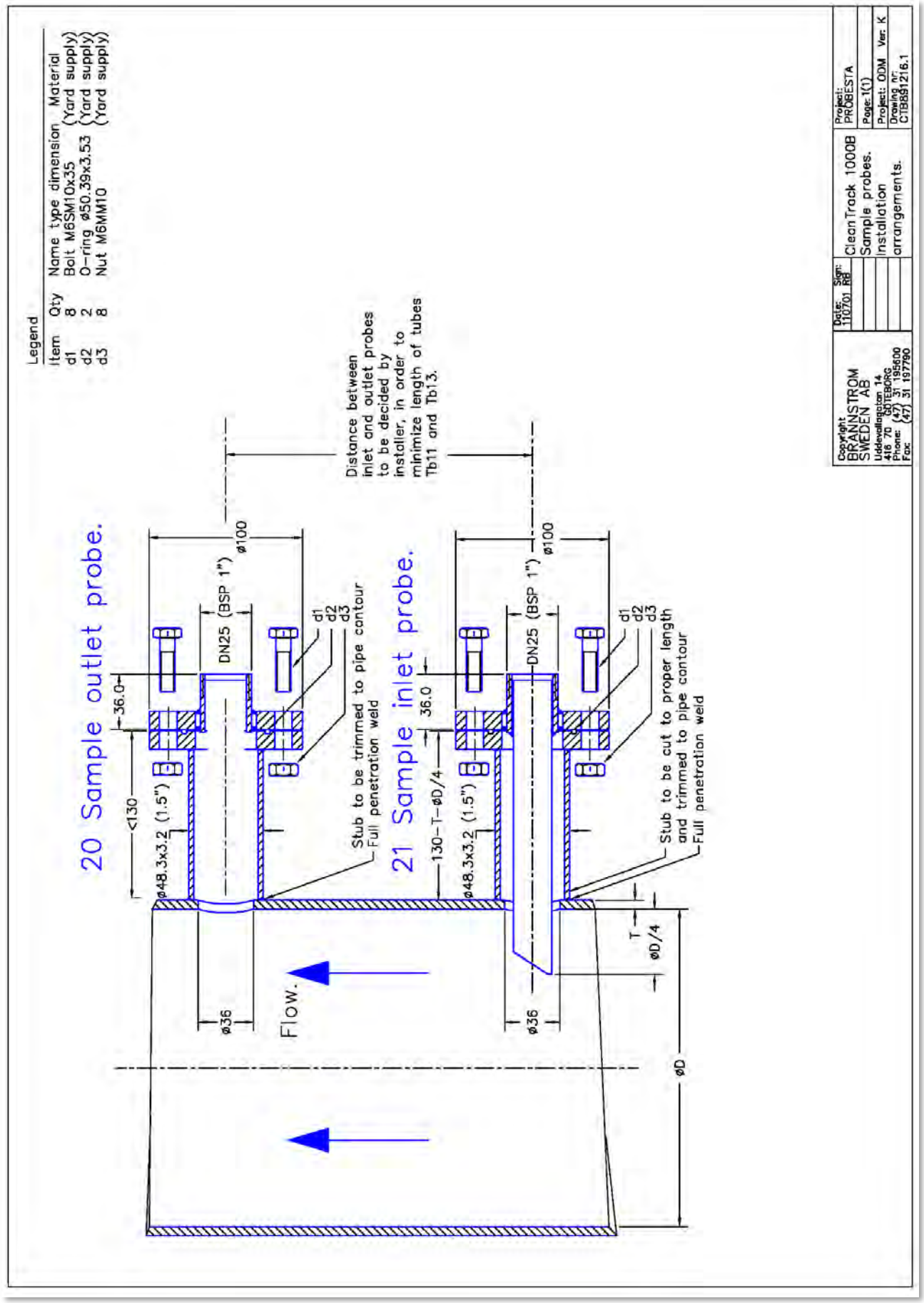
Drawing: CTB110627.1elext, internal cable diagram for optional extended SPP-100 sample pump motor



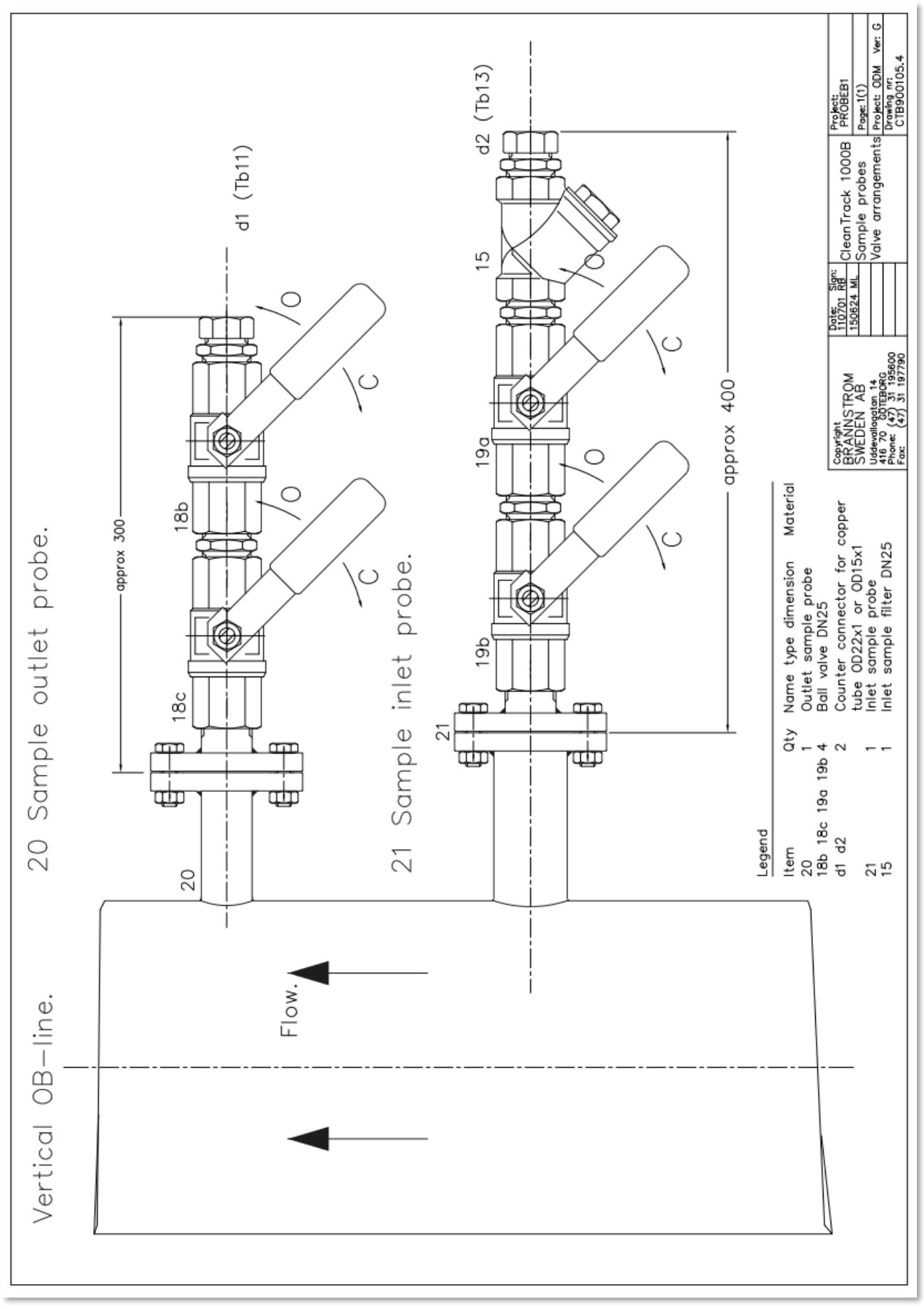
10.11. Sample probes

10.11.1. Sample probes installation arrangements 1”

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

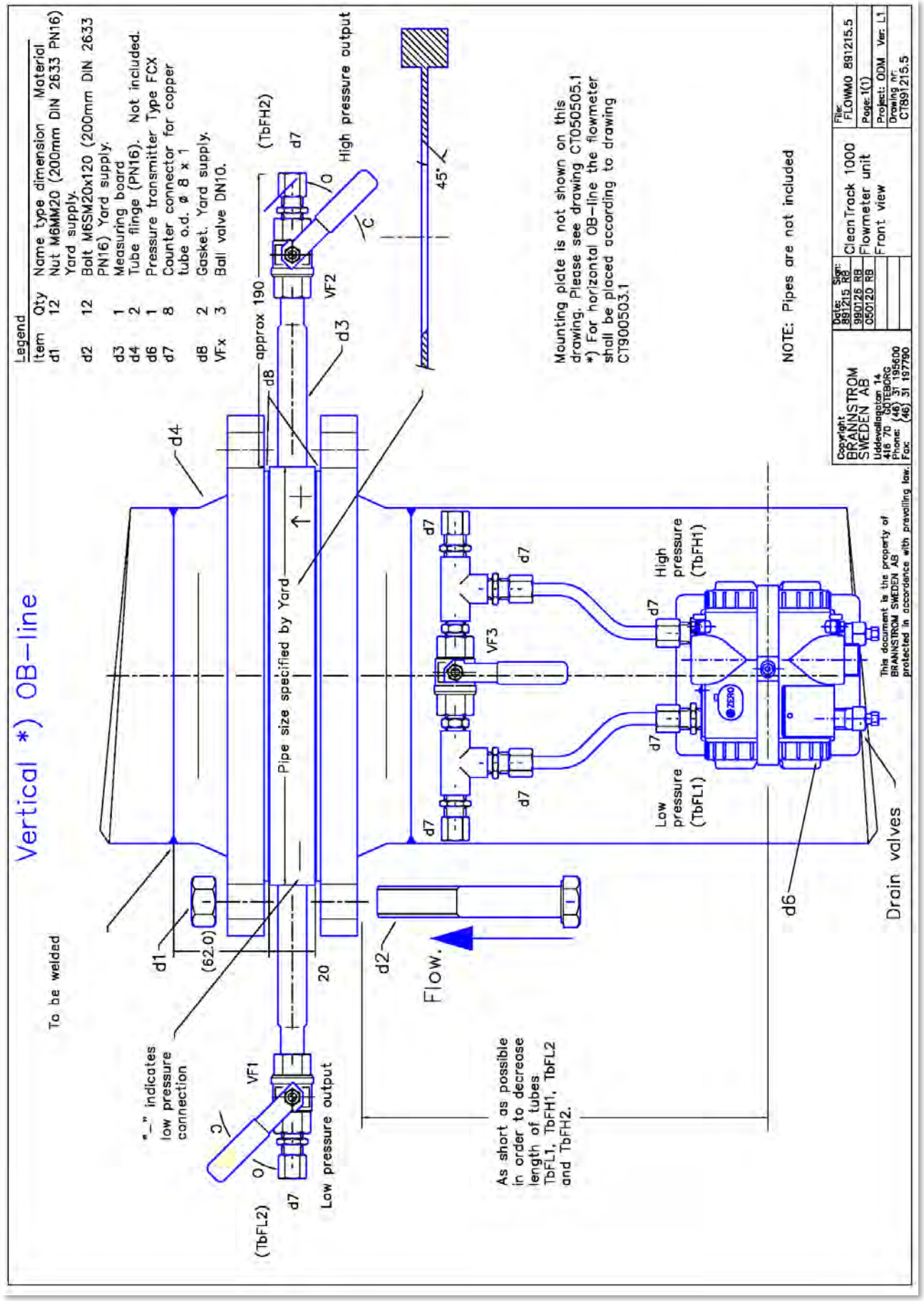


Drawing: CTB900105.4, Sample probes valve arrangements 1".

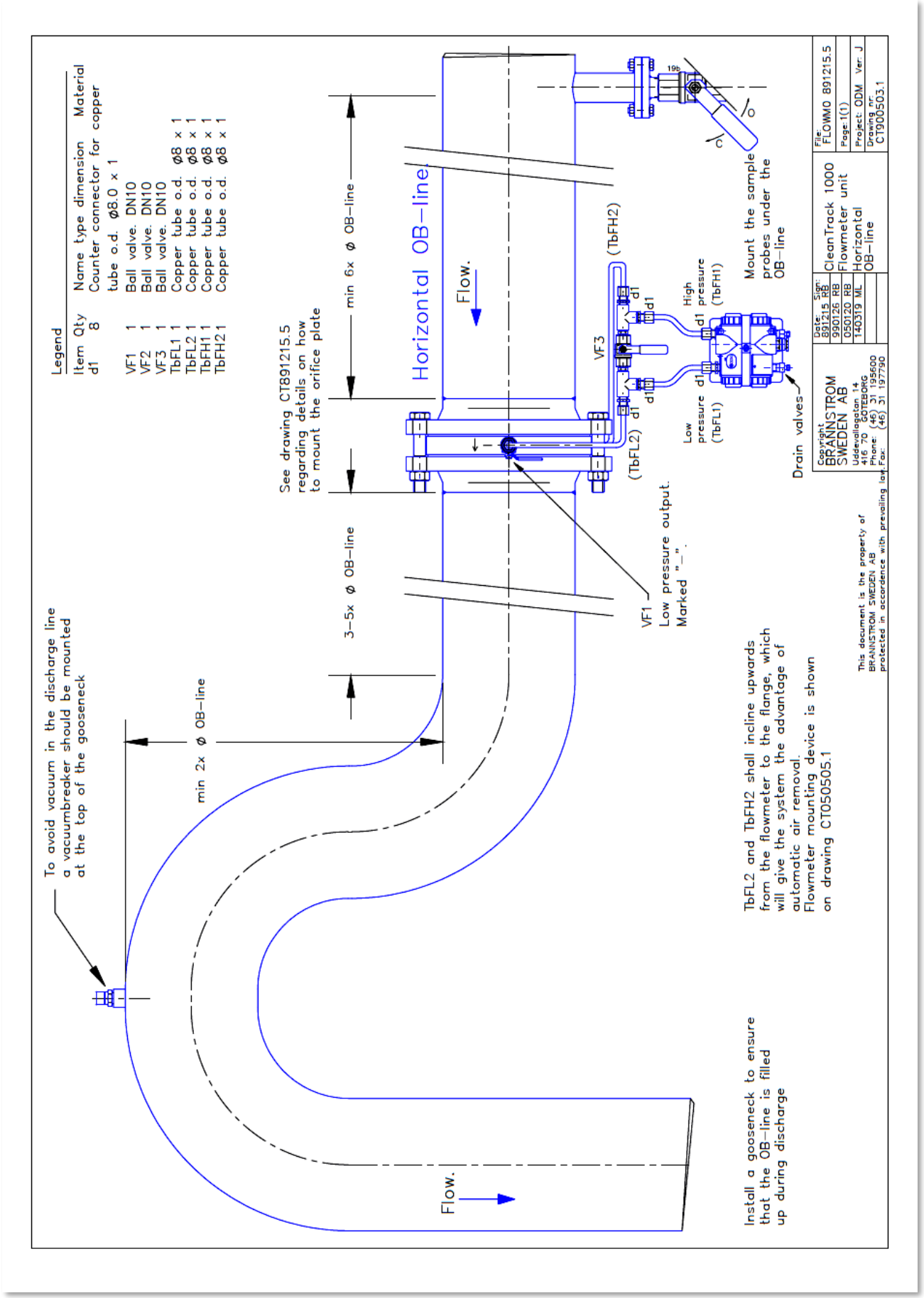


10.12. Flow meter

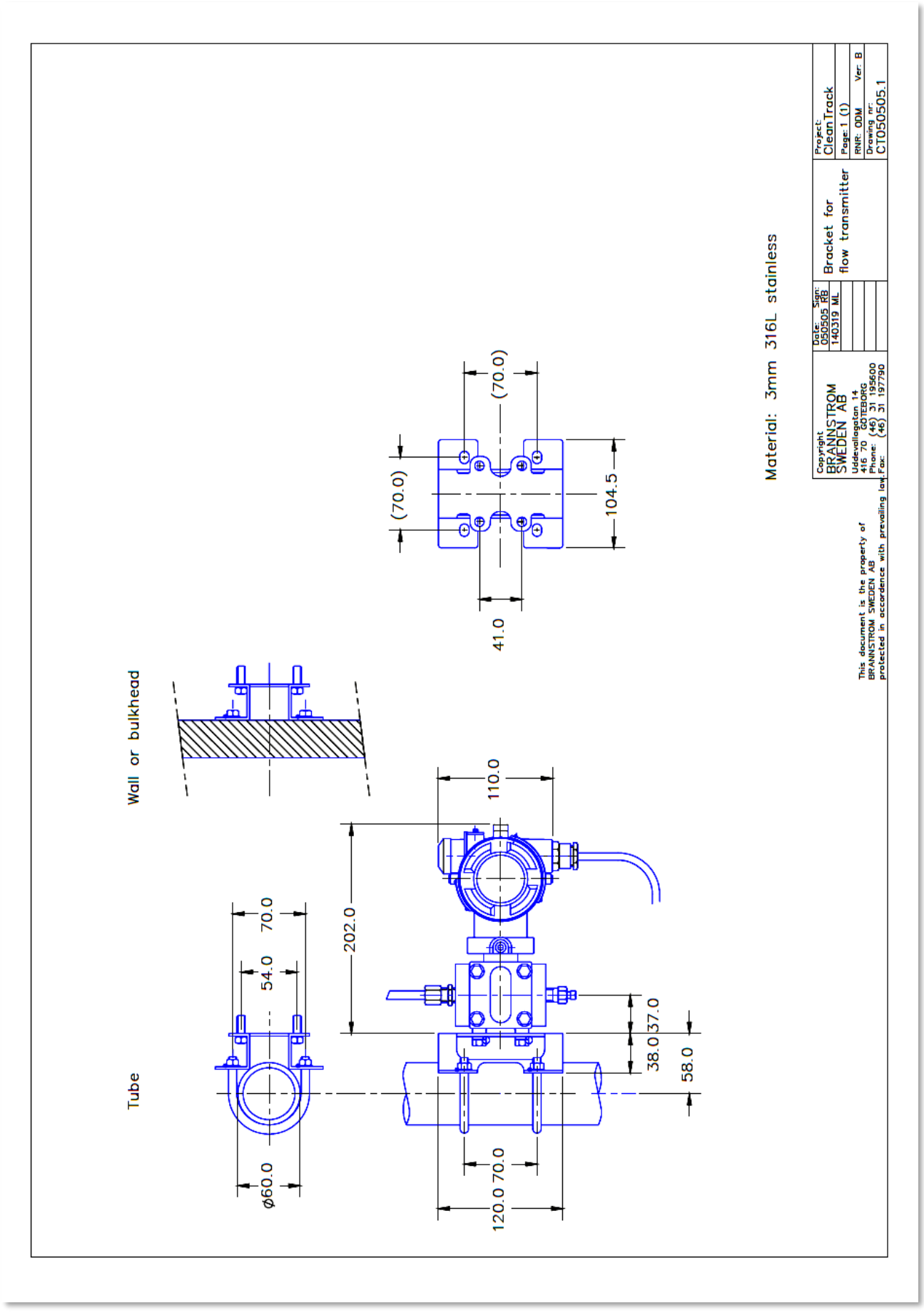
Drawing: CT891215.5, CleanTrack Flow meter unit, Vertical.



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

Qualitätssicherungs Zertifikat
Quality System Approval Certificate

Zertifikat-Nr. / *Certificate No.* **SEE 16057**

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

Hersteller (Antragsteller) *Manufacturer (Applicant)*	**BRANNSTROM SWEDEN AB**
Adresse *Address*	**Udevallagatan 14** **SE - 41670 Göteborg**
Gemäß der: *As per:*	**Richtlinie 2014/90/EU (Schiffsausrüstung)** ***Directive 2014/90/EU (Ship`s Equipment)***
in Übereinstimmung ist mit: *is in conformity with:*	**Modul D**

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

Folgende Produktionsstätten sind mit inbegriffen:
Following production sites are covered:

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

Ausstellungsdatum **Date of issue**	**06.10.2016**
Ablaufdatum **Expiry date**	**06.10.2019**

DGUV Test

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 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
YYYY Die vierstellige Ziffern des Jahres, in dem das Konformitätskennzeichen angebracht wurde.
XXXX Nummer der benannten Stelle, die die Qualitätssicherung beim Hersteller überwacht
Example for "Wheelmark" Format
YYYY The year in which the mark is affixed.
XXXX Number of the Notified Body responsible for quality surveillance module

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

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

Seite / *page*
1 von / *of* 1

BG Verkehr,
Dienststelle Schiffssicherheit,
Prüf- und Zertifizierungsstelle

BG Verkehr
Dienststelle Schiffssicherheit
Prüf- und Zertifizierungsstelle
im DGUV Test
European notified Body No. 0736

Annex to QS - certificate No.: 16057

Following products are covered by the quality ensurance system:

Approval-No.:	Not.-body	Trade - Name	Valid - date	Item - No.:
320.029	0736	BilgMon 488	29.02.2020	A.1/2.3
320.033	0736	GreenMon	30.04.2023	MED/2.3
322.009	0736	CleanTrack 1000B	29.02.2020	A.1/2.5

The manufacturer complies with the Council Directive 2014/90/EU on Marine Equipment and is allowed to affix the Mark of Conformity followed by the BG Verkehr Ship Safety Division identification number (0736) and the year of production.

Example: ⊙ 0736/yyyy (Year of production)

The manufacturer shall issue a Declaration of Conformity for each product with reference to the EC Type-Examination Certificate and this QS-Certificate.

Hamburg, 07.05.2018

(Kolberg)

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

11.2. Type Approval, DNV

DNV·GL

EC-TYPE EXAMINATION CERTIFICATE (MODULE B)

Certificate No:
MEDB000035X
Revision No:
1

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
GOTENBURG, Sweden

is found to comply with the requirements in the following Regulations/Standards:
Regulation **(EU) 2017/306,**
item No. MED/2.5. Marpol 73/78 as amended, Annex I Regulation 31, IMO Res. MEPC.108(49), IMO Res. 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 **2020-03-27**.
Issued at **Høvik** on **2018-06-18**

DNV GL local station:
Gothenburg

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.

Job Id: **344.1-002591-3**
Certificate No: **MEDB000035X**
Revision No: **1**

Product description

The CleanTrack 1000 B is intended for installation onboard oil tankers for ballast 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.

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

Type Examination documentation

Drw. No.	*Date/ Rev.*	*Title;*
CTB10001	160704/ E	Computer unit (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	130130/ B	Connection Box (2 shts.)
CTB10003	110506/ B1	Converting unit (3 shts.)
CTB110627.1el	160112/ C	Converting unit - Electric sample pump motor - Internal cable diagram
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	150929/ C	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 samplepump 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 samplepump system with fresh water
CTB10921	170919/ B	Controlled Pneumatic samplepump system with indicated fresh water valve
CTB10902	170619/ C	General arrangement - Manual pneumatic samplepump system
CTB10903	171919/ D	General arrangement - Pilot controlled pneumatic samplepump system
CTB110204.1el	170406/ J	Cable diagram - Electric sample pump system
CTB110204.1pn	170406/ F4	Cable diagram - Pneumatic sample pump system
CTB110204.1bh	170406/ G	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	150609/ B	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.

Job Id: **344.1-002591-3**
Certificate No: **MEDB000035X**
Revision No: **1**

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 FÜR TRANSPORT UND VERKEHRSWIRTSCHAFT
Issued under the authority of the Government of the FEDERAL REPUBLIC OF GERMANY by Berufsgenossenschaft für Transport und Verkehrswirtschaft

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), 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).

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
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
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
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.: 322009
Certificate-No.:

Eine Kopie dieses Zeugnisses soll jederzeit auf jedem Schiff mitgeführt werden, das mit dieser Anlage ausgerüstet ist.
A copy of this certificate should 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: **29.02.2020**
This certificate of type approval is valid until:

Ausgestellt in Hamburg am: **01.03.2015**
Issued at Hamburg on:

BERUFSGENOSSENSCHAFT FÜR TRANSPORT UND VERKEHRSWIRTSCHAFT - DIENSTSTELLE SCHIFFSSICHERHEIT -

Berufsgenossenschaft für Transport und Verkehrswirtschaft 29

(Siegel) *(Seal)*

Unterschrift *Signature*

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

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

Dienststelle Schiffssicherheit
BG Verkehr

- Dienststelle Schiffssicherheit -

BG Verkehr, Ottenser Hauptstraße 54, 22765 Hamburg

Brannstrom Sweden AB
Mr. B. Brännström
Uddevallagatan 14
41670 Göteborg
Schweden

Ihr Zeichen:
Ihre Nachricht vom: application from 28.08.2018
Unser Zeichen: 73-1-322.009

Ansprechpartner: Dipl.-Ing. B. Seifert
Telefon: 040 3980 - 2321
Fax: 040 36 137 - 204
E-Mail: Bernd.Seifert@BG-Verkehr.de

Datum: 10.09.2018

Ölgehaltsmessgeräte zur Überwachung des Einleitens von mit Öl verunreinigtem Wasser aus dem Ladetankbereich von Öltankschiffen
Oil Content Meters intended for monitoring the discharge of oil contaminated water from the cargo tank areas of oil tankers
- Typenprüfungszeugnisse
- Certificate of Type Test

Erweiterung des vorhandenen ODM Systems CleanTrack 1000 B zur Behandlung von Gemischen aus Erdöl und Biokraftstoffen nach IMO Resolution MEPC.240(65).
Upgrading of existing ODM system CleanTrack 1000 B to handle Bio-Fuel-Blends, according to the IMO resolution MEPC.240(65).

Anhang zum IMO-Typenprüfungszeugnis 322.009, ausgestellt am 01.03.2015
Annex to IMO Certificate of Type Approval 322.009, issued on 01.03.2015

Sehr geehrte Damen und Herren,
Dear Ladies and Gentlemen,

hiermit bestätigen wir,
hereby we confirm,

das bezugnehmend auf die oben angegebene IMO Richtlinie das ODM System CleanTrack 1000 B durch die Fa. Brannstrom Sweden AB umgerüstet werden kann.
with reference to the above stated IMO guidelines, the ODM system CleanTrack 1000 B may be upgraded by Brannstrom Sweden AB in Gothenburg, Sweden.

Diese Umrüstung erfolgt durch den Einbau eines Umrüstsatzes der Fa. Brannstrom Sweden AB und enthält Hardware und/oder Software die für das System entwickelt wurde.
This upgrading is done by the installation of an upgrading-kit from Brannstrom Sweden AB, consisting of hardware and/or software designed for the system.

Postanschrift: BG Verkehr, Dienststelle Schiffssicherheit, Ottenser Hauptstraße 54, 22765 Hamburg
Besucheranschrift: Brandstwiete 1, 20457 Hamburg
Telefon: +49 40 36 137 - 0
Telefax: +49 40 36 137 - 204
Internet: www.deutsche-flagge.de
Servicezeiten: Mo.-Do. 8:00 - 16:00 Uhr, Fr. 8:00 - 14:00 Uhr
Hamburger Sparkasse
BLZ: 200 505 50
Konto: 1280 343 748
IBAN: DE66 2005 0550 1280 343 748
BIC: HASPDEHHXXX

ODM Systeme die entsprechend umgerüstet wurden zeigen im Display folgenden Satz:
ODM system that has been updated in acc. to the above will show in the display:

"Bio-Fuel Blend Approved"

Dem Besichtiger ist es damit schnell möglich zu erkennen, ob das System umgerüstet ist oder nicht.
This will allow for any surveyor to quickly determine whether the system has been upgraded or not.

Weiterhin führt Brannstrom Sweden AB eine Datenbank über alle umgerüsteten ODM Systeme. Bei Fragen von Besichtigern/Behörden wenden Sie sich bitte an:
Furthermore, Brannstrom Sweden AB will keep a database of all ODM-systems that has been upgraded. (if there are any questions from a surveyor/authority please contact:

Brannstrom Sweden AB
Tel no: +46 – 31 19 56 00
Fax: +46 – 31 19 77 90
e-mail: info@brannstrom.se

Mit freundlichen Grüßen/*Best regards*
Schiffssicherheitsabteilung/*Ship Safety Division*
i.A./*by order*

(Seifert)

11.4. IMO Certificate, CCS

中 国 船 级 社
CHINA CLASSIFICATION SOCIETY

格式
Form CP279

编号
No. GB18T00008

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 _____ 提供,
Oil content meter supplied by Brannstrom Sweden AB
式样和型号名称 _____ 并合并:
under type and model designation ODMCS-System CleanTrack 1000B
以及:
and incorporating:
油份计分析设备由 _____ 制造,
Oil content meter analysing unit manufactured by Brannstrom Sweden AB
规格/装配图号 CTB00002 日期 2011-11-17
to specification/assembly drawing No. CTB00002 Date 17-Nov-11
油份计电子部分由 _____ 制造,
Electronic section of oil content meter manufactured by Brannstrom Sweden AB
规格/装配图号 CTB00001 日期 2011-11-17
to specification/assembly drawing No. CTB00001 Date 17-Nov-11
*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 Same to upper contents
规格/装配图号 CTB00003 日期 2017-11-17
to specification/assembly drawing No. CTB00003 Date 17-Nov-17
*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:

中国船级社 C2 04 CHINA CLASSIFICATION SOCIETY

CCS

June 22, 2018

No. 17414254

编号
No. GB18T00008

*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.

主管机关印章
Official stamp

签字
Signed Wen Yukui

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

日期
Dated 2018-06-22

*视情况可删去
*Delete as appropriate.

No. 17209663

11.5. Type Approval, CCS

中国船级社 证书格式号/Form: T01.02-FS000025

CHINA CLASSIFICATION SOCIETY

型式认可证书

CERTIFICATE OF TYPE APPROVAL

证书编号/Certificate No. GB18T00007

兹证明本证书所述制造厂生产的下列产品能够满足下面列明认可标准的要求。

This is to certify that the following products produced by the manufacturer stated in the certificate can meet the requirements of the approval standards listed below.

认可产品/ Product Approved

油船排油监控系统

OIL DISCHARGE MONITORING AND CONTROL SYSTEM

制造厂/ Manufacturer

Brannstrom Sweden AB

Uddevallagatan 14, 416 70 Gothenburg Sweden

附加标志/ Notations

无/Nil.

认可标准/ Approval Standard

1.国际海事组织(IMO) MEPC. 108(49)决议《修订的油船排油监控系统指南和技术条件》
IMO Res. MEPC. 108(49), REVISED GUIDELINES AND SPECIFICATIONS FOR OIL DISCHARGE MONITORING AND CONTROL SYSTEMS FOR OIL TANKERS
2.IMO 环保会 MEPC.1/Circ.761 通函：2011 石油和生物燃料混合物装运指南
IMO MEPC.1/Circ.761: 2011 GUIDELINES FOR THE CARRIAGE OF PETROLEUM OIL AND BIO-FUELS
3.IMO 环保会 MEPC.240（65）决议：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))

证书有效期至/ This Certificate is valid until 2022年6月21日 / Jun. 21, 2022

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 2018年6月22日 Jun. 22, 2018

本证书根据中国船级社《钢质海船入级规范》及有关程序规定签发。关于证书的有关规定见本证书页背面的说明。当本证书包括多页纸张时，则所有证书页为一个整体，必须同时使用。每一页证书均须由本社盖章方为有效。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。本认可证书不代表本社对个体产品质量的检验。有关各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 for Classification of Sea-going Steel Ships and related procedures of the Society. Refer to the back of the certificate for detailed requirements of the certificate. When the certificate consists of more than one page, all pages of the certificate are taken as a whole and are used simultaneously. No certificate page is valid without bearing the stamp of the Society 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. This approval certificate does not constitute the inspection of the Society about the quality of the unit/batch product. Related parties who are doubted about the authenticity of the certificate may inquire of the Society or its offices.

中国船级社总部/CCS headquarters：北京市东直门南大街9号船检大厦 邮编：100007 电话/Tel: +86(10)58112288 传真/Fax: +86(10)58112811
CCS Mansion, 9 Dongzhimen Nan Da Jie, Beijing 100007, China 网址/Web Site: http://www.ccs.org.cn
本地检验机构/CCS Local Office: 中国船级社哥德堡办事处 CCS Gothenburg Office 电话/Tel: +46(31)131165 传真/Fax: +46(31)7118881

GB06978696

No. 17414253

产品明细/ Product Description

油船排油监控系统/OIL DISCHARGE MONITORING AND CONTROL SYSTEM 型号/Model	: ODMCS-system, Clean Track 1000 B
油份计/Oil Content Meter	: Mainly including:Computer unit, Converting unit, Analysising unit,Sample feed pump unit. For optional components,refer to "others".
测量范围/Range of Measuring	: 0 - 1000 ppm
测量精度/Accuracy of Measuring	: Acc. to MEPC.108(49).
电源/Power Supply	: 110/220/380/440VAC, 50/60Hz

批准的图纸和设计计算书/ Approved Drawings and Design Calculations

图纸批准号/ Drawings Approval No. : GB13A00004

产品认可试验报告/ Approval Test Report

试验报告编号/Test Report No.	:	2005-3043
试验报告日期/Test Report Date	:	2005-02-11
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.	:	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.108(49)
试验报告日期/Test Report Date	:	2011-05-19
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.	:	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.	:	Test Reports acc. to IMO Res.MEPC.240(65)
试验报告日期/Test Report Date	:	2014-01-23
试验单位/ Laboratory	:	Brannstrom Sweden AB
试验单位地址/ Test Address	:	Uddevallagatan 14, 41670 Gothenburg,Sweden

产品适用范围/Application of the Product

For monitoring the discharge of oil-contaminated water from the cargo tank areas of oil tankers which carriage of Crude and Petroleum Products acc. to MEPC .108(49), and Bio Fuel Blends acc. to IMO MEPC. 1/Circ.761 and IMO Res.MEPC.240(65).

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.

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

按照规范逐件检验的产品/The product inspected one by one 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逐件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产品证书。
After approval, product inspection should be carried out one by one by the Surveyor of the Society in accordance with the approved product inspection scheme, and the Product Certificate will be issued by the Society upon satisfactory inspection.

对于原材料和零部件的检验要求/ Inspection Requirements for Materials and Components

产品如下原材料和零部件应由本社认可的制造厂生产/The following materials and components of the product should be manufactured by the factory approved by the Society:Nil.

产品如下原材料和零部件应经本社检验，持有本社产品证书/The following materials and components of the product should be inspected and certificated by the Society:Nil.

产品如下原材料和零部件的制造厂清单，经本社批准方可变更/The list of manufacturer for the following materials and components of the product should not be changed without the Society's approval:Nil.

责任声明/Statement of Responsibility

本社的认可不影响、替代与本社授权或检验无关的各方对上述工厂的认可和发证，并且不对与本社授权或检验无关的各方负责，不承担其未经应允而承认、接受本社认可所导致的法律和经济责任。
The approval of the Society does not affect and replace any approval and certification of the manufacturer by any parties that bear no relation with this Society's authorization or survey and therefore takes no responsibility for these parties. The Society does not undertake any legal and economic liabilities arising from accepting this Society's certificate without prior permission from this Society.

其他/Others

1. 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.

2. Certificate of Type Approval (No.GB18T00008)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.

Note:
本证书由原型式认可证书（No. GB14T00003）换新并替代原证书。
This certificate is renewed from and supersedes the previous Type Approval Certificate No. GB14T00003.

中国船级社哥德堡办事处
CCS Gothenburg Office

*****本证书正文完/ End of Text*****

11.6. Type Approval, NK

NIPPON KAIJI KYOKAI

Certificate

OF

TYPE APPROVAL

Certificate No.
TA17935E(R)

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 2017 until 16 August 2022.
Issued at Tokyo on 14 September 2017.

NIPPON KAIJI KYOKAI

H. Kobayashi
General Manager
Material and Equipment Department

Initial approval date : 17 August 2012

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

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 16057 valid until 06.10.2019

Product type: Oil Discharge Monitoring and Control System for Oil Tankers CleanTrack 1000B
Module B: EC Type-Examination Certificate No. MEDB000035X valid until 27 March 2020
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)

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 / 2019

A technical construction file for this equipment is retained at the following address:

Brannstrom Sweden AB
Uddevallagatan 14
416 70 Göteborg
SWEDEN

Signed:

Date: 2019-01-02

Name: Jerker Edgren

Position: QA-Manager

BRANNSTROM SWEDEN AB

Brannstrom Sweden AB
Uddevallagatan 14
416 70 Göteborg
Tfn: +46 31 19 56 00
Fax: +46 31 19 77 90
info@brannstrom.se • www.brannstrom.se

BRANNSTROM
SWEDEN

DECLARATION OF CONFORMITY

CTB120207.1 rev B

We as the manufacture herewith declares that the product with:

Product name:	Fluid analyzer
Product type:	Measuring Cell type CTB11
Product Description:	See EC Type Examination

is in conformity with the European directive 94/9/EC (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

EN60079-0:2012	Explosive atmospheres - Part 0: Equipment - General requirements
EN60079-11:2012	Explosive atmospheres – Part 11: Equipment protection by intrinsic safety "i"
EN60079-26:2007	Explosive atmospheres – Part 26: Equipment with equipment protection level (EPL) Ga

And therefore complies with all of 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	TRAC GLOBAL
Notified Body No.	0891
Role:	Issue of ATEX EC Type Examination certificate
Certificate No.	TRAC12ATEX0028X

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, 2015-10-29

Roland Brännström

Brannstrom Sweden AB
Uddevallagatan 14
416 70 Göteborg
Tfn: +46 31 19 56 00
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BRANNSTROM SWEDEN

DECLARATION OF CONFORMITY
ZB120207.1 rev B

We as the manufacture herewith declares that the product with:

Product name:	Zener Barrier
Product type:	Oil Monitor interface type Z11
Product Description:	See EC Type Examination

is in conformity with the European directive 94/9/EC (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:

EN60079-0:2012	Explosive atmospheres - Part 0: Equipment - General requirements
EN60079-11:2012	Explosive atmospheres – Part 11: Equipment protection by intrinsic safety "i"
EN60079-26:2007	Explosive atmospheres – Part 26: Equipment with equipment protection level (EPL) Ga

And therefore complies with all of 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	TRAC GLOBAL
Notified Body No.	0891
Role:	Issue of ATEX EC Type Examination certificate
Certificate No.	TRAC12ATEX0027X

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, 2015-10-29

Roland Brännström
CEO

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BRANNSTROM
SWEDEN

12.2. ATEX Certificate Zener Barrier PCB

TRaC
testing regulatory and compliance

1 **EC TYPE EXAMINATION CERTIFICATE**

2 Equipment or protective system intended for use in potentially explosive atmospheres – Directive 94/9/EC – Annex III

3 EC Type Examination Certificate No.: **TRAC12ATEX0027X**

4 Equipment: **Zener Barrier Oil Monitor Interface, Type Z11**

5 Manufacturer: **BRANNSTROM SWEDEN AB**

6 Address: **Uddevallagatan 14, SE-416, 70 Göteborg, Sweden**

7 This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8 TRaC Global Ltd, Notified Body number 0891 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment or protective system 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-009181-33-00A**.

9 Compliance with the Essential Health and Safety Requirements, with the exception of those listed in section 18 of the schedule to this certificate, has been assured by compliance with:

EN 60079-0:2009 **EN 60079-11:2012** **EN 60079-26:2007**

10 If the sign "X" is placed after the certificate number then this indicates that the equipment or protective system is subject to special conditions of safe use specified in the schedule to this certificate.

11 This EC-Type Examination certificate relates only to the design and construction of the specified equipment in accordance with Directive 94/9/EC. Further requirements of this Directive apply to the manufacture and supply of this equipment.

12 The marking of this equipment or protective system shall include the following:

Ex **II (1) G [Ex ia] IIC**

This certificate and its schedules may only be reproduced in its entirety and without change. This certificate is issued in accordance with the TRaC Ex Certification Scheme.

S.P. Winsor

S P Winsor, Certification Officer

Issue date: 2012-08-10

Copy No.: 1e

Page 1 of 5 Form RF355 is16

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Unit 1, Pendle Place, Skelmersdale, West Lancashire, WN8 9PN UK.
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www.tracglobal.com

13 **SCHEDULE TO EC TYPE EXAMINATION CERTIFICATE**

14 **TRAC12ATEX0027X**

15 **General description of equipment or protective system included within the scope of this certificate**

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.

A list of controlled Manufacturer's Documents is given in Appendix A to this schedule.

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

* - Refer to instructions for relevant parameters

16 **Test report No.:** **TRA-009181-33-00A**.

17 **"Special Conditions of Safe Use" for Ex Equipment, if any:**

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.

18 **Essential health and safety requirements**

Covered by application of the standards listed in section 9 of this certificate and the assessment conducted in the test report listed in section 16 of this certificate.

19 **Additional information**

"Routine tests", if any:

1. The transformer in this apparatus shall be subjected to a minimum of 600V 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.

"Special conditions for manufacture", if any:

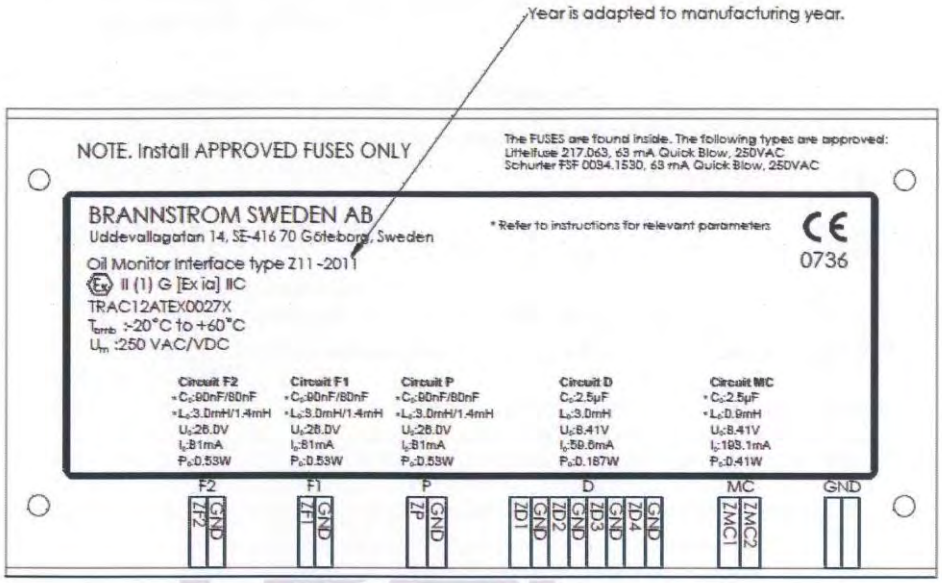
None.

Other information, if any:

None.

Photographs

Details of markings



Details of variations to this certificate

- None.

Notes to CE marking

In respect of CE Marking, TRaC Global Ltd accepts no responsibility for the compliance of the equipment against all applicable Directives in all applications.

Notes to this certificate

TRaC certification reference: **TRA-009181-32-00**.

Throughout this certificate, the date format yyyy-mm-dd (year-month-day) is used.

APPENDIX A - LIST OF CONTROLLED MANUFACTURER'S 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	B+	2012-06-15
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+	2012-07-03
Z11 Oil Monitor interface capacitor (4 Pages)	ZB11202CAP	A+	2012-06-26
PCB Stackup (1 Page)	P3712052	A	2012-05-28

12.3. ATEX Certificate Measuring Cell

TRaC
testing regulatory and compliance

1 **EC TYPE EXAMINATION CERTIFICATE**

2 Equipment or protective system intended for use in potentially explosive atmospheres – Directive 94/9/EC – Annex III

3 EC Type Examination Certificate No.: **TRAC12ATEX0028X**

4 Equipment: **Fluid Analyser / Measuring Cell, Type CTB11**

5 Manufacturer: **BRANNSTROM SWEDEN AB**

6 Address: **Uddevallagatan 14, SE-416, 70 Göteborg, Sweden**

7 This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8 TRaC Global Ltd, Notified Body number 0891 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment or protective system 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, with the exception of those listed in section 18 of the schedule to this certificate, has been assured by compliance with:

EN 60079-0:2009 **EN 60079-11:2012** **EN 60079-26:2007**

10 If the sign "X" is placed after the certificate number then this indicates that the equipment or protective system is subject to special conditions of safe use specified in the schedule to this certificate.

11 This EC-Type Examination certificate relates only to the design and construction of the specified equipment in accordance with Directive 94/9/EC. Further requirements of this Directive apply to the manufacture and supply of this equipment.

12 The marking of this equipment or protective system shall include the following:

Ex **II 1 G Ex ia IIC T4 Ga**

This certificate and its schedules may only be reproduced in its entirety and without change. This certificate is issued in accordance with the TRaC Ex Certification Scheme.

S.P. Winsor

S P Winsor, Certification Officer

Issue date: 2012-08-10

Copy No.: 1e

Page 1 of 4 Form RF355 is16

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www.tracglobal.com

13 **SCHEDULE TO EC TYPE EXAMINATION CERTIFICATE**

14 **TRAC12ATEX0028X**

15 **General description of equipment or protective system included within the scope of this certificate**

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.

A list of controlled Manufacturer's Documents is given in Appendix A to this schedule.

Parameter	Channel 1
Li	0.165mH
Ci	2µF
Ui	8.41V
Pi	0.41W
Ii	193.1mA

16 **Test report No.:** **TRA-009185-33-00A**.

17 **"Special Conditions of Safe Use" for Ex Equipment, if any:**

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.

18 **Essential health and safety requirements**

Covered by application of the standards listed in section 9 of this certificate and the assessment conducted in the test report listed in section 16 of this certificate.

19 **Additional information**

"Routine tests", if any:

1. The transformer in this apparatus shall be subjected to a minimum of 600V 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.

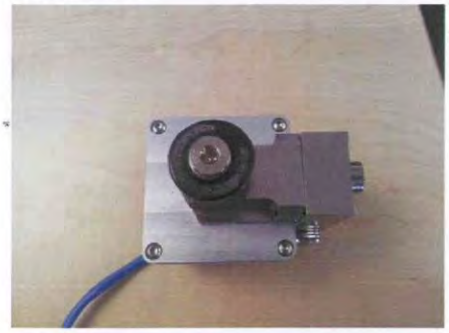
"Special conditions for manufacture", if any:

None.

Other information, if any:

None.

Photographs



CTB11 top view

CTB11 side view

Details of markings

Measuring cell CTB11-2011 CE
BRANNSTROM SWEDEN AB
Uddevallagatan 14, SE-41670 Göteborg, Sweden 0736
Ex II 1 G Ex ia IIC T4 Ga T_{amb} -40°C - +60°C
TRAC12ATEX0028X
Li 0.165mH Ci 2uF Ui 8.41V
Pi 0.41W Ii 193.1mA

Details of variations to this certificate

- None.

Notes to CE marking

In respect of CE Marking, TRaC Global Ltd accepts no responsibility for the compliance of the equipment against all applicable Directives in all applications.

Notes to this certificate

TRaC certification reference: **TRA-009185-32-00**.

Throughout this certificate, the date format yyyy-mm-dd (year-month-day) is used.

APPENDIX A - LIST OF CONTROLLED MANUFACTURER'S 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+	2010-06-05
MC etk Ex (Marking label) (1 Page)	P3711050	B+	2012-06-15
CTB11, Cleanmon Tr2 Transformer (1 Page)	+CTB111103.1	A+	2011-03-11
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

12.4. Pressure transmitter, Danfoss

Features

- Ex II 1G EEx ia IIC T4 - T6 in compliance with ATEX 100a
- Applicable in potentially explosive atmosphere: Zone 0, Zone 1, Zone 2 (gases and vapour)
- Enslosure and wetted parts of acid-resistant stainless steel (AISI 316L)
- Pressure ranges in relative (gauge) or absolute from 0 up to 600 bar
- Output signal: 4 - 20 mA
- A wide range of pressure connections
- Temperature compensated and laser calibrated
- MBS 4251 and MBS 4751 with integrated pulse snubber for protection against cavitation and liquid hammering
- MBS 4701 and MBS 4751 zero and span adjustment

Description

The intrinsically safe pressure transmitter program is designed for use in hazardous environments and offers a reliable pressure measurement, even in harsh applications with severe medium influences like cavitation, liquid hammer or pressure peaks.
The flexible pressure transmitter program is EEx ia IIC T6 explosion protected according to ATEX 100a and covers a 4-20 mA output signal, absolute and gauge (relative) versions, measuring ranges from 0-1 to 0-600 bar, zero point and span adjustment, plug connection and a wide range of pressure connections.
Excellent vibration stability, robust construction, and a high degree of EMC/EMI protection equip the pressure transmitter to meet the most stringent industrial requirements.

Ordering standard versions MBS 4701

Plug: Pg 9 (EN 175301-803-A)
Output: 4-20 mA
Pressure connection: G ½ A (EN 837)

Measuring range Pe [1] [bar]	Type no.	Code no.
0-1	MBS 4701-1011-1AB08	**060G4303**
0-1.6	MBS 4701-1211-1AB08	**060G4300**
0-2.5	MBS 4701-1411-1AB08	**060G4304**
0-4	MBS 4701-1611-1AB08	**060G4305**
0-6	MBS 4701-1811-1AB08	**060G4306**
0-10	MBS 4701-2011-1AB08	**060G4307**
0-16	MBS 4701-2211-1AB08	**060G4301**
0-25	MBS 4701-2411-1AB08	**060G4308**
0-40	MBS 4701-2611-1AB08	**060G4309**
0-60	MBS 4701-2811-1AB08	**060G4302**
0-100	MBS 4701-3011-1AB08	**060G4310**

MBS 4751 with pulse snubber

0-160 bar	MBS 4751-3211-1AB08	**060G4311**
0-250 bar	MBS 4751-3411-1AB08	**060G4312**
0-400 bar	MBS 4751-3611-1AB08	**060G4313**
0-600 bar	MBS 4751-3811-1AB08	**060G4314**

1) Relative/ gauge

Technical data

Performance (EN 60770)

MBS type		Standard version		With zero point and span adjustment	
		MBS 4201	MBS 4251	MBS 4701	MBS 4751
		-	with pulse snubber	-	with pulse snubber
Accuracy (incl. non-linearity, hysteresis and repeatability)		±1% FS	±1% FS	±0.5% FS	±0.5% FS
Non-linearity BFSL (conformity)		≤ ±0.2% FS			
Hysteresis and repeatability		≤ ±0.1% FS			
Thermal error band (compensated temperature range)		≤ ±1% FS			
Response time	Liquids with viscosity < 100 cSt	< 4 ms	< 4 ms	< 4 ms	< 4 ms
	Air and gases	< 4 ms	< 35 ms	< 4 ms	< 35 ms
Overload pressure (static)		6 × FS (max. 1500 bar)			
Burst pressure		> 6 × FS (max. 2000 bar)			
Durability, P: 10-90% FS		>10×10⁶ cycles			
Zero point adjustment	0-1 to 0-10 bar mearsuring range	-	-	-5 to +20 % FS	
	0-16 to 0-40 bar measuring range	-	-	-5 to +10% FS	
	0-60 to 0-600 bar measuring range	-	-	-2.5 to +5% FS	
Span adjustment	0-1 to 0-600 bar measuring range	-	-	-5 to +5% FS	

Electrical specifications

Nom. output signal (short curcuit protected)	4 to 20 mA
Supply voltage, UB (polarity protected)	10 to 28 V dc
Supply voltage dependency	≤ ±0.05% FS/10 V
Current limitation (linear output signal up to 1.5 × rated range)	30-35 mA
Load [R_L] (load connected to 0 V)	$R_L \leq \frac{U_B - 10\,V}{0.02\,A}\,[\Omega]$

Environmental conditions

Media temperature range				See page 5
Ambient temperature range				See page 5
Compensated temperature range				0 to + 100°C
Transport temperature range		Plug version/cable version		–50 to +100°C/-30 to +80°C
EMC - Emission				EN 61000-6-3
EMC Immunity	Electrostatic discharge	Air mode	8kV	EN 61000-6-2
		Contact mode	4 kV	EN 61000-6-2
	RF	Field	10 V/m, 26 MHz - 1 GHz	EN 61000-6-2
		Conducted	10 V_{rms}, 150 kHz - 30 MHz	EN 61000-6-2 1)
	Transient	Burst	4 kV (CM), Clamp	EN 61000-6-2
		Surge	1 kV (CM, DM) Rg = 42 Ω	EN 61000-6-2
Insulation resistance				> 100 MΩ at 100 V
Vibration stability	Sinusoidal	20 g, 25 Hz - 2 kHz		IEC 60068-2-6
	Random	7.5 g_{rms}, 5 Hz - 1 kHz		IEC 60068-2-64
Shock resistance	Shock	500 g/1ms		IEC 60068 - 2 - 27
	Free fall			IEC 60068 - 2 - 32
Enclosure (depending on electrical connection)				See page 5

1) In the frequency range of 150 kHz - 3 MHz the error is > 1 % FS

Mechanical characteristics

Materials	Wetted parts	EN 10088-1; 1.4404 (AISI 316 L)
	Enclosure	EN 10088-1; 1.4404 (AISI 316 L)
Weight (depending on pressure connection)		0.2 - 0.3 kg

Ordering special versions

MBS 4201 -
MBS 4251 -
MBS 4701 -
MBS 4751 - 1 - [Measuring range] [Pressure reference] [Pressure connection] [Electrical connection] [Output signal]

Measuring range

0 - 1 bar	1 0
0 - 1.6 bar	1 2
0 - 2.5 bar	1 4
0 - 4 bar	1 6
0 - 6 bar	1 8
0 - 10 bar	2 0
0 - 16 bar	2 2
0 - 25 bar	2 4
0 - 40 bar	2 6
0 - 60 bar	2 8
0 - 100 bar	3 0
0 - 160 bar	3 2
0 - 250 bar	3 4
0 - 400 bar	3 6
0 - 600 bar	3 8

Pressure reference

Gauge (relative)	1
Absolute	2

Pressure connection

A B 0 8	G ½ A (EN 837)
A C 0 4	¼ -18 NPT
A C 0 8	½ -14 NPT
G B 0 4	DIN 3852-E-G ¼ Gasket: DIN 3869-14 NBR
F A 0 8	ISO 6149-2, M14 x 1.5-6g, O-ring NBR

Electrical connection

Figures refer to plug and standard PIN configuration - see page 5

1	Plug Pg 9 (EN175301-803-A)
3	Screened cable, 2 m[1)]
7	ISO 15170-A1-3.2-Sn, male [1)] (Bayonet plug)

[1)] MBS 4201 and MBS 4251 only

Output signal

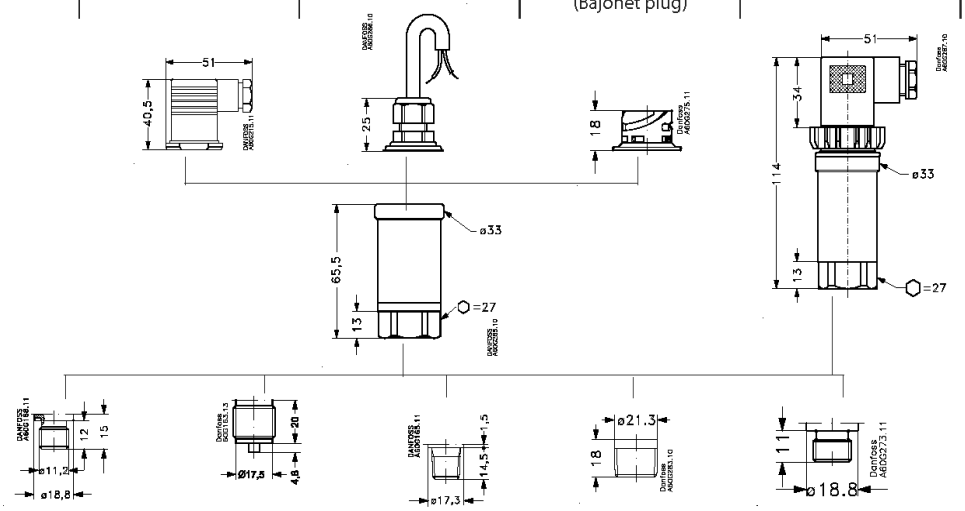
1	4 - 20 mA

Preferred versions

Non-standard build-up combinations may be selected. However, minimum order quantities may apply. Please contact your local Danfoss office for further information, or request on other versions.

Dimensions / Combinations

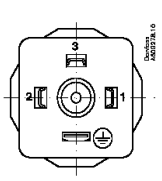
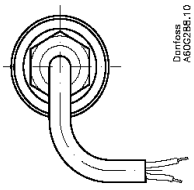
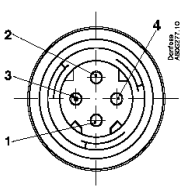
	Non adjustable versions MBS 4201, MBS 4251			Adjustable versions MBS 4701, MBS 4751
Type code	1	3	7	1
	EN175301-803-A, Pg 9	2 m cable	ISO 15170-A1-3.2-Sn (Bajonet plug)	EN175301-803-A, Pg 9



	DIN 3852-E-G ¼ Gasket DIN 3869-14-NBR	G½A (EN 837)	¼ - 18 NPT	½ - 14 NPT	ISO 6149-2 M14 x 1.5 - 6g Incl. O-ring NBR
	GB04	AB08	AC04	AC08	FA08
Recommended torque 1)	30-35 Nm	30-35 Nm	2-3 turns after finger tightened	2-3 turns after finger tightened	30-35 Nm

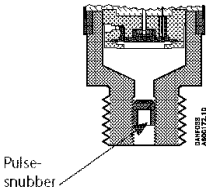
1)Depends of different parameters as packing material, mating material, thread lubrication and pressure level.

Electrical connections

Type code page 4						
	1		3		7	
	EN 175301-803-A 		Cable versions 		ISO 15170-A1-3-2-Sn (bayonet plug) 	
Ambient temperature	-40 to + 85°C		-30 to + 85°C		-40 to + 85°C	
Material	Glass filled Polyamid, PA 6.6		PVC cable		Glass filled Polyester, PBT	
Endosure 1)	IP 65		IP67		IP67/IP69K	
Ex-certification - Conformity specifications						
Ambient temperature						
Eex ia IIC T4	−40 to 100°C		−30 to 80°C		−40 to 100°C	
Eex ia IIC T5	−40 to 75°C		−30 to 75°C		−40 to 75°C	
Eex ia IIC T6	−40 to 50°C		−30 to 50°C		−40 to 50°C	
Medium temperature						
Eex ia IIC T4	−40 to 125°C		−40 to 125°C		−40 to 125°C	
Eex ia IIC T5	−40 to 95°C		−40 to 95°C		−40 to 95°C	
Eex ia IIC T6	−40 to 50°C		−40 to 50°C		−40 to 50°C	
Power supply Ui	28 V dc		28 V dc		28 V dc	
Short circuit rating Ii	100 mA		100 mA		100 mA	
Power limitation Pi	0.7 W		0.7 W		0.7 W	
Internal capacity Ci	≤ 40 nF		≤ 40 nF + 0.2 nF/m cable		≤ 40 nF	
Internal inductivity Li	≤ 0.1 mH		≤ 0.1 mH + 0.8 µH/m cable		≤ 0.1 mH	
Electrical connection, 4-20 mA output (2 wire)						
Standard configuration	Pin 1:	+ Supply	Black 1:	+ Supply	Pin 1:	+ Supply
	Pin 2:	− Supply	Black 2:	− Supply	Pin 2:	− Supply
	Pin 3:	Not used	Screen:	Not connected	Pin 3:	Ventilation
	Earth:	Connected to MBS enclosure		to MBS enclosure	Pin 4:	Not used

1) (IP protection fulfilled together with mating connector)

MBS 4251 and MBS 4751 Application and media conditions



Application

Cavitation, liquid hammer and pressure peaks may occour in hydraulic systems with changes in flow velocity, e.g. fast closing of a valve or pump starts and stops.
The problem may occour on inlet and outlet side, even at rather low operating pressures.

Media condition

Clogging of the nozzle may occour in liquids containing particles. Mounting the transmitter in an upright position minimizes the risk of clogging, because the flow in the nozzle is restricted to the start-up period when the dead volume behind the nozzle orifice is relatively big (0.3 mm). The media viscosity has only little effect on the response time. Even at a viscosities up to 100 cSt, the response time will not exceed 4 ms.

[1] # PRODUCTION QUALITY ASSURANCE NOTIFICATION

[2] **Equipment or Protective System intended for use in Potentially Explosive Atmospheres Directive 94/9/EC**

[3] Notification Number: **12 ATEX Q1209493 Rev. 0**

[4] Equipment or Protective System or Components as listed:

Pressure transmitters manufactured in DK (Nordborg) & Poland with the following protection principles:
Intrinsic safety "ia/ib"

Electrically operated coils manufactured in DK (Kolding) & China with the following protection principles:
Intrinsic safety "ia/ib" (China)
Encapsulation "ma/mb" (China & Kolding)

Self-regulating heating cables and accessories manufactured in DK (Vejle) with the following protection principles:
Increased safety "e"
Dust "tD"

[5] Applicant: **Danfoss A/S, Nordborgvej 81, DK-6430 Nordborg, Denmark**

[6] Manufacturer: **Danfoss A/S, Nordborgvej 81, DK-6430 Nordborg, Denmark**
Danfoss Kolding, Albuen 29, DK-6000 Kolding, Denmark
Danfoss A/S, Heating Solutions Division, Ulvehavevej 61, DK-7100 Vejle, Denmark
Danfoss Sp z.o.o., UL. Chrzanowska 5, 05-825 Grodzisk Mazowiecki, Poland
Danfoss Ltd., No.5 Fuyuan Road, Wuqing Development Area, 301700 Tianjin, China
Danfoss Ltd., No.9 Quanhui Road, Wuqing Development Area, 301700 Tianjin, China

[7] UL International Demko A/S notified body number 0539 for Annex **IV** in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, notifies to the applicant that the actual manufacturer has a production quality system which complies to Annex **IV** of the Directive.

[8] This notification is based on audit report No. **12CA09493, Dated 2012-05-30**

This notification can be withdrawn if the manufacturer no longer satisfies the requirements of Annex IV. The Manufacturer is obliged to inform UL International Demko A/S of any changes in their ISO 9001:2008 registration or other aspects upon which this notification has been given.

Results of periodic re-assessment of the quality system are a part of this notification.

[9] This notification is valid until: **2015-03-30**

and can be withdrawn if the manufacturer does not satisfy the production quality assurance re-assessment.

[10] According to Article 10[1] of the Directive 94/9/EC the CE marking shall be followed by the identification number 0539 identifying the notified body involved in the production control stage.

Certification Manager
Jan-Erik Storgaard

Notified Body

This notification may only be reproduced in its entirety and without any change

Date of issue: 2012-05-31

UL International Demko A/S, Borupvang 5A, 2750 Ballerup, Denmark
Tel. +45 44 85 65 65, info.dk@ul.com
www.ul-europe.com

Danfoss A/S
DK-6430 Nordborg
Danmark
CVR nr.: 20 16 57 15

Telefon: +45 7488 2222
Fax: +45 7449 0949

EC-DECLARATION OF CONFORMITY

Danfoss A/S

Industrial Automation

declares under our sole responsibility that the product(s)

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.

Pressure Transmitter types
MBS 42x1 and MBS 47x1 series

CE 0539 Ex II 1G
Ex ia IIC T4-T6 Ga

EC-Type Examination :	**DEMKO 01 ATEX 127938X**
Technical file :	060R3143
UL-DEMKO Notified Body no.:	0539
Directive :	94/9/EC Equipment and protective systems intended for use in potentially explosive atmospheres
Standards :	EN50014:1997 incl. A1,A2, EN50020: 2002, EN50284 :1999 --- Evaluated by Danfoss in accordance to : EN 60079-0 : 2011 Equipment- general requirements EN 60079-11 : 2011 Equipment – protection by intrinsic safety "i"

Date	Issued by	Date	Approved by
2012-05-10	Børge Frost Iwersen, Project Manager	2012-05-10	John Hansen, Product Manager

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. 01 Page 1 of 1

12.5. Pressure transmitter, Siemens

12.5.1. Declaration of Conformity

SIEMENS

EU Declaration of Conformity
EU-Konformitätserklärung
EU-Déclaration de Conformité

CE

No. A5E38498463A/001

Manufacturer: *Hersteller:* *Fabricant:*	Siemens AG Process Industries and Drives Process Automation
Address: *Anschrift:* *Adresse:*	DE-76181 Karlsruhe
Product description: *Produktbezeichnung:* *Identificateur:*	**Pressure transmitter / Druckmeßumformer** **SITRANS P200; SITRANS P210; SITRANS P220** Type / Typ 7MF 156a-bcdef-ghjk a b c d e f g h j k see table Annex A / siehe Tabelle Anhang A

The product described above in the form as delivered is in conformity with the provisions of the following European Directives:
Das bezeichnete Produkt stimmt in der von uns in Verkehr gebrachten Ausführung mit den Vorschriften folgender Europäischer Richtlinien überein:
Le produit mentionné ci-dessus, tel qu'il est livré, est conforme aux dispositions des Directives Européennes suivantes :

2014/30/EU EMC	Directive of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to electromagnetic compatibility *Richtlinie des Europäischen Parlaments und des Rates zur Harmonisierung der Rechtsvorschriften der Mitgliedstaaten über die elektromagnetische Verträglichkeit* *Directive du parlement Européen et du conseil relative à l'harmonisation des législations des États membres concernant la compatibilité électromagnétique*
2014/34/EU ATEX	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 *Richtlinie des Europäischen Parlaments und des Rates zur Harmonisierung der Rechtsvorschriften der Mitgliedstaaten für Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen* *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*
2011/65/EU RoHS	Directive of the European Parliament and the Council on the restriction of the use of certain hazardous substances in electrical and electronic equipment. *Richtlinie des Europäischen Parlaments und des Rates zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräte.* *Directive du parlement Européen et du relative à la limitation de l'utilisation de certaines substances dangereuses dans les équipements électriques et électroniques*

Karlsruhe, 06.06.2016
Siemens Aktiengesellschaft

Dr. Holger von Both,
Research & Development / Entwicklung
(Name, function / Funktion)

i.V. Dr v. Both
signature / *Unterschrift*

Jürgen Pflaum,
Quality / Qualität
(Name, function / Funktion)

i.V.
signature / *Unterschrift*

Annex A is integral part of this declaration.
Anhang A ist integraler Bestandteil dieser Erklärung.
L'annexe A fait partie intégrante de la présente déclaration

This declaration certifies the conformity to the specified directives but contains no assurance of properties.
The safety documentation accompanying the product shall be considered in detail.
Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, ist jedoch keine Beschaffenheits- oder Haltbarkeitsgarantie nach §443 BGB.
Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.
La présente déclaration atteste la conformité aux Directives citées. Elle n'est pas assimilable à un descriptif justifiant certaines propriétés.
La documentation relative à la sécurité accompagnant le produit doit être examiné en détail.

SIEMENS

Annex A to the EU Declaration of Conformity
Anhang A zur EU-Konformitätserklärung
Annexe A de la Déclaration de conformité

No. A5E38498463A/001

Product description: **Pressure transmitter / Druckmeßumformer**
Produktbezeichnung **SITRANS P200; SITRANS P210; SITRANS P220**
Identificateur: Type / Typ 7MF 156a-bcdef-ghjk
a b c d e f g h j k see table Annex A / siehe Tabelle Anhang A

Conformity to the Directives indicated on page 1 is assured through the application of the following standards (depending on versions):
Die Konformität mit den auf Blatt 1 angeführten Richtlinien wird nachgewiesen durch die Einhaltung folgender Normen (variantenabhängig):
La conformité aux Directives indiquées sur la page 1 est garantie par l'application des normes suivantes (selon les versions):

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 9	A,B,C	A,B,C,D E,F,G	00, 01 10, 30	1,2,3,4 5,6,9	A,B,C,D E,F,G,H J,P,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									
2011/65/EU	EN 50581	2012									
2014/34/EU	EN 60079-0	2012/A11:2013					01	1,2,5,6 9			
2014/34/EU	EN 60079-11	2012									
2014/34/EU	EN 60079-26	2007									
Note 1: The manufacturer declares that this product complies with the requirements of the new editions of the standards. The changes of the new editions have been checked and do not affect this product.											

* all environments included / *beinhaltet alle Umgebungen / dans tout type d'environnement*

Certificates:
Zertifikate:
Certificat:

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	A,B,C,D E,F,G	01	1,2,5,6 9	A,B,C,D E,F,G,H J,P,Z	A,B,C,D Z	1,3

Inspection / Surveillance:
Kontrolle / Überwachung:
Controle / Supervision:

Directive *Richtlinie* *Directive*		Notified Body Product Quality Assurance *Benannte Stelle Qualitätssicherung Produktion* *Organisme notifie*	No.:
2014/34/EU	ATEX	Sira Certification Service, CSA Group Testing UK Ltd – Unit 6, Hawarden Industrial Park, Hawarden, Deeside, CH5 3US, United Kingdom	0518

12.5.2. ATEX Certificate

electrosuisse

EC-Type Examination Certificate

(1)

(2) Equipment or protective system intended for use in potentially explosive atmospheres **- Directive 94/9/EC**

(3) Examination Certificate Number

SEV 10 ATEX 0146

(4) Equipment: Pressure transmitter SITRANS P200, Typ 7MF1565-*
Pressure transmitter SITRANS P210, Typ 7MF1566-*
Pressure transmitter SITRANS P220, Typ 7MF1567-*

(5) Manufacturer: Siemens AG

(6) Address: Östliche Rheinbrückenstr.50, D-76187 Karlsruhe

(7) The equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(8) Electrosuisse SEV as notified body No. 1258 in accordance with article 9 of the Council Directive of the European Communities of 23 March 1994 (94/9/EC), certifies that this equipment has been found to comply with the essential health and safety requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The results of the examination are recorded in confidential report No. 10-IK-0307.02

(9) Compliance with the essential health and safety requirements has been assured by compliance with:

EN 1127-1:2007 **EN 60079-0:2009** **EN 60079-11:2007**

EN 60079-26:2007 **EN 61241-11:2006**

(10) If the sign «X» is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This examination certificate relates only to design and construction of the specified equipment in accordance with Directive 94/9/EC. Further requirements of this directive apply to the manufacturing process and the placing on the market of the equipment.

(12) The marking of the equipment shall include the following:

II 1/2 GD
Ex ia IIC T4 Ga/Gb
Ex ia IIIC T125°C Da/Db

Electrosuisse SEV
Certification Body ATEX

Fehraltorf, 2010-12-14

Martin Plüss
Product Certification

Page 1/3

SEV Verband für Elektro-, Energie- und Informationstechnik
SEV Association pour electrotechnique, les technologies de l'enegie et de l'information
SEV Associazione per elettrotecnica, la tecnica energetica e l'informatica
SEV Association for Electrical Engineering, Power and Information Technologies

Luppmenstrasse 1
CH-8320 Fehraltorf

Tel. +41 (0)44 956 11 11
Fax +41 (0)44 956 11 22
info@electrosuisse.ch
www.electrosuisse.ch

(13) # Appendix

(14) **EC-Type Examination Certificate SEV 10 ATEX 0146**

(15) Description of the equipment

The pressure transmitter 7MF156x in 2-wire technique is used for the measuring of gauge and absolute pressure of gases, liquids, vapours and dust. The pressure transmitter 7MF156x differ in the pressure measuring cell and the pressure range. For the measuring of the pressure the signal of a pressure measuring cell with a membrane made of stainless steel or with a membrane made of ceramic is converted into a 4-20mA - output signal by the electronic.

Type designation

The exact type name is specified in the model code of the manufacturing documents and is transmitted depending on the version on the label.

Ratings:

Supply and signal circuit:

With type of protection intrinsic safety Ex ia IIC

only for connection to a certified intrinsically safe circuit.

Maximum values:

$U_i \leq 30$ V
$I_i \leq 100$ mA
$P_i \leq 0.750$ W

effective internal capacitance $C_i = 0$ nF
effective internal inductivity $L_i = 0$ mH

Note
The relationship between the maximum ambient temperature and the medium temperature can be seen in the following table:

transmitter type	Ambient temperature	medium temperature
7MF156x	-25 …85 °C	-30 …120 °C

The pressure transmitter 7MF156x 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 connection to the process must be sufficiently tight according to the requirements of EN 60079-26, section 4.6. The pressure measuring cell may be used only for flammable substances for which the membranes of cells are sufficiently chemically and corrosion resistant.

SEV Verband für Elektro-, Energie- und Informationstechnik
SEV Association pour electrotechnique, les technologies de l'enegie et de l'information
SEV Associazione per elettrotecnica, la tecnica energetica e l'informatica
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electrosuisse

Appendix to EC-Type Examination Certificate SEV 10 ATEX 0146

(16) Test Report 10-IK-0307.02

(17) Special conditions for safe use
none

(18) Fundamental essential health and safety requirements
Fulfilled by the standards applied

Electrosuisse SEV
Certification Body ATEX

Fehraltorf, 2010-12-14

Martin Plüss
Product Certification

SEV Verband für Elektro-, Energie- und Informationstechnik
SEV Association pour electrotechnique, les technologies de l'enegie et de l'information
SEV Associazione per elettrotecnica, la tecnica energetica e l'informatica
SEV Association for Electrical Engineering, Power and Information Technologies

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12.6. Flow meter, Siemens

Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin
Nationales Metrologieinstitut

EU-TYPE-EXAMINATION CERTIFICATE

(Translation)

(1)

(2) Equipment or Protective Systems Intended for Use in Potentially Explosive Atmospheres - **Directive 2014/34/EU**

(3) EU-Type Examination Certificate Number:

PTB 13 ATEX 2007 X **Issue: 1**

(4) Equipment: Explosion protected pressure transducer

SITRANS P DS III Hart, SITRANS P DS III-PA, SITRANS P DS III-FF types 7MF4*** - * ++ * * - *B+ * and 7MF4*** - * ++ * * - *E+ *

SITRANS P410 Hart, SITRANS P410-PA, SITRANS P410-FF types 7MF4*** - * ++ * * - *B+ * Z-C41 and 7MF4*** - * ++ * * - *E+ * Z-C41

SITRANS P310 Hart, SITRANS P310-PA, SITRANS P310-FF types 7MF2*** - * ++ * * - *B+ * and 7MF2*** - * ++ * * - *E+ *

(5) Manufacturer: Siemens AG – Process Industries and Drives

(6) Address: 76181 Karlsruhe, Germany

(7) This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 17 of the Directive 2014/34/EU of the European Parliament and of the Council, dated 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 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 Test Report PTB Ex 16-26170 .

(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 60079-15:2010** **EN 60079-26:2015**

ZSEx001e c

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment 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 equipment in accordance to the Directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

sheet 1/8

Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin
Nationales Metrologieinstitut

(1) **EU-TYPE-EXAMINATION CERTIFICATE**
(Translation)

(12) The marking of the equipment shall include the following:

II 1/2 G	**Ex ia IIC T4/T5/T6 Ga/Gb**	**II 1/2 G**	**Ex ib IIC T4/T5/T6 Ga/Gb**
II 2/3 G	**Ex nA IIC T4/T5/T6 Gb/Gc**	**II 2/3 G**	**Ex ic IIC T4/T5/T6 Gb/Gc**
II 3 G	**Ex nA IIC T4/T5/T6 Gc**	**II 3 G**	**Ex ic IIC T4/T5/T6 Gc**

Konformitätsbewertungsstelle, Sektor Explosionsschutz
On behalf of PTB:

Braunschweig, October 12, 2016

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT 24

Dr.-Ing. F. Lienesch
Regierungsdirektor

ZSEx001e c

(13) # SCHEDULE

(14) **EU-Type Examination Certificate Number PTB 13 ATEX 2007 X, Issue: 1**

(15) Description of Product

The explosion protected pressure transducer

SITRANS P DS III Hart, SITRANS P DS III-PA, SITRANS P DS III-FF
types 7MF4*** - * ++ * * - *B+ * and 7MF4*** - * ++ * * - *E+ *

SITRANS P410 Hart, SITRANS P410-PA, SITRANS P410-FF
types 7MF4*** - * ++ * * - *B+ * Z-C41 and 7MF4*** - * ++ * * - *E+ * Z-C41

SITRANS P310 Hart, SITRANS P310-PA, SITRANS P310-FF
types 7MF2*** - * ++ * * - *B+ * and 7MF2*** - * ++ * * - *E+ *

is used for the measurement of non-corrosive and corrosive gases, vapours and liquids. The equipment consists of the components enclosure, electronic assembly and measuring cell. The pressure to be measured is transmitted to the hermetically sealed sensor unit by means of a separating diaphragm and an oil-filled system. This arrangement guarantees the separation of areas from each other where equipment of categories 1/2 or 2/3 is required.

The measuring signal is conditioned in the electronic assembly making it available as a load-independent direct current, 4-20 mA (HART) or as a bus signal (FF or Profibus-PA).

Category-1/2-equipment

The enclosure for the electronic system is installed in hazardous areas requiring equipment of category 2. The process connection elements are mounted into the partition separating areas from each other where equipment of category 1 or 2 is required.

For relationship between temperature class, maximum permissible medium temperature and maximum permissible ambient temperature at the electronic system, reference is made to the following table:

Temperature class	Medium temperature	Ambient temperature at the electronic system
T4	-20 ... + 60 °C	-40 ... +85 °C
T5	-20 ... + 60 °C	-40 ... +70 °C
T6	-20 ... + 60 °C	-40 ... +60 °C

For applications requiring category-1-equipment the process pressure shall range from 0.8 bar to 1.1 bar.

The operating conditions for operation without explosive mixtures shall be taken from the manufacturer´s specifications.

Category-2-equipment

The measuring transducers are installed in hazardous areas requiring equipment of category 2.

For relationship between maximum permissible ambient temperature and temperature class reference is made to the following table:

Temperature class	Ambient temperature
T4	-40 ... +85 °C
T5	-40 ... +70 °C
T6	-40 ... +60 °C

The permissible operating temperatures and pressures for the operation shall be taken from the manufacturer´s specifications.

Category-2/3-equipment

The enclosure for the electronic system is installed in hazardous areas requiring equipment of category 3. The process connection elements are mounted into the partition separating areas from each other where equipment of category 2 or 3 is required.

For relationship between maximum permissible ambient temperature and temperature class reference is made to the following table:

Temperature class	Ambient temperature
T4	-40 ... +85 °C
T5	-40 ... +70 °C
T6	-40 ... +60 °C

The operating conditions for operation without explosive mixtures shall be taken from the manufacturer´s specifications.

Category-3-equipment

The measuring transducers are installed in hazardous areas requiring equipment of category 3.

For relationship between maximum permissible ambient temperature and temperature class reference is made to the following table:

Temperature class	Ambient temperature
T4	-40 ... +85 °C
T5	-40 ... +70 °C
T6	-40 ... +60 °C

The operating conditions for operation without explosive mixtures shall be taken from the manufacturer´s specifications.

SCHEDULE TO EU-TYPE EXAMINATION CERTIFICATE PTB 13 ATEX 2007 X, Issue: 1

Electrical data

Variant	Marking
SITRANS P DS III, type 7MF4*33-*++-*B+*** **SITRANS P410, type 7MF4*33-*++**-*B+*Z-C41** **SITRANS P310, type 7MF2*33-*++**-*B+***	**II 1/2 G Ex ia IIC T4/T5/T6 Ga** **II 1/2 G Ex ib IIC T4/T5/T6 Gb**

Auxiliary power-/output signal circuit (terminals: +,-)

type of protection Intrinsic Safety Ex ia IIC
or Ex ib IIC
only for connection to a certified intrinsically safe circuit

Maximum values:

U_i = 30 V
I_i = 100 mA
P_i = 750 mW

L_i = 0.4 mH
C_i = 6 nF

Variants	Marking
SITRANS P DS III PA, type 7MF4*34-*++-*B+*** **SITRANS P410-PA, type 7MF4*34-*++**-*B+*Z-C41** **SITRANS P310-PA, type 7MF2*34-*++**-*B+*** **SITRANS P DS III FF, type 7MF4*35-*++**-*B+*** **SITRANS P410-FF, type 7MF4*35-*++**-*B+*Z-C41** **SITRANS P310-FF, type 7MF2*35-*++**-*B+***	**II 1/2 G Ex ia IIC T4/T5/T6 Ga** **II 1/2 G Ex ib IIC T4/T5/T6 Gb**

Auxiliary power-/output signal circuit (terminals: +,-)

type of protection Intrinsic Safety Ex ia IIC
or Ex ib IIC
only for connection to a certified intrinsically safe circuit (e.g. FISCO-supply unit or a linear barrier) with the maximum values specified in the following table:

	FISCO-supply unit ia / ib	linear barrier ia / ib
U_i	17.5 V	24 V
I_i	380 mA	174 mA
P_i	5.32 W	1 W

L_i = 7 µH
C_i = 1.1 nF

SCHEDULE TO EU-TYPE EXAMINATION CERTIFICATE PTB 13 ATEX 2007 X, Issue: 1

Variants	Marking
SITRANS P DS III, type 7MF4*33-*++-*B+*** **SITRANS P410, type 7MF4*33-*++**-*B+*Z-C41** **SITRANS P310, type 7MF2*33-*++**-*B+***	
SITRANS P DS III PA, type 7MF4*34-*++-*B+*** **SITRANS P410-PA, type 7MF4*34-*++**-*B+*Z-C41** **SITRANS P310-PA, type 7MF2*34-*++**-*B+***	**II 1/2 G Ex ia IIC T4/T5/T6 Ga** **II 1/2 G Ex ib IIC T4/T5/T6 Gb**
SITRANS P DS III FF, type 7MF4*35-*++-*B+*** **SITRANS P410-FF, type 7MF4*35-*++**-*B+*Z-C41** **SITRANS P310-FF, type 7MF2*35-*++**-*B+***	

Pilot indicator signal circuit (terminals: plug-in contacts, flat connector)

type of protection Intrinsic Safety Ex ia IIC
or Ex ib IIC

only for connection to floating indicators or test instruments without internal power supply (battery, mains) and without external circuits

or

for connection to test instruments which are approved for operation in explosion hazardous areas

Maximum values for the interconnection of pilot indicator signal circuit and test instrument

U_i = 30 V
I_i = 100 mA
P_i = 750 mW

	IIC
L_o [mH]	0.5
C_o [nF]	3

Measuring cell circuit

internal circuit, no external interface

Variant	Marking
SITRANS P DS III, type 7MF4*33-*++-*E+*** **SITRANS P410, type 7MF4*33-*++**-*E+*Z-C41** **SITRANS P310, type 7MF2*33-*++**-*E+***	**II 2/3 G Ex nA IIC T4/T5/T6 Gc** **II 3 G Ex nA IIC T4/T5/T6 Gc**

Auxiliary power-/output signal circuit (terminals: +,-)

type of protection Non-sparking Ex nA IIC

U_m = 45 V

SCHEDULE TO EU-TYPE EXAMINATION CERTIFICATE PTB 13 ATEX 2007 X, Issue: 1

Variant	Marking
SITRANS P DS III, type 7MF4*33-*++-*E+*** **SITRANS P410, type 7MF4*33-*++**-*E+*Z-C41** **SITRANS P310, type 7MF2*33-*++**-*E+***	**II 2/3 G Ex ic IIC T4/T5/T6 Gc** **II 3 G Ex ic IIC T4/T5/T6 Gc**

Auxiliary power-/output signal circuit (terminals: +,-)

type of protection Intrinsic Safety Ex ic IIC
Maximum values:
U_i = 45 V
L_i = 0.4 mH
C_i = 6 nF

Variants	Marking
SITRANS P DS III PA, type 7MF4*34-*++-*E+*** **SITRANS P410-PA, type 7MF4*34-*++**-*E+*Z-C41** **SITRANS P310-PA, type 7MF2*34-*++**-*E+*** **SITRANS P DS III FF, type 7MF4*35-*++**-*E+*** **SITRANS P410-FF, type 7MF4*35-*++**-*E+*Z-C41** **SITRANS P310-FF, type 7MF2*35-*++**-*E+***	**II 2/3 G Ex nA IIC T4/T5/T6 Gc** **II 3 G Ex nA IIC T4/T5/T6 Gc**

Auxiliary power-/output signal circuit (terminals: +,-)

type of protection Non-sparking Ex nA IIC

U_m = 32 V (max. bus voltage)

Variant	Marking
SITRANS P DS III PA, type 7MF4*34-*++-*E+*** **SITRANS P410-PA, type 7MF4*34-*++**-*E+*Z-C41** **SITRANS P310-PA, type 7MF2*34-*++**-*E+*** **SITRANS P DS III FF, type 7MF4*35-*++**-*E+*** **SITRANS P410-FF, type 7MF4*35-*++**-*E+*Z-C41** **SITRANS P310-FF, type 7MF2*35-*++**-*E+***	**II 2/3 G Ex ic IIC T4/T5/T6 Gc** **II 3 G Ex ic IIC T4/T5/T6 Gc**

Auxiliary power-/output signal circuit (terminals: +,-)

type of protection Intrinsic Safety Ex ic IIC
for connection to an FISCO-supply unit according to EN 60079-11:2012 or to a linear barrier with the maximum values specified in the following table:

	FISCO-supply unit ic	linear barrier ic
U_i	17.5 V	32 V
I_i	570mA	132 mA
P_i		1 W

L_i = 7 µH
C_i = 1.1 nF

SCHEDULE TO EU-TYPE EXAMINATION CERTIFICATE PTB 13 ATEX 2007 X, Issue: 1

Changes with respect to previous editions

Compilation of the specifications from the initial certificate and the 1st supplement as well as the following modifications:

- Correction of the marking (EPL)
- Alteration of components on the application assembly DSIII (Hart) without an impact on explosion protection:
  New type for D17, smaller size of R149 (rating, 910 kΩ not changed), new quartz Z1, capacitances C19, C20 are omitted
- Revision of the documentation
- Adaption to the current state of the standards

(16) Test Report PTB Ex16-26170

(17) Specific conditions of use

1. For non-intrinsically safe variants (type of protection Ex nA IIC) the terminal for the equipotential bonding conductor of the pressure transducer SITRANS P DS III, SITRANS P410 and SITRANS P310 shall be electrically connected to the equipotential bonding system of the hazardous area.
   The intrinsically safe variants shall be earthed electrostatically using an appropriate method.
2. Plug facilities or plug connectors for the connection of external circuits are not permitted for the application as category-3-equipment with type of protection "Non-sparking" (nA).
3. The explosion protection of the pressure transducer particularly depends on the tightness of the diaphragm when the equipment is connected to intrinsically safe circuits of category "ib" and simultaneously mounted and operated in the partition between areas where equipment of category 1 or category 2 is required. For these operating conditions the pressure transducer shall only be used for such flammable media, the diaphragm is sufficiently resistent to, with respect to chemical influences and corrosion.

(18) Essential health and safety requirements

Met by compliance with the aforementioned standards.

According to Article 41 of Directive 2014/34/EU, EC-type examination certificates which have been issued according to Directive 94/9/EC prior to the date of coming into force of Directive 2014/34/EU (April 20, 2016) may be considered as if they were issued already in compliance with Directive 2014/34/EU. By permission of the European Commission supplements to such EC-type examination certificates and new issues of such certificates may continue to hold the original certificate number issued before April 20, 2016.

Konformitätsbewertungsstelle, Sektor Explosionsschutz Braunschweig, October 12, 2016
On behalf of PTB:

Dr.-Ing. F. Lienesch
Regierungsdirektor

12.7. Flow meter, Fuji

CERTIFICATE

(1) EC-Type Examination

(2) **Equipment and protective systems intended for use in potentially explosive atmospheres - Directive 94/9/EC**

(3) EC-Type Examination Certificate Number: **DEKRA 13ATEX0222 X** Issue Number: **1**

(4) Equipment: **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 equipment 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 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems 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.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 60079-0 : 2012 **EN 60079-11 : 2012** **EN 60079-26 : 2007**

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-Type Examination Certificate relates only to the design, examination and tests of the specified equipment according to the Directive 94/9/EC. Further requirements of the directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

(12) The marking of the equipment shall include the following:

II 1 G Ex ia IIC T4 / T5 Ga
II 1 D Ex ia IIIC T100 °C / T135 °C Da

This certificate is issued on 18 April 2014 and, as far as applicable, shall be revised before the date of cessation of presumption of conformity of (one of) the standards mentioned above as communicated in the Official Journal of the European Union.

DEKRA Certification B.V.

R. Schuller
Certification Manager

Page 1/3

DEKRA Certification B.V. Meander 1051, 6825 MJ Arnhem P.O. Box 5185, 6802 ED Arnhem The Netherlands
T +31 88 96 83000 F +31 88 96 83100 www.dekra-certification.com Registered Arnhem 09085396

(13) **SCHEDULE**

(14) **to EC-Type Examination Certificate DEKRA 13ATEX0222 X** Issue No. **1**

(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 an electric analog and/or digital signal.
Optionally, the transmitter is provided with a digital or analog display with an integral overvoltage protection device.

The enclosure of the transmitter provides a degree of protection of at least IP66/67 in accordance with EN 60529.

Ambient temperature range: -40 °C to +70 °C for T4/ T135 °C;
-40 °C to +50 °C for T5/ T100 °C.

Electrical data

Supply and output circuit (terminals supply + and -):
in type of protection intrinsic safety Ex ia IIC or Ex ia IIIC, only for connection to a certified intrinsically safe circuit, with following maximum values :
$U_i \leq 28$ Vdc; $I_i = 94{,}3$ mA ; $P_i = 0{,}66$ W; $C_i = 26$ nF (36 nF with Arrester Board);
$L_i = 0{,}6$ mH (0,7 mH with analog indicator).

Installation instructions

The instructions provided with the equipment shall be followed in detail to assure safe operation.

(16) **Test Report**

No. 216829300.

(17) **Special conditions for safe 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.

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.

Because the transmitter enclosure is made of alumium alloy, if the transmitter is installed in an explosive atmosphere requiring the use of apparatus of equipment category 1 G, it shall be installed such that even in the event of rare incidents, ignition sources due to impact and friction sparks are excluded.

(13) **SCHEDULE**

(14) **to EC-Type Examination Certificate DEKRA 13ATEX0222 X** Issue No. **1**

(18) **Essential Health and Safety Requirements**

Covered by the standards listed at (9).

(19) **Test documentation**

As listed in Test Report No. 216829300.

12.8. Sample Pump, SPP-100 with Elprom explosion proof motor

12.8.1. Elprom instructions

GB

Motors series O-M

Safety, installing maintenance instructions

www.orange1.eu

(Rev.03 - 2016/02/08)

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 d IIC T3 Gb T.amb –40℃ , +60℃ II 2G Ex d IIC T4 Gb T.amb –40℃ , +60℃ II 2G Ex d IIC T5 Gb T.amb –40℃ , +40℃ II 2G Ex de IIC T3 Gb T.amb –40℃ , +60℃ II 2G Ex de IIC T4 Gb T.amb –40℃ , +60℃ II 2G Ex de IIC T5 Gb T.amb –40℃ , +40℃	Zones 1, 2
DUST	II 2D Ex tb IIIC T125℃ T.amb –40℃ , +60℃	Zones 21, 22

The motors comply with the Essential Health and Safety Requirements for potentially explosive atmospheres provided by European Standards:
EN 60079-0), EN 60079-1, EN 60079-7, 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 98/37/EC.
Commissioning is not allowed until the conformity of the end product with this directive has been established.
These asynchronous motors comply the EMC (2004/108/EC) 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 M< 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 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, Elprom will equip the motor with heaters.
Instead of an anti-condensation heater, another possibility is to connect a voltage that is approximately 4 to 10 % of the rated motor phase-voltage to stator terminals U1 and V1; 20 to 30 % of rated motor current is sufficient 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 e (or Ex eb)	–40℃ , +60℃	EN 60079-0 EN 60079-7
	Ex d (or Ex db)	–40℃ , +60℃	EN 60079-0 EN 60079-1
DUST	Ex tb	–40℃ , +60℃	EN 60079-0 EN 60079-31

The cable glands shall be completely screwed to the motor.

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 (see the table of the tightening torque).

Cable gland motor/terminal box: tightening torque 5Nm

4. CONNECTION TO THE POWER SUPPLY

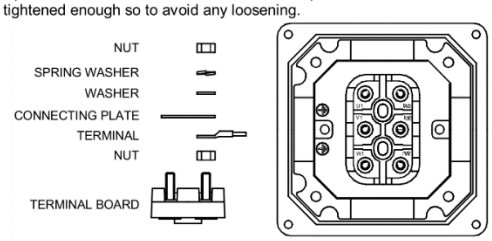
Only qualified people are allowed to connect the motor to the power supply.
The connection to the electric supply must be done by through the cable entry supplied with the motor or through another type of cable entry certified in accordance with the European Standards showed above in compliance with Directive ATEX 94/9/EC.
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.
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

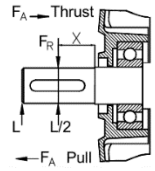
In case the motors are supplied by inverter, they shall be provided with protectors inside the windings (normally PTC thermistors), capable of assuring the respect of temperature class limits..
Such devices shall be connected to a control device able to cut off power to the motor in case of reaching of the limit temperature.

Heaters

The heaters shall be supplied only when the motor is not under power.

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-ZZ	356	240	110
71	6202-ZZ	356	300	140
80	6204-ZZ	580	400	190
90	6205-ZZ	639	430	200
100	6206-ZZ	881	440	200
112	6306-ZZ	1325	620	290
132	6308-ZZ	1941	860	400

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 d (db)	Flameproof motor and terminal box
GAS	Ex de (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℃	Max surface temperature
T.amb		Ambient temperature
AB xx ATEX 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

6. MAINTENANCE AND REPAIR

MAINTENANCE shall be performed only by qualified people in accordance with the standard 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 ELPROM 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.

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.

Motor size	Flanges	feet	Terminal box Cover
63	M5x16	M6x16	M5x16
71	M5x16	M6x16	M5x16
80	M6x20	M6x20	M5x16
90	M6x20	M8x20	M5x16
100	M8x20	M8x30 DADO M8	M5x16
112	M8x20	M8x35 NUT M8	M5x16
132	M10x20	M10X50 NUT M10	M6x15
Screw quality 8.8			

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Dichiarazione CE di Conformità / EC Declaration of Conformity / Déclaration CE de Conformité
EG Konformitätserkärung / Declaration CE 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 d IIC T3 Gb T_{amb} −40°C , +60°C	EUM1 10 ATEX 0350
CE 0477	Ex	II 2G Ex d IIC T4 Gb T_{amb} −40°C , +60°C	EUM1 10 ATEX 0350
CE 0477	Ex	II 2G Ex d IIC T5 Gb T_{amb} −40°C , +40°C	EUM1 10 ATEX 0350
CE 0477	Ex	II 2G Ex de IIC T3 Gb T_{amb} −40°C , +60°C	EUM1 10 ATEX 0350
CE 0477	Ex	II 2G Ex de IIC T4 Gb T_{amb} −40°C , +60°C	EUM1 10 ATEX 0350
CE 0477	Ex	II 2G Ex de IIC T5 Gb T_{amb} −40°C , +40°C	EUM1 10 ATEX 0350
CE 0477	Ex	II 2D Ex tb IIIC T125°C T_{amb} −40°C , +60°C	EUM1 10 ATEX 0350

Sono prodotti da/ Are manufactured by/ Sont fabriqués par la société/ Wurden gefertigt von/ Han sido fabricadospor

ELPROMTECH S.r.l.

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

94/9/EC - 2014/34/UE	(ATEX)
2014/30/UE	(EMC)
2006/42/EC	(Machinery)
2011/65/CE	(RoHS)

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 :2009, EN 60079-1 :2007, EN 60079-7 :2007, EN 60079-31 :2009,
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 die 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 está 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

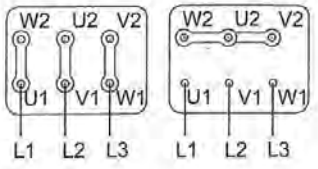
Product Quality Assurance Notification Number: EPT 15 ATEX 2075 Q
Notified by Eurofins Product Testing Italy S.r.l. – Notified Body n.0477 - Via Courgné 21 - 10156 Torino Italy

15/01/2016

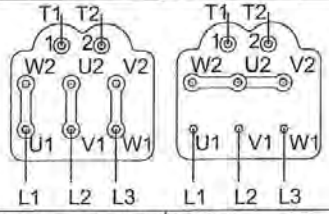
Cinzia Tasinazzo
Legale Rappresentante

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)

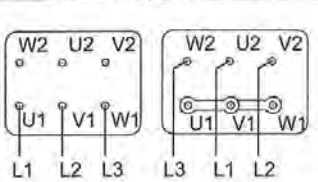


(Δ) Collegamento delta Tensione inferiore Delta connection lower voltage	(Y) Collegamento stella Tensione superiore Star connection higher voltage

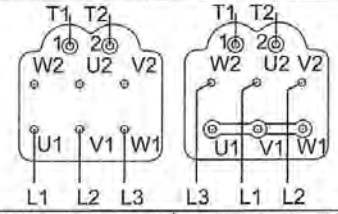


(Δ) Collegamento delta Tensione inferiore Delta connection lower voltage	(Y) Collegamento stella Tensione superiore Star connection higher voltage

Trifase doppia velocità 1 avvolgimento – Three-phase double speed 1 winding

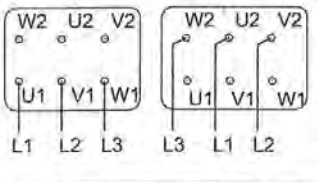


Bassa velocità – Low speed	Alta velocità – high speed

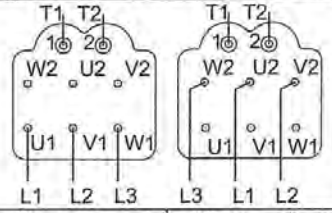


Bassa velocità – Low speed	Alta velocità – high speed

Trifase doppia velocità 2 avvolgimenti separati – Three-phase double speed 2 separate windings

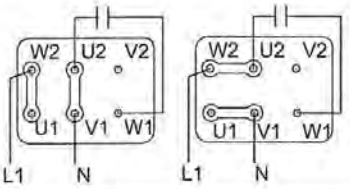


Bassa velocità – Low speed	Alta velocità – high speed



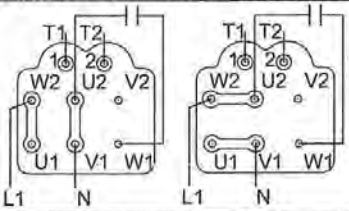
Bassa velocità – Low speed	Alta velocità – high speed

Monofase 4 fili – Single-phase 4 wires



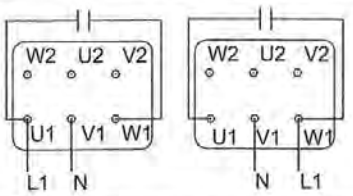
Rotazione oraria Clockwise rotation	Rotazione antioraria Counter clockwise rotation

Monofase 4 fili con protezione termica – Single-phase 4 wires with thermal protection



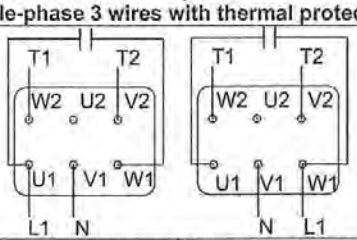
Rotazione oraria Clockwise rotation	Rotazione antioraria Counter clockwise rotation

Monofase 3 fili – Single-phase 3 wires



Rotazione oraria Clockwise rotation	Rotazione antioraria Counter clockwise rotation

Monofase 3 fili con protezione termica – Single-phase 3 wires with thermal protection



Rotazione oraria Clockwise rotation	Rotazione antioraria Counter clockwise rotation

12.8.2. Elprom 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 0**

[4] Equipment: **Electric motor**

Series: **O-M**

[5] Manufacturer: **ELPROMTECH S.r.l.**

[6] Address: Via Mantova n° 93, 43122 Parma - Italia

[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.17.REL.02/54408

[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	**or**	**II 2G Ex db IIC T3**	**-40°C ≤ T_{amb} ≤ +60°C**
II 2G Ex db e IIC T3 Gb	**or**	**II 2G Ex db eb IIC T3**	**-40°C ≤ T_{amb} ≤ +60°C**
II 2G Ex db IIC T4 Gb	**or**	**II 2G Ex db IIC T4**	**-40°C ≤ T_{amb} ≤ +60°C**
II 2G Ex db e IIC T4 Gb	**or**	**II 2G Ex db eb IIC T4**	**-40°C ≤ T_{amb} ≤ +60°C**
II 2G Ex db IIC T5 Gb	**or**	**II 2G Ex db IIC T5**	**-40°C ≤ T_{amb} ≤ +40°C**
II 2G Ex db e IIC T5 Gb	**or**	**II 2G Ex db eb IIC T5**	**-40°C ≤ T_{amb} ≤ +40°C**
II 2D Ex tb IIIC T125°C			**-40°C ≤ T_{amb} ≤ +60°C**

Place and date of issue:
Torino, 2017-02-06

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
SGQ N° 133A
PRD N° 119B
Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC
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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 0

[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 two voltage motors is indicated the lower (ex. 230 for 230/400)

Frequency	
5	50Hz
6	60Hz
7	50/60Hz

Protection (IP and Ex)	
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 0

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 (till +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 n. MOTORI ASINCRONI SERIE O – M.

Inverter supply
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 protection 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).
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 by 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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[13] [14] **ANNEX**
EU-TYPE EXAMINATION CERTIFICATE N. EPT 17 ATEX 2588 X Issue 0

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 of a separate ATEX certification according to the applicable standards IEC 60079-31 and IEC 60079-1 or IEC 60079-7.

Warning label

"Flameproof joints cannot be repaired"
"Use screws quality 8.8"

[16] **Assessment Report n° EPT.17.REL.02/54408**

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	Scheduled
Technical Note	Nota Tecnica Motori Serie O-M	01	2016-12-07	✓
Safety instructions	Motori Serie O-M Istruzioni sicurezza installazione e manutenzione	04	2016-12-07	✓
Assembly drawing _motor_Exd	Assieme_motore_Exd	00	2016-10-03	✓
Assembly drawing _motor_Exde	Assieme_motore_Exde	00	2016-10-03	✓
Drawing – capacitor enclosures	Custodie condensatore Exd IIC	00	2016-10-03	✓

[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**

This Certificate is at its first issue and replace the EC-TYPE EXAMINATION CERTIFICATE n. EUM1 10 ATEX 0350 and its supplements n. 1 and 2.

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SGQ N° 133A
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Directive Responsible

Page 4 of 4

End of Certificate

Eurofins Product Testing Italy S.r.l. - Via Cuorgnè, 21 – 10156 Torino - Italia
Notified Body N. 0477

12.8.3. Elprom Certificate, EUM1 10 ATEX 0350

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EUROFINS – MODULO UNO S.P.A. - VIA CUORGNÉ, 21 – 10156 TORINO - ITALY
ORGANISMO NOTIFICATO N. 2049

[1] SUPPLEMENT N.2 AT EC TYPE EXAMINATION CERTIFICATE

[2] Equipments or protective systems or components intended for use in potentially explosive atmospheres Directive 94/9/EC

[3] Number of EC Type examination certificate:

EUM1 10 ATEX 0350

[4] Equipment: **Electrical Motor Gas Group IIC e Dust Group IIIC**
Series: **O-M**

[5] Manufacturer: **ELPROMTECH S.r.l.**

[6] Address: Via Mantova 93 – Parma 43122 (Italy)

[7] This equipment and any acceptable variation thereto is specified in the annex to this supplement and the documents listed in the Assessment report n. M1.12.REL.03/48070.

[8] EUROFINS-MODULO UNO S.p.A., notified body n. 2049 in accordance with Article 9 of the Council Directive 94/9/CE of 23th March 1994, certifies that this equipment have 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 confidential report n. M1.12.REL.03/48070

[9] Compliance with the essential health and safety is assured by compliance with:
EN 60079-0:2009, EN 60079-1:2007, EN 60079-7:2007, EN 60079-31:2009

[10] No changes

[11] No changes

[12] As alternative to the sign present in the EC examination certificate n. EUM1 10 ATEX 0350 , the equipment shall include the sign Ex and at least one of the following strings:

II 2G Ex d IIC T3 Gb	**or**	**II 2G Ex db IIC T3**	**Tamb -40°C ÷ 60°C**
II 2G Ex de IIC T3 Gb	**or**	**II 2G Ex db eb IIC T3**	**Tamb -40°C ÷ 60°C**
II 2G Ex d IIC T4 Gb	**or**	**II 2G Ex db IIC T4**	**Tamb -40°C ÷ 60°C**
II 2G Ex de IIC T4 Gb	**or**	**II 2G Ex db eb IIC T4**	**Tamb -40°C ÷ 60°C**
II 2G Ex d IIC T5 Gb	**or**	**II 2G Ex db IIC T5**	**Tamb -40°C ÷ 40°C**
II 2G Ex de IIC T5 Gb	**or**	**II 2G Ex db eb IIC T5**	**Tamb -40°C ÷ 40°C**
II 2D Ex tb IIIC T125°C			**Tamb -40°C ÷ 60°C**

Turin, 14 May 2012

CE 2049

Dionisio Bucchieri
Directive Responsible

Paolo Dentis
Notified Body Manager

This certificate do not replace anyway the declaration of conformity can exonerate the Manufacturer from product liability.
Any change in the design or realization may be not valid this certificate and requires a communication to the body. The technical documentation do not refers to others directives applicable to the equipment. The change of the reference standards cause the decay of the certificate. This certificate has one page and is reproducible only in its entirety.
This document is the English translation made by the notified body of the original document drawn in Italian, only the Italian text is legally valid.

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NOTIFIED BODY N. 2049

[13] ANNEX

[14] SUPPLMENT N.2 AT EC TYPE EXAMINATION CERTIFICATE N. EUM1 10 ATEX 0350

[15] **Description of Equipment**

No changes

[16] **Warning Label**

No changes

[17] **Assessment report n° M1.12.REL.03/44586**

This supplement to EC Type certificate is released after the positive result of the conformity assessment of the Council Directive 94/9/CE and to technical standard EN 60079-0:2009; EN 60079-1:2007,EN 60079-7:2007, EN 60079-31:2009, performed by the notified body EUROFINS-MODULO UNO S.p.A., and quoted in the above assessment report.

[18] **Descriptive Documents**

The documents listed in the EC Type examination certificate n. EUM1 10 ATEX 0350 are integrated/replaced by the following documents:

Name	Description	Date	Rev.	Listed
Istruzioni sere O-M	Manual for use, maintenance and installation	19/04/2012	0	
Motori asincroni serie O-M	Technical note O-M series motor	19/04/2012	0	
Servoventilazione	Technical note O-M series motor	19/04/2012	0	
Assieme motore Ex de IIC - A	Ex de motor design with joint description	20/04/2012	0	√
Assieme motore Ex d IIC - A	Ex d motor design with joint description	20/04/2012	0	√
Assieme motore Ex d IIC – senza scatola	Ex d motor design with joint description	20/04/2012	0	√
Assieme motore Ex de IIC - B	Ex de motor design with joint description	20/04/2012	0	√
Assieme motore Ex d IIC - B	Ex d motor design with joint description	20/04/2012	0	√

[19] **Special condition for a safe use**

No changes

[20] **Essential Health and Safety Requirements**

No changes

Paolo Dentis

Notified Body Manager

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EUROFINS – MODULO UNO S.P.A. - VIA CUORGNÈ, 21 – 10156 TORINO - ITALY
NOTIFIED BODY N. 2049

[13] ANNEX

[14] SUPPLMENT N.2 AT EC TYPE EXAMINATION CERTIFICATE N. EUM1 10 ATEX 0350

[21] **Certificate History**

This supplement is at its first issue.
This supplement is issued as a consequence of the change of manufacturer's name

[22] **Terms and conditions**

No changes

Paolo Dentis

Notified Body Manager

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EUROFINS – MODULO UNO S.P.A. - VIA CUORGNÉ, 21 – 10156 TORINO - ITALY
ORGANISMO NOTIFICATO N. 2049

[1] SUPPLEMENT N.1 AT EC TYPE EXAMINATION CERTIFICATE

[2] Equipments or protective systems or components intended for use in potentially explosive atmospheres Directive 94/9/EC

[3] Number of EC Type examination certificate:

EUM1 10 ATEX 0350

[4] Items: **Electrical Motor Gas Group IIC e Dust Group IIIC**
Series: **O-M**

[5] Manufacturer: **ELPROM S.r.l.**

[6] Address: Via Mantova 93 – **Parma** 43122 (Italy)

[7] This equipment and any acceptable variation thereto is specified in the annex to this supplement and the documents listed in the Assessment report n. M1.11.REL.01/44586.

[8] EUROFINS-MODULO UNO S.p.A., notified body n. 2049 in accordance with Article 9 of the Council Directive 94/9/CE of 23th March 1994, certifies that this equipment have 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 confidential report n. M1.11.REL.01/44586

[9] Compliance with the essential health and safety is assured by compliance with:
EN 60079-0:2009, EN 60079-1:2007, EN 60079-7:2007, EN 60079-31:2009

[10] No changes

[11] No changes

[12] As alternative to the sign present in the EC examination certificate n. EUM1 10 ATEX 0350 , the equipment shall include the sign Ex and at least one of the following strings:

Ex db IIC T3	**Tamb -40°C + 60°C**
Ex db eb IIC T3	**Tamb -40°C + 60°C**
Ex db IIC T4	**Tamb -40°C + 60°C**
Ex db eb IIC T4	**Tamb -40°C + 60°C**
Ex db IIC T5	**Tamb -40°C + 40°C**
Ex db eb IIC T5	**Tamb -40°C + 40°C**
Ex tb IIIC T125°C	**Tamb -40°C + 60°C**
Ex tb IIIB T125°C	**Tamb -40°C + 60°C**

Turin, 14 November 2011

CE
2049

Dionisio Bucchieri
Directive Responsabile

Paolo Dentis
Notified Body Manager

This certificate do not replace anyway the declaration of conformity nor exonerate the Manufacturer from product liability.
Any change in the design or realization may be not valid this certificate and requires a communication to the body. The technical documentation do not refers to others directives applicable to the equipment. The change of the reference standards cause the decay of the certificate. This certificate has one page and is reproducible only in its entirety.
This document is the English translation made by the notified body of the original document drawn in Italian; only the Italian text is legally valid

[13] ANNEX

[14] SUPPLMENT N.1 AT EC TYPE EXAMINATION CERTIFICATE N. EUM1 10 ATEX 0350

[15] **Description of Equipment**

This replace the description made in the EC examination certificate n. EUM1 10 ATEX 0350.

2 GD category motors appropriate for use in Zone 1, 2, 21, 22 manufactured in accordance with the standards EN 60079-0 e EN 60079-1 EN60079-7, EN 60079-31; the symbol "eb" on the marking string, where present, refers to the terminals enclosure type of protection; the certification includes the IIB and IIC group capacitor enclosure described in the manufacturer documentation; if the manufacturer uses an IIB capacitor enclosure, the whole equipment belong to IIB group. The principal characteristics of the apparatus are:

a) Three-phase and single-phases asyncrhronous squirrel cage rotors motors with shaft height from 56 to 132 mm.

b) Totally closed with protection degree up to IP66 ventilated and not ventilated (with half power in respect to the ventilated corresponding motors so to maintain a T3 temperature class).

c) Insulation class F, H

d) 2, 4, 6, 8, 2/4, 4/8, 4/6, 6/8 poles

e) Voltage supply up to 850 V

f) Frequency 50/60 Hz

g) Double speed motors with one Dahlander winding or with two separate windings

h) Max surface temperature:

GAS	temperature class T3, T4, T5
DUST	T125°C

i) 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 protection 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..

j) In case of single phase motors the capacitors have to be placed in the appropriate enclosure or in safe zone.

k) Possibility of use of anticondensation resistences powered only at stopped motor.

l) Painting: the paint used has a maximum thickness of 0,2 mm

Ventilation can be made by fan, who is fitted directly on the shaft, or by using a special motor.
This motor belong to O-M series. It will be 63 to save space inside the fan cover .
Supply voltage must be within ±5% of the nominal value

Paolo Dentis
Notified Body Manager

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EUROFINS – MODULO UNO S.P.A. - VIA CUORGNÈ, 21 – 10156 TORINO - ITALY
NOTIFIED BODY N. 2049

[13] ANNEX

[14] SUPPLMENT N.1 AT EC TYPE EXAMINATION CERTIFICATE N. EUM1 10 ATEX 0350

The code list is in the following table

OD 063 A 4 H 230 5 P 4 U

Motor Type			
MD	Single Phase Ex db	ME	Single Phase Ex db Ex eb
OD	Three Phase Ex db	OE	Three Phase Ex db EX eb

Shaft height
56, 63, 71, 80, 90, 100, 112,132

Stator Dimensions	
A, B	56, 63, 71, 80
S, L	90 - 132
K, M	100 - 112 - 132

Poles	
2, 4, 6	Single phasse 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 poli

Mounting System			
H	B3	W	B3/B14
B	B3 box dx	X	B3/B5
S	B3 box sx	J	B3/B14 box sx
F	B5	M	B3/B14 box dx
G	V1 (B5 + roof)	R	B3/B5 box sx
Q	B14	T	B3/B5 box dx

Supply Voltage
For two voltage motors is indicated the lower (ex. 230 for 230/400)

Frequency	
5	50Hz
6	60Hz
7	50/60Hz

Protection (IP and Ex)	
P	Motor 2G
Q	Motor 2GD

Temperature class	
3	Temperature class T3 (200°C)
4	Temperature class a 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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Pagina 3 di 7

Rev. 0 of 14 November 2011

eurofins | Modulo Uno

EUROFINS – MODULO UNO S.P.A. - VIA CUORGNÈ, 21 – 10156 TORINO - ITALY
NOTIFIED BODY N. 2049

[13] ANNEX

[14] SUPPLMENT N.1 AT EC TYPE EXAMINATION CERTIFICATE N. EUM1 10 ATEX 0350

Motor list inside the certificate with relative powers

Three Phase Motors one speed

3000 rpm		1500rpm		1000 rpm		750 rpm	
Type	Power [kW]	Type	Power [kW]	Type	Power [kW]	Type	Power [kW]
56A2	0,09	56A4	0,06				
56B2	0,12	56B4	0,09				
63A2	0,18	63A4	0,12				
63B2	0,25	63B4	0,18	63B6	0,12		
71A2	0,37	71A4	0,25	71A6	0,18		
71B2	0,55	71B4	0,37	71B6	0,25	71B8	0,12
80A2	0,75	80A4	0,55	80A6	0,37	80A8	0,18
80B2	1,1	80B4	0,75	80B6	0,55	80B8	0,25
90S2	1,5	90S4	1,1	90S6	0,75	90S8	0,37
90L2	2,2	90L4	1,5	90L6	1,1	90L8	0,55
		100K4	2,2			100K8	0,75
100L2	3	100L4	3	100L6	1,5	100L8	1,1
112M 2	4	112M 4	4	112M 6	2,2	112M 8	1,5
132K2	5,5	132S4	5,5	132S6	3	132S8	2,2
132S2	7,5	132M 4	7,5	132K6	4	132L8	3
132M 2	9	132L4	9				
132L2	11						

Single Phase Motor one speed

3000 rpm		1500rpm		1000 rpm	
Type	Power [kW]	Type	Power [kW]	Type	Power [kW]
56A2	0,09	56A4	0,06		
56B2	0,12	56B4	0,09		
63A2	0,18	63A4	0,12		
63B2	0,25	63B4	0,18	63B6	0,09
71A2	0,37	71A4	0,25	71A6	0,12
71B2	0,55	71B4	0,37	71B6	0,18
80A2	0,75	80A4	0,55	80A6	0,25
80B2	1,1	80B4	0,75	80B6	0,37
90S2	1,5	90S4	1,1	90S6	0,55
90L2	1,5	90L4	1,5	90L6	0,75
100M2	2,2			100M6	1,10
100L2	3	100M4	2,2		
112M2	4	112M4	3		

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EUROFINS – MODULO UNO S.P.A. - VIA CUORGNÈ, 21 – 10156 TORINO - ITALY
NOTIFIED BODY N. 2049

[13] ANNEX

[14] SUPPLMENT N.1 AT EC TYPE EXAMINATION CERTIFICATE N. EUM1 10 ATEX 0350

Three Phase Motor two speeds constant torque							
1500/3000 rpm		750/1500rpm		1000/1500 rpm		750/1000 rpm	
Type	Power [kW]	Type	Power [kW]	Type	Power [kW]	Type	Power [kW]
71A3	0,22	71A5	0,11				
	0,33		0,18				
71B3	0,4	71B5	0,15	71BL	0,10	71B9	0,08
	0,5		0,3		0,20		0,12
80A3	0,45	80A5	0,22	80AL	0,20	80B9	0,13
	0,6		0,45		0,40		0,15
80B3	0,6	80B5	0,37	80BL	0,30	80B9	0,15
	0,8		0,55		0,50		0,25
90S3	0,8	90S5	0,37	90SL	0,45	90S9	0,25
	1,1		0,75		0,65		0,35
90L3	1,2	90L5	0,6	90LL	0,60	90L9	0,30
	1,6		1,1		0,95		0,60
100M3	1,5	100M5	0,7	100ML	0,90	100M9	0,55
	2,2		1,1		1,40		0,80
100L3	2,2	100L5	1,1	100LL	1,10	100L9	0,65
	3		1,8		1,85		1,00
112M3	3,3	112M5	1,4	112ML	1,60	112M9	1,00
	4		2,6		2,40		1,50
132S	5,9	132S	3,3	132S	3	132S	1,85
	4,8		1,85		2		1,30
132M	7,5	132M	4,8	132K	4	132M	2,55
	5,5		2,4		2,6		1,85
132L	8	132L	5,5	132M	4,4	132L	3
	6		3		3		2
				132L	5,2		
					3,3		

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EUROFINS – MODULO UNO S.P.A. - VIA CUORGNÈ, 21 – 10156 TORINO - ITALY
NOTIFIED BODY N. 2049

[13] ANNEX

[14] SUPPLMENT N.1 AT EC TYPE EXAMINATION CERTIFICATE N. EUM1 10 ATEX 0350

Three Phase Motor two speeds quadratic torque							
1500/3000 rpm		750/1500rpm		1000/1500 rpm		750/1000 rpm	
Type	Power [kW]	Type	Power [kW]	Type	Power [kW]	Type	Power [kW]
71A3	0,09 / 0,37	71A5	0,05 / 0,25				
71B3	0,14 / 0,50	71B5	0,07 / 0,37	71BL	0,10 / 0,30		
80A3	0,18 / 0,75	80A5	0,10 / 0,55	80AL	0,13 / 0,44	80B9	0,09 / 0,33
80B3	0,25 / 1,10	80B5	0,15 / 0,75	80BL	0,18 / 0,59	80B9	0,12 / 0,40
90S3	0,37 / 1,50	90S5	0,25 / 0,90	90SL	0,30 / 0,90	90S9	0,19 / 0,48
90L3	0,55 / 2,20	90L6	0,30 / 1,20	90LL	0,40 / 1,15	90L9	0,25 / 0,66
100M 3	0,62 / 2,60	100M5	0,45 / 1,90	100ML	0,60 / 1,80	100M 9	0,37 / 0,90
100L3	0,75 / 3,30	100L5	0,55 / 2,20	100LL	0,70 / 2,20	100L9	0,45 / 1,10
112M 3	4,40 / 1,10	112M5	0,75 / 3,00	112ML	0,90 / 3,00	112M 9	0,75 / 1,50
132S	6,5 / 2	132S	4,4 / 1,1	132S	4 / 1,2	132S	2,2 / 0,9
132M	8,5 / 2,5	132M	5,9 / 1,5	132K	4,8 / 1,4	132M	2 / 1,2
132L	9,2 / 2,8	132L	7,5 / 1,85	132M	5,5 / 1,7	132L	3,7 / 1,5
				132L	6,6 / 2		

[16] **Warning Label**
No changes

[17] **Assessment report n° M1.11.REL.01/44586**

This supplement to EC Type certificate is released after the positive result of the conformità assessment of the Council Directive 94/9/CE and to technical standard EN 60079-0:2009; EN 60079-1:2007,EN 60079-7:2007, EN 60079-31:2009, performed by the notified body EUROFINS-MODULO UNO S.p.A., and quoted in the above assessment report.

Paolo Dentis
Notified Body Manager

[13] ANNEX

[14] SUPPLMENT N.1 AT EC TYPE EXAMINATION CERTIFICATE N. EUM1 10 ATEX 0350

[18] **Descriptive Documents**

The documents listed in the EC Type examination certificate n. EUM1 10 ATEX 0350 are integrated/replaced by the following documents:

Name	Description	Date	Rev.	N. pages	Listed
Istruzioni sere O-M	Manual for use, maintenance and installation	03/11/2011	1	4	
Motori asincroni serie O-M	Technical note O-M series motor	24/10/2011	2	12	√
Servoventilazione	Technical note O-M series motor	25/10/2010	1	7	√
Assieme motore Ex de IIC rev 01	Ex de motor with joint description (type 56-132)	10/11/2011	1	1	√
Assieme motore Ex d IIC rev 01	Ex d motor design with joint description	10/11/2011	1	1	√
Assieme motore Ex d IIC – senza scatola rev 01	Ex d motor design with joint description	10/11/2011	1	1	√
Assieme motore Ex d IIC – rev0	Ex d motor design with joint description (type 56-132)	03/11/2011	0	1	√
Assieme motore Ex de IIC – rev0	Ex de motor design with joint description (type 56-132)	03/11/2011	0	1	√
Rapporto di prova 2011-0001	Results of thermal tests on motor	23/09/2011	0	15	

[19] **Special condition for a safe use**

No changes

[20] **Essential Health and Safety Requirements**

No changes

[21] **Certificate History**

This supplement is at its first issue.
This supplement is issued as a result of the Assessment Report n. M1.11.REL.01/44586 of 17-10-2011

[22] **Terms and conditions**

No changes

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Notified Body Manager

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EUROFINS – MODULO UNO S.P.A. - VIA CUORGNÈ, 21 – 10156 TORINO - ITALY
NOTIFIED BODY N. 2049

[1] # EC TYPE EXAMINATION CERTIFICATE

[2] **Equipments or Protective Systems intended for use in potentially explosive atmospheres 94/9/CE Directive**

[3] EC Type Examination Number:

EUM1 10 ATEX 0350

[4] Equipment: Electrical Motor Gas Group IIC

series O - M

[5] Manufacturer: **ELPROM S.r.l.**

[6] Address: **Via Mantova, 93 - 43122 PARMA**

[7] This equipment and any acceptable variation thereto is specified in the annex of this certificate and the documents therein referred to

[8] EUROFINS-MODULO UNO S.p.A., notified body number 2049 in accordance with Article 9 of the Council Directive 94/9/CE of 23 March 1994, certifies that these equipment have 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 to the Directive.
The examination and test results are recorded in confidential report n. M1.10.REL.01/40346

[9] Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 60079-0:2009; EN 60079-1:2007; EN 60079-7:2007; EN 61241-1:2004

[10] If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the annex to this certificate.

[11] This EC-TYPE EXAMINATION CERTIFICATE relates to the design and construction of the specified equipment.
Further requirements of this Directive apply to the manufacturing and the supply of this equipment.
These requirements are not included in this certificate.

[12] The equipment shall include the sign (Ex) and at least one of the following strings:

Ex d IIC T3 Tamb -40°C ÷ 60°C
Ex de IIC T3 Tamb -40°C ÷ 60°C
Ex d IIC T4 Tamb -40°C ÷ 50°C
Ex de IIC T4 Tamb -40°C ÷ 50°C
Ex d IIC T5 Tamb -40°C ÷ 40°C
Ex de IIC T5 Tamb -40°C ÷ 40°C
Ex tD A21 IP66 T125°C Tamb -40°C ÷ 50°C

Turin, 03 December 2010

CE 2049

Dionisio Bucchieri
Directive Responsible

Paolo Dentis
Notified Body Manager

This certificate do not replace anyway the declaration of conformity nor exonerate the Manufacturer from product liability.
Any change in the design or realization may be not valid this certificate and requires a communication to the body. The technical documentation do not refers to others directives applicable to the equipment. The change of the reference standards cause the decay of the certificate. This certificate has one page and is reproducible only in its entirety.
This document is the English translation made by the notified body of the original document drawn in Italian, only the Italian text is legally valid.

[13] ANNEX

[14] EC TYPE EXAMINATION CERTIFICATE n. EUM1 10 ATEX 0350

[15] Description of Equipment

2GD category motors appropriates for the use in Zone 1, 2, 21, 22 manufactured in accordance with the standards EN 60079-0, EN 60079-1, EN 0079-7, EN 61241-1; the symbol "e" symbol on marking string, when present, refers to the terminals enclosure type of protection; the certification includes the IIB and IIC group capacitor enclosure described in the manufacturer documentation; if the manufacturer uses an IIB capacitor enclosure, the whole equipment belong to IIB group.

The principal characteristics of the apparatus are:

a) Three-phase and single-phases asynchronous squirrel cage rotors motors with shaft height from 56 to 112 mm

b) Totally closed with protection degree up to IP66 ventilated and not ventilated (with half power in respect to the ventilated corresponding motors so to maintain a T3 temperature class).

c) Insulation class F, H

d) 2, 4, 6, 8, 2/4, 4/8, 4/6, 6/8 poles

e) Voltage supply up to 850 V ,

f) Frequency 50/60 Hz

g) Double speed motors with one Dahlander winding or with two separate windings

h) Max surface temperature:

GAS	temperatura class T3, T4, T5
DUST	T125°C

i) 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 protection 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.

j) In case of single phase motors the capacitors have to be placed in the appropriate enclosure or in safe zone.

k) Possibility of use of anticondensation resistences powered only at stopped motor.

l) Painting: the paint used has a maximum thickness of 0,2 mm

The code list is in the following table

Paolo Dentis
Notified Body Manager

[13] ANNEX

[14] EC TYPE EXAMINATION CERTIFICATE n. EUM1 10 ATEX 0350

OD 063 A 4 H 230 5 P 4 U

Motor Type			
MD	Single Phase Ex d	ME	Single Phase Ex d
OD	Three Phase Ex d	OE	Three Phase Ex d

Shaft height
56, 63, 71, 80, 90, 100, 112

Motor Dimensions	
A, B	56, 63, 71, 80
S, L	90
K, M	100
M	112

Poles	
2, 4, 6	Single phase motors
2, 4, 6, 8	Three phase motors 1 speed
3, 5, 7, 9	Three phase motors 2 speed 2/4, 4/6, 4/6, 6/8 poles

Mounting System			
B	B3	W	B3/B14
H	B3box dx	X	B3/B5
S	B3 box sx	J	B3/B14 box sx
F	B5	M	B3/B14 box dx
G	V1 (B5 + roof)	R	B3/B5 box sx
Q	B14	T	B3/B5 box dx

Supply voltage
For two voltage motors is indicated the lower (ex. 230 for 230/400)

Frequency	
5	50Hz
6	60Hz
7	50/60Hz

Protection (IP and Ex)	
P	IP66 – Motor Ex d or Ex de
Q	IP68 – Motor Ex d or Ex de plus Ex tD

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	(PTO) Protector – temperature class T3
4	(PTO) Protector – – temperature class T4
5	(PTO) Protector — temperature class T5
P	PTC – temperature class T3
U	PTC – temperature class T4
V	PTC – temperature class T5

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EUROFINS – MODULO UNO S.P.A. - VIA CUORGNÉ, 21 – 10156 TORINO - ITALY
NOTIFIED BODY N. 2049

[13] ANNEX

[14] EC TYPE EXAMINATION CERTIFICATE n. EUM1 10 ATEX 0350

[15] Motor list inside the certificate with relative powers

Three Phase Motors one speed							
3000 rpm		1500rpm		1000 rpm		750 rpm	
Tipo	Power [kW]	Tipo	Power [kW]	Tipo	Power [kW]	Tipo	Power [kW]
56A2	0,09	56A4	0,06				
56B2	0,12	56B4	0,09				
63A2	0,18	63A4	0,12				
63B2	0,25	63B4	0,18	63B6	0,12		
71A2	0,37	71A4	0,25	71A6	0,18		
71B2	0,55	71B4	0,37	71B6	0,25	71B8	0,12
80A2	0,75	80A4	0,55	80A6	0,37	80A8	0,18
80B2	1,1	80B4	0,75	80B6	0,55	80B8	0,25
90S2	1,5	90S4	1,1	90S6	0,75	90S8	0,37
90L2	2,2	90L4	1,5	90L6	1,1	90L8	0,55
		100K4	2,2			100K8	0,75
100L2	3	100L4	3	100L6	1,5	100L8	1,1
112M2	4	112M4	4	112M6	2,2	112M8	1,5

Three Phase Motors two speeds constant torque							
1500/3000 rpm		750/1500rpm		1000/1500 rpm		750/1000 rpm	
Tipo	Potenza [kW]	Tipo	Potenza [kW]	Tipo	Potenza [kW]	Tipo	Potenza [kW]
71A3	0,22	71A5	0,11				
	0,33		0,18				
71B3	0,4	71B5	0,15	71BL	0,10	71B9	0,08
	0,5		0,3		0,20		0,12
80A3	0,45	80A5	0,22	80AL	0,20	80B9	0,13
	0,6		0,45		0,40		0,15
80B3	0,6	80B5	0,37	80BL	0,30	80B9	0,15
	0,8		0,55		0,50		0,25
90S3	0,8	90S5	0,37	90SL	0,45	90S9	0,25
	1,1		0,75		0,65		0,35
90L3	1,2	90L5	0,6	90LL	0,60	90L9	0,30
	1,6		1,1		0,95		0,60
100M3	1,5	100M5	0,7	100ML	0,90	100M9	0,55
	2,2		1,1		1,40		0,80
100L3	2,2	100L5	1,1	100LL	1,10	100L9	0,65
	3		1,8		1,85		1,00
112M3	3,3	112M5	1,4	112ML	1,60	112M9	1,00
	4		2,6		2,40		1,50

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[13] ANNEX

[14] EC TYPE EXAMINATION CERTIFICATE n. EUM1 10 ATEX 0350

[15]

Three Phase Motors two speeds quadratic torque							
1500/3000 rpm		750/1500rpm		1000/1500 rpm		750/1000 rpm	
Tipo	Potenza [kW]	Tipo	Potenza [kW]	Tipo	Potenza [kW]	Tipo	Potenza [kW]
71A3	0,09	71A5	0,05				
	0,37		0,25				
71B3	0,14	71B5	0,07	71BL	0,10		
	0,50		0,37		0,30		
80A3	0,18	80A5	0,10	80AL	0,13	80B9	0,09
	0,75		0,55		0,44		0,33
80B3	0,25	80B5	0,15	80BL	0,18	80B9	0,12
	1,10		0,75		0,59		0,40
90S3	0,37	90S5	0,25	90SL	0,30	90S9	0,19
	1,50		0,90		0,90		0,48
90L3	0,55	90L5	0,30	90LL	0,40	90L9	0,25
	2,20		1,20		1,15		0,66
100M3	0,62	100M5	0,45	100ML	0,60	100M9	0,37
	2,60		1,90		1,60		0,90
100L3	0,75	100L5	0,55	100LL	0,70	100L9	0,45
	3,30		2,20		2,20		1,10
112M3	4,40	112M5	0,75	112ML	0,90	112M9	0,75
	1,10		3,00		3,00		1,50

Single phase motors one speed					
3000 rpm		1500rpm		1000 rpm	
Tipo	Potenza [kW]	Tipo	Potenza [kW]	Tipo	Potenza [kW]
56A2	0,09	56A4	0,06		
56B2	0,12	56B4	0,09		
63A2	0,18	63A4	0,12		
63B2	0,25	63B4	0,18	63B6	0,09
71A2	0,37	71A4	0,25	71A6	0,12
71B2	0,55	71B4	0,37	71B6	0,18
80A2	0,75	80A4	0,55	80A6	0,25
80B2	1,1	80B4	0,75	80B6	0,37
90S2	1,5	90S4	1,1	90S6	0,55
90L2	1,5	90L4	1,5	90L6	0,75
100M2	2,2			100M6	1,10
100L2	3	100M4	2,2		
112M2	4	112M4	3		

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Notified Body Manager

[13] ANNEX

[14] EC TYPE EXAMINATION CERTIFICATE n. EUM1 10 ATEX 0350

[16] **Assessment report n° M1.10.REL.01/40346**

This EC-Type examination certificate is issued in consequence of positive assessment to 94/9/CE directive and to harmonized standards EN 60079-0, EN 60079-1, EN 0079-7, EN 61241-1, performer by the notified body EUROFINS-MODULO UNO S.p.A., and written in the report indicated above

Individual tests

No routine verifications and tests have to be performed in accordance with EN 60079-1 requirements; The manufacturer shall execute the verification and tests indicated in EN 60079-0 chapter 27

Descriptive Documents

Name	Description	Date	Rev.	N. pages	Listed
Motori serie O-M Istruzioni di sicurezza, installazione e manutenzione	Manuale di utilizzo installazione e manutenzione	10/09/2010	0	1	
Motori asincroni serie O-M	Nota tecnica motori serie O-M	29/09/2010	0	12	√
Custodie condensatore Ex d IIB / Ex d IIC	Custodie condensatore Gas gruppo IIB e IIC	29/09/2010	0	1	√
Pressacavo Ex d	Disegno dettaglio pressacavo	20/09/2010	0	1	√
Disegno motore Ex d con descrizione giunti	Disegno motore Ex d con descrizione giunti	20/09/2010	0	1	√
Disegno motore Ex d con descrizione giunti	Disegno motore Ex d con descrizione giunti senza scatola morsetti	20/09/2010	0	1	√
Disegno motore Ex de IIC con descrizione giunti	Disegno motore Ex d e scatola Ex e con descrizione giunti	20/09/2010	0	1	√
Rapporto di prova 2010-0001	Risultati prove termiche motori	03/12/2009	0	19	
Product information MC 153NF/K 32 MC 153NF/W 57.01	Scheda tecnica sigillante scatola morsetti	11/2010	4	5	
Product information AS 50/AW 50	Scheda tecnica sigillante scudo	07/2010	4	5	

Special condition for a safe use

[17] The cable gland integrated in the terminal enclosure and used for the connection between the enclosure and the motor is appropriate only for the use with the a cable with the same diameter of the internal hole of the elastomeric ring.

Paolo Dentis
Notified Body Manager

[13] ANNEX

[14] EC TYPE EXAMINATION CERTIFICATE n. EUM1 10 ATEX 0350

Essential Health and Safety Requirements

[18] Guaranteed by the conformity to the harmonized standards; The requirement 1.2.7 assessment is not included in this certificate

[19] **Certificate History**

This certificate is at its first issue

[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 Directive;

Changes or amendments in the standards which form the basis to assess the compliance with the essential requirements of the 94/9/EC directive.

Paolo Dentis
Notified Body Manager

End of certificate

12.8.4. 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

DEKRA Certification B.V. Meander 1051, 6825 MJ Arnhem P.O. Box 5185, 6802 ED Arnhem The Netherlands
T +31 88 96 83000 F +31 88 96 83100 www.dekra-certification.com Registered Arnhem 09085396

(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

12.9. Sample Pump, Speck pump with Gast air motor

Please contact Brannstrom Sweden AB to receive the ATEX certificate of the Speck sample pump with Gast air motor.
Email: info@brannstrom.se

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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