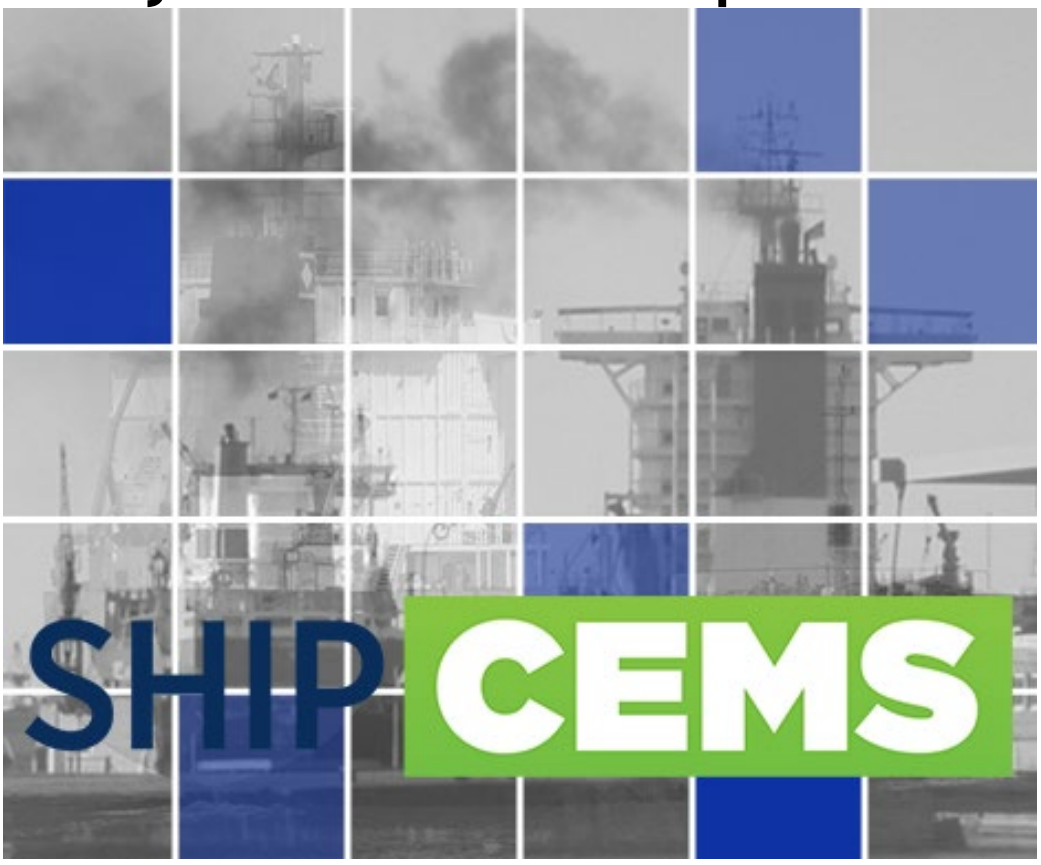
ShipCEMS Continuous Emission Measurement System

Analyser module reset procedure



ShipCEMS Continuous Emission Measurement System

Analyser module reset procedure

The purpose of this instruction is to provide the information required to make correct settings for the calibration to function.

The reason why a calibration is not working could be a contaminated analyser or that the analyser was wrongly calibrated.

This manual is intended for personnel performing the installation. The information supplied shall be used as basis for the installation contractor's own drawings applicable to the ship. On completion of the installation, this manual must be kept on the ship for reference purposes during system maintenance.

NA-E-INS-081

Revision status

Revision	Date	Prepared	Checked	Approved
Rev. 01	27.01.2020	ALI	JET	MBA

Document history

Revision	Reason for issue
Rev. 01	First issue.

Important

Before using the equipment, read all instructions thoroughly and follow all precautions and warnings contained within this document. Improper use may cause personal injury and/or damage to the equipment, and may void the warranty. Norsk Analyse disclaims any responsibility for damage or injury caused by improper installation, use or maintenance of the equipment.

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Table of contents

Admonitions

Note	*Text set off in this manner presents clarifying information or specific instructions relevant to the immediate instruction.*
Caution	*Text set off in this manner provides a warning notice that failure to follow the directions in this caution can result in damage to equipment.*
Warning	***Text set off in this manner provides a warning notice that failure to follow the directions in this warning can result in bodily harm or loss of life and/or extensive damage to equipment.***
DANGER	***TEXT SET OFF IN THIS MANNER PROVIDES A WARNING NOTICE THAT FAILURE TO FOLLOW THE DIRECTIONS IN THIS WARNING WILL RESULT IN BODILY HARM OR LOSS OF LIFE AND/OR EXTENSIVE DAMAGE TO EQUIPMENT.***

1 Introduction

1.1 Time estimation and grade of difficulty

Time estimation: 60 minutes

Grade of difficulty (1-10): 5

1.2 Purpose

AX number	AX material description
N/A	N/A

By following the steps in the instruction, the analyser module will have a factory reset, correct data entered and then a new calibration with correct calibration gas values. After finishing the steps the ShipCEMS system should work correctly.

1.3 Contact details

For enquiries related to sales, service, support, maintenance and spare parts, please contact us at:

Norsk Analyse
Wirgenesvei 10
N-3157 Barkåker, Norway
Phone: +47 3337 5100
Fax: +47 3337 5149

Support: support@norskanalyse.com
Spare parts: vimex@norskanalyse.com

2 General safety rules

Safety precautions must be followed at all times during installation, operation and maintenance of the system.

Personnel shall be sufficiently qualified, and proper caution shall be taken to avoid injuries or damage to life, health, environment, equipment and property.

2.1 High voltage

Warning ***ShipCEMS operates at a potentially lethal AC voltage.***

Always switch off all power before installation or maintenance. Adhere to safety precautions and instructions as directed by company policy.

For safety reasons during troubleshooting on the equipment with power ON, two persons must always be present.

Whenever installation or maintenance is carried out, it is essential that a first aid kit is available, and that personnel are familiar with the first aid instructions for electrical shock.

3 System description

3.1 System overview

The main purpose of the ShipCEMS Continuous Exhaust Emission Monitoring System is to analyse sulphur dioxide and carbon dioxide in wet marine exhaust flue.

The analyser module is located inside the analyseer cabinet cabinet (AC).

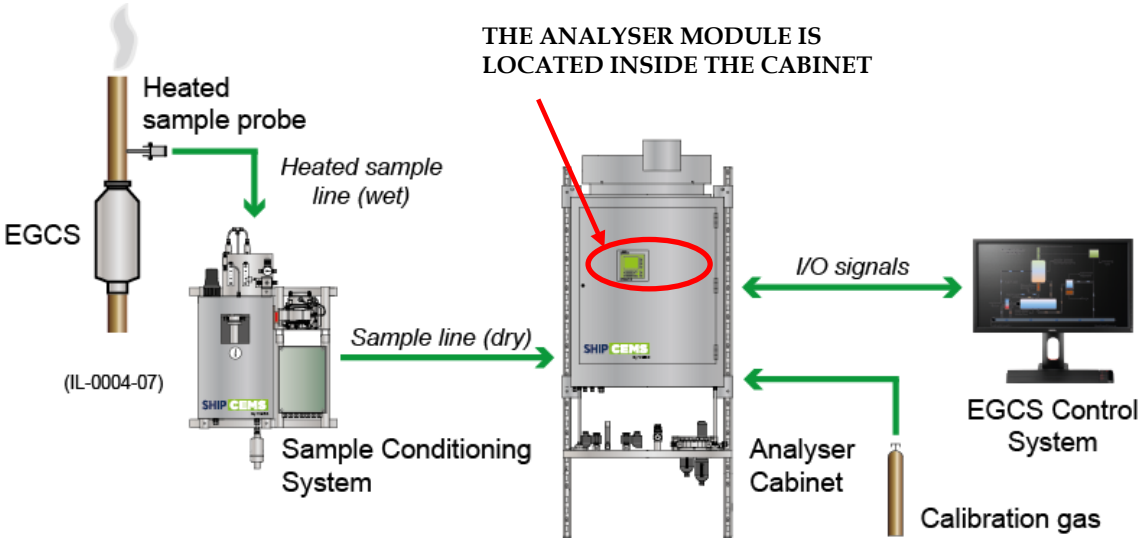


Figure 1 Block diagram for ShipCEMS analyser system

3.2 Necessary tools

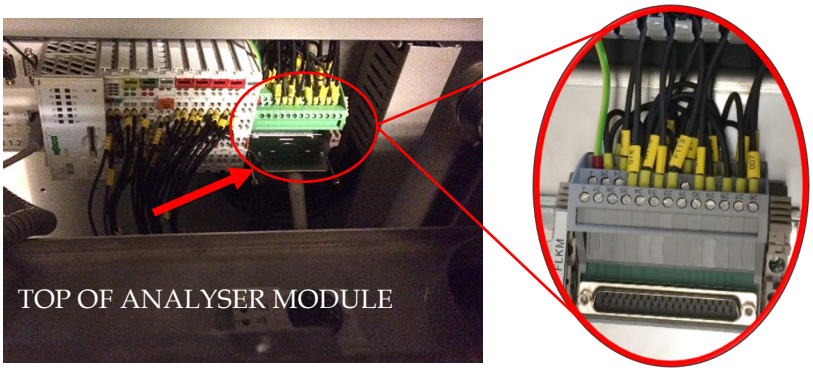
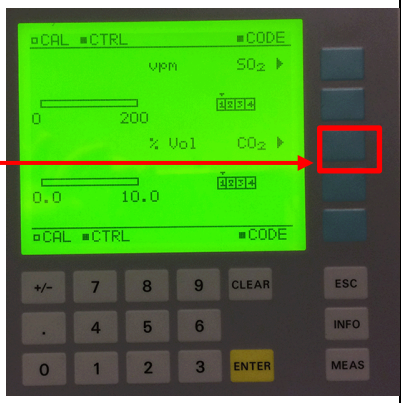
N/A

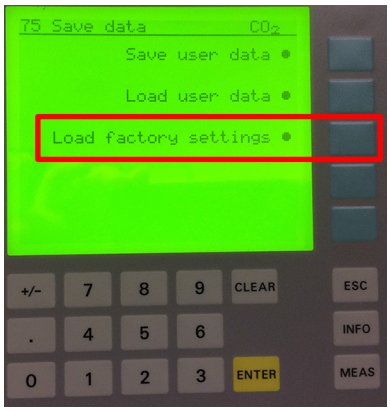
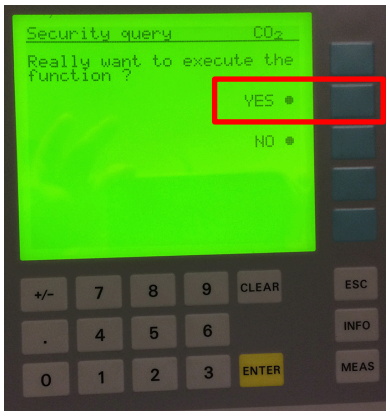
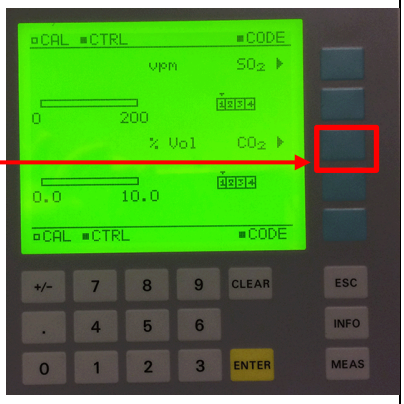
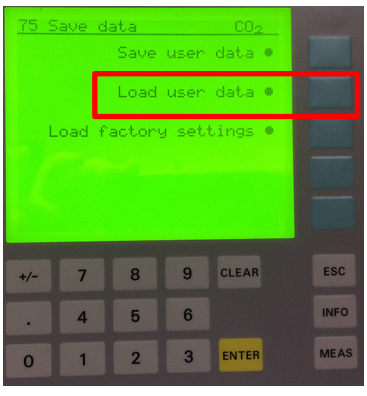
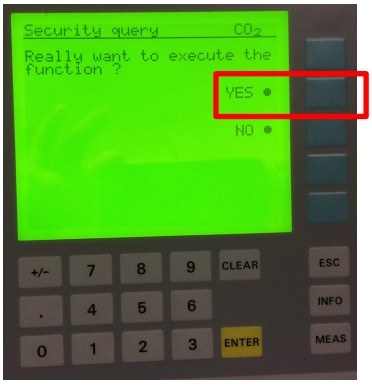
4 Procedure

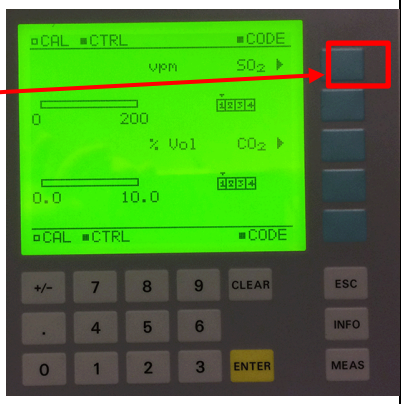
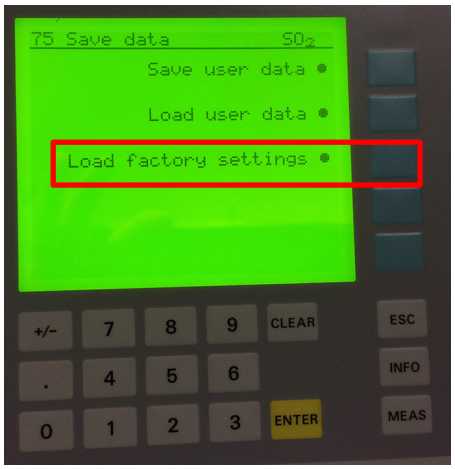
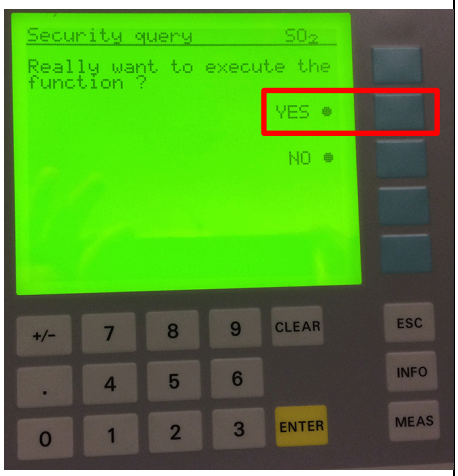
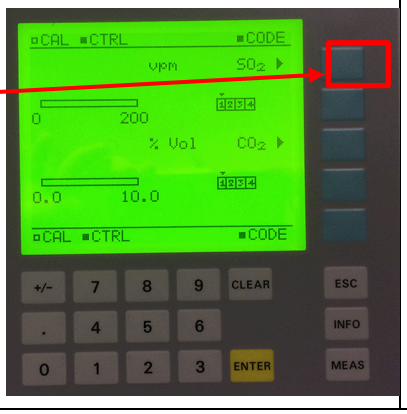
The procedure must be performed by skilled personnel and be supervised by a technician with relevant experience.

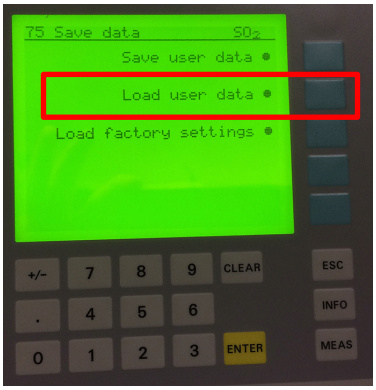
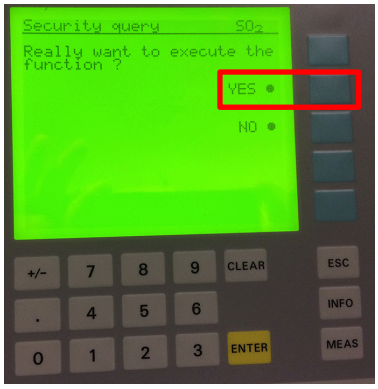
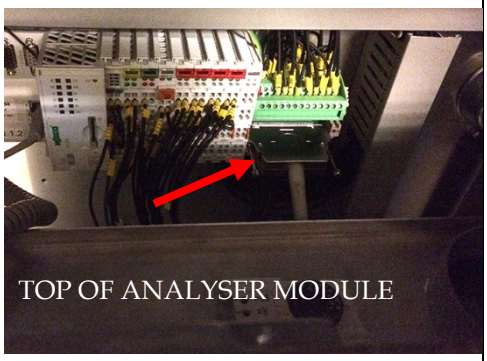
Note *Failure to adhere to instructions given may render the guarantee void.*

Step	Description	Sign
1	Check the range for SO2 and CO2 on the analyser module HMI- main page. It is most likely the following (if not, print your values below). • 0-200ppm for SO2 _____ • 0-10% for CO2 _____	
2	Disconnect electric supply.	

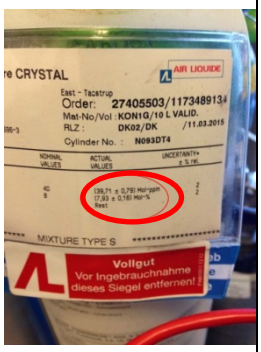
Step	Description	Sign
3	Disconnect D-sub (FLKM) (internal signal cables) from the analyser module. It is visible if you look over the top of the analyser module. 	
4	Turn the power back ON. 	
5	CO2: a) Enter function 75 (7 then 5) (no reaction on HMI) b) Push the CO2 button. c) Press password 222 (or 135) and Enter (you cannot see the digits you enter). 	
6	If HMI respons *Illegal code,* press ESC twice until the main page appears. Repeat step 5, but use the other password (135) instead.	

Step	Description	Sign
7	Select *Load factory settings* and select *YES.*   Wait for the analyser to restart.	
8	CO2: a) Enter function 75 (7 then 5) (no reaction on HMI) b) Push the CO2 button. c) Press password 222 (or 135) and Enter (you cannot see the digits you enter). 	
9	Select *Load user data. Select YES.*   *W*ait for the analyser to restart.	

Step	Description	Sign
10	Repeat the procedure for SO2: a) Enter function 75 (7 then 5) then b) Push the SO2 button. c) Use the same password as for CO2 (222 or 135). 	
11	Select *Load factory settings* and select *YES*.   *W*ait for the analyser to restart.	
12	SO2: a) Enter function 75 (7 then 5) then b) Push the SO2 button. c) Use the same password as for CO2 (222 or 135). 	

Step	Description	Sign
13	Select *Load user data* and *YES*.   *W*ait for the analyser to restart.	
14	Disconnect electric supply. 	
15	Connect D-sub (internal signal cables) from the analyser module. It is visible if you look over the top of the analyser module. Turn it the correct way! 	
16	Turn the power back ON. 	

Step	Description	Sign
17	**Main page:** **CO2:** The range is most likely the same, 0-10%, but in case it is 0-15% change to the same as you had before factory reset under function 41. Refer to step 1. a) Enter function 41. b) Select CO2. c) Print code 111 and Enter d) Change to correct value e) Select MEAS f) Accept modification g) YES h) Press MEAS twice to log out and store changes.	
18	**Main page:** **SO2:** Change the range to the same as you had before loading the factory reset, this can be done under **function 41** (most likely you need to change the range from 0-50 to 0-200 ppm)**.** Refer to step 1. a) Enter function 41. b) Select SO2. c) Print code 111 and Enter d) Change to correct value e) Select MEAS f) Accept modification g) YES h) Press MEAS twice to log out and store changes.	

Step	Description	Sign
19	Enter correct values for the calibration bottle for the CO2 and SO2 under function 22. Press 22 and select channel e.g. SO2 a) Enter function 22. b) Select SO2 c) Print 111 and Enter d) Enter setpoint for all 4x MR values and press Enter. e) Press MEAS f) Accept modification? g) YES h) Press MEAS twice to log out and store changes. 	
20	Clear the logbook on both channels, by pushing the buttons 6 then 0 followed by either the SO2 or CO2 button. Password (111) There is no visual respons from HMI when entering password!	
21	Perform SO2/CO2 configuration (Chapter 4 in factory test (NA-E-TST-004-ShipCEMS Internal Test Procedure Analyser Cabinet). The six pages are included on the next pages.)	

Channel no. 1. **Measured gas: SO2**				
Function no.	**Menu**	**Sub-menu**	**Parameter**	**Setting**
22	Set points for zero/span		Zero set point Set point MR 1 Set point MR 2 Set point MR 3 Set point MR 4	0.00 vpm [Insert bottle SO2 value] [Insert bottle SO2 value] [Insert bottle SO2 value] [Insert bottle SO2 value]
Press MEAS				
23	Total/single range calibration		Total range calibration	Checked
Press MEAS				
24	Autocal /-check	Mode	ON Cyclic Binary	Checked Not checked Checked
Press MEAS				
24	Autocal /-check	Sequence	Step 1 Step 2 Step 3 Step 4 Step 5	Zero gas 1 2.0 min Calibration gas 1 2.0 min Zero gas 1 2.0 min Vacant *(*6)* Vacant *(*5)*
Press MEAS				
24	Autocal /-check	Cycle parameter	Cycle time Span calibration cycle	24 1
Press MEAS				
40	Range selection			MR1 checked
Press MEAS				

Note (*) – No. of button presses

Channel no. 1 **Measured gas: SO2**				
Function no.	**Menu**	**Sub-menu**	**Parameter**	**Setting**
41	Define measuring ranges		MR1 MR2 MR3 MR4	0 – 200 ppm 0 – 200 ppm 0 – 200 ppm 0 – 200 ppm
Press MEAS				
55	Select display digits		Suppress negative values Automatic Total After decimal	Checked Not checked 3 0
Press MEAS				
70	Analog outputs		4-20 mA Inverted Suppress negative values	Checked Not checked Checked
Press MEAS				
71	Relay outputs		Relay 1 Relay 2 Relay 3 Relay 4 Relay 5 Relay 6	Fault Span gas 1 *(*8)* Zero gas Maintenance request *(*1)* Function control *(*6)* Limit1 *(*20)*
Press MEAS				
72	Binary inputs	Define	Binary input 1 All others	Auto calibration *(*14)* Vacant
Press MEAS				
77	Store analog outputs		Analog out to measured value Analog out to 0/2/4 mA Analog out to 21 mA Store on/off	Checked Not checked Not checked Checked

Channel no. 1	**Measured gas: SO2**			
Function no.	**Menu**	**Sub-menu**	**Parameter**	**Setting**
Press MEAS				
78	Calibration tolerances		Calibration at zero Sensitivity calibration Signal tolerance violation	10% 10% Not checked
Press MEAS				
79	Codes for input level		Code level 1 Code level 2	111 135
Press MEAS				

Note (*) – No. of button presses

Channel no. 2	**Measured gas: CO2**			
Function no.	**Menu**	**Sub-menu**	**Parameter**	**Setting**
22	Set points for zero/span		Zero set point Set point MR 1 Set point MR 2 Set point MR 3 Set point MR 4	0.04% [Insert bottle CO2 value] [Insert bottle CO2 value] [Insert bottle CO2 value] [Insert bottle CO2 value]
Press MEAS				
23	Total/single range calibration		Total range calibration	Checked
Press MEAS				
24	Autocal /-check	Mode	ON Cyclic Binary	Checked Not checked Checked
Press MEAS				
24	Autocal /-check	Sequence	Step 1 Step 2 Step 3 Step 4 Step 5	Zero gas 1 2.0 min Calibration gas 1 2.0 min Zero gas 1 2.0 min Vacant *(*6)* Vacant *(*5)*
Press MEAS				
24	Autocal /-check	Cycle parameter	Cycle time Span calibration cycle	24 1
Press MEAS				
40	Range selection			MR1 checked
Press MEAS				
41	Define measuring ranges		MR1 MR2 MR3 MR4	0 – 10% 0 – 10% 0 – 10% 0 – 10%
Press MEAS				

Channel no. 2	**Measured gas: CO2**			
Function no.	**Menu**	**Sub-menu**	**Parameter**	**Setting**
52	On/Off Config		Monitor sample gas pressure	Checked
Press MEAS				
55	Select display digits		Suppress negative values Automatic Total After decimal	Checked Not checked 4 2
Press MEAS				
70	Analog outputs		4-20 mA Inverted Suppress negative values	Checked Not checked Checked
71	Relay outputs		Relay 1 Relay 2 Relay 3 Relay 4 Relay 5 Relay 6	Fault Span gas 1 *(*8)* Zero gas Maintenance request *(*1)* Function control *(*6)* Fl. sam. gas (Pr. sample gas) *(*18)*
Press MEAS				
72	Binary inputs	Define	Binary input 1 All others	Auto calibration *(*14)* Vacant
Press MEAS				
77	Store analog outputs		Analog out to measured value Analog out to 0/2/4 mA Analog out to 21 mA Store on/off	Checked Not checked Not checked Checked
Press MEAS				

Channel no. 2	**Measured gas: CO2**			
Function no.	**Menu**	**Sub-menu**	**Parameter**	**Setting**
78	Calibration tolerances		Calibration at zero Sensitivity calibration Signal tolerance violation	10% 10% Not checked
Press MEAS				
79	Codes for input level		Code level 1 Code level 2	111 135
Press MEAS				

Note (*) – No. of button presses

22	Wait for 1 ½ hours. 	

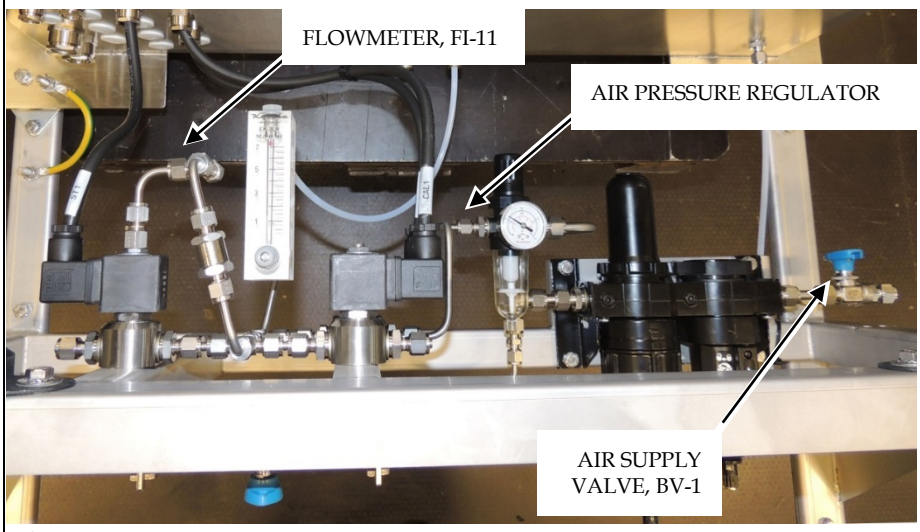
23

Perform a flow adjustment for zero and span gas:

Flow adjustment for analyser calibration

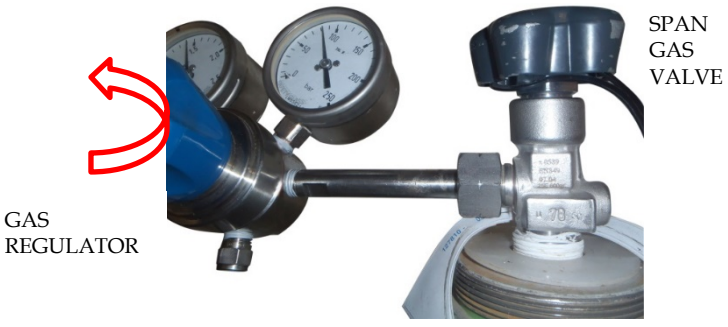
a) AC: Press F4 button on the LOGO display until *Air inlet* is selected.

b) AC: Adjust the air supply pressure regulator under AC until flowmeter, FI-11, under AC is 1.0 l/min.



c) AC: Press F4 button until Span inlet is selected.

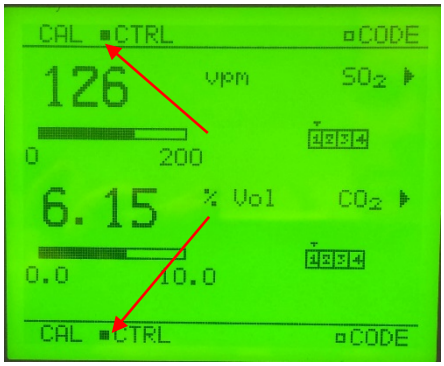
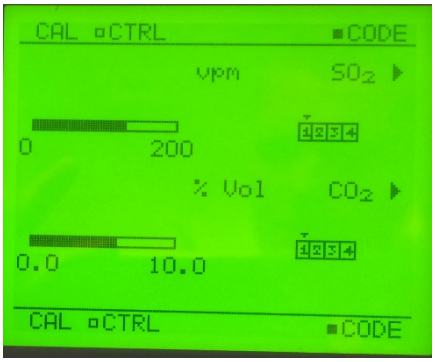
d) Make sure the gas regulator (refer to figure below) is fully closed. (Fully turned counterclockwise.)



e) Open span gas valve on the cylinder and carefully open gas regulator (several turns clockwise) until flowmeter, FI-11, under AC (refer to figure above) shows 1.0 l/min.

f) Flow settings are completed.

24	Perform a new calibration. It takes approx. 4 min. **CALIBRATION PROCEDURE:** a) Make sure flow adjustments has been carried out in previous step! b) Press the F3 button on LOGO display to start the auto-calibration procedure below: **Zero calibration:** c) **Prior to** zero calibration the solenoid valve for instrument air will open and the analyser will be purged with air for two minutes for stable reading. Purging is performed automatically. d) When readings are stable the zero calibration is performed. e) Solenoid valve for instrument air will close and span calibration will start. **Span calibration:** f) Prior to span calibration the solenoid valve for span gas will open and the analyser will be purged with span gas for two minutes for stable reading. Purging is performed automatically. g) When readings are stable, the span calibration is performed. h) After span calibration is performed the solenoid valve will close and the system goes automatically back to its prior mode (e.g. measuring or idle mode). i) Close span gas valve on the cylinder. *Note* *Purging is performed to achieve stable measurements before calibration. A complete calibration procedure takes approx. six minutes.*	

25	If CTRL is checked in the main page (black square at either top or bottom) you have to log out by pressing the MEAS button <u>twice</u> (if not analog output will freeze). After correct procedure CTRL is unchecked. Refer to pictures below. *Note* *CTRL is also checked in warmup mode.*  CTRL is checked  CTRL not is checked	
26	Test the system and revert to Norsk Analyse with your findings.