 UNION Instruments GmbH	Quick start manual <i>INCA - Errors and Service messages</i>	Datum: 08.05.2013
		Version: V1.02

Quick start manual



INCA Process Gas Analyzer


Errors and Service messages

Description of error outputs, error triggers and proposals for a solution of errors and service messages reported by the INCA Prozess Gas Analyzer.

REMARK:

Errors and service messages are supported by the following software versions:

- Firmware INCA: V1.08 and newer
- INCACtrl: V1.02 and newer

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Change history

Date	Changes	Author	Version
24.04.2013	Translation of DE-version V1.01R01	TF	V1.01R01
08.05.2013	Release	TF	V1.02

Table 1: Change history

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Introduction

The errors and service messages of the INCA process gas analyzer are aiming to support the user in error analysis regarding problems occurring during operation of the analyzer.

The outputs are displayed as follows:

- on the display of the INCA process gas analyzer
- in the main dialog of the PC-program INCACtrl (provided the program is connected to the INCA process gas analyzer).

There 2 types of outputs:

- 1.) errors
- 2.) service messages

Errors

Indicating general operation defects of the INCA process gas analyzer

Service messages

Indicating deficits regarding calibration, age and usage of specific sensors

Attention



A correction of errors and service messages is compulsive for a reliable and high-grade measurement of the INCA process gas analyzer.

Attention



A correction of errors and service messages should only be carried out by qualified personnel.

Errors and Service messages

Display

All errors and service messages are displayed in a 2 lines.

The **1st line** distinguishes if it is an error or a services message. This line is translated to the set language.

The **2nd line** gives information about th cause of the message.

The output occurs during the standard measurement display – every 10 seconds for 4 seconds. While navigating through the menu, the output is deactivated.

Only one message is displayed at a time. The messages have a priority order (see below) and only the message with the highest priority is displayed.

INCA (display)



Fig. 1: Output INCA (Display)

INCACtrl (PC)

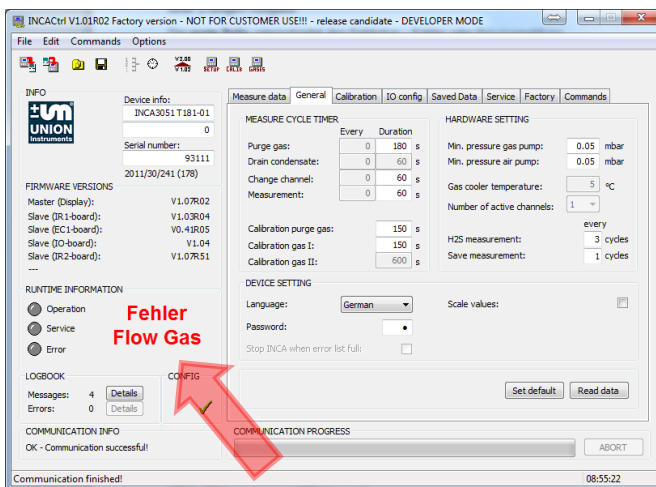



Fig. 2: Output INCACtrl (PC)

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REMARK: Communication error „Errors Password“

The below described messages are supported by INCACtrl versions V1.02 and newer. To ensure that the INCA process gas analyzer can only be configured with a newer version of INCACtrl, a communication must authenticate first before further commands can be sent. When using an older version of INCACtrl with a newer firmware, the display will output “Errors Password”.

Important



Always use the newest versions of INCACtrl and firmware. If necessary perform a firmware update through INCACtrl. (Download: <http://www.union-instruments.com>)

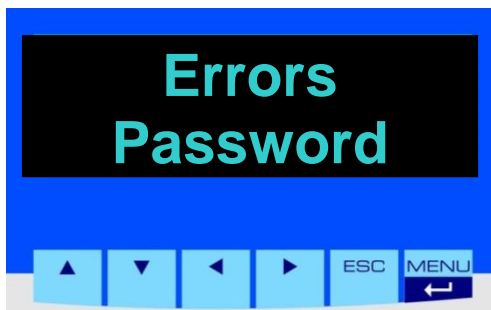


Fig. 3: Output communication error "Errors Password"




Display status LEDs

All pending errors und service messages are summarized and signaled in the front panel through status LEDs (implemented in front panel from manufacturing date approx. 10/2013):

- Operation
- Service
- Error


This display always gives very quick an overview about the status of the INCA process gas analyzer.

The following states are displayed through those LEDs:

LED OPERATION	
Output state	Description
 flashing	Device functionality OK (even Service might be pending)
 flashing	Device functionality is affected by errors
 flashing	Device stopped by fatal error

LED SERVICE	
Output state	Description
 flashing	Service message pending

LED ERROR	
Output state	Description
 flashing	Error pending

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Overview

Errors and service messages are listed in the following table. They are ordered by priority from high to low priority. The highest priority messages is always displayed.

ERRORS	
Type	Description
Global error <i>fatalErrorMessage</i>	Fatal error, which has stopped the INCA - Error list with error codes (e. g. 0x1234)
Sensor error <i>runtimeErrSens</i>	Errors, which are reported directly from a sensor PCB. - Errors from PCB-IR (CO ₂ , CH ₄ , C ₂ +) - Errors from PCB-EC bzw. PCB-EC-T (H ₂ S, O ₂ , H ₂) - Errors from PCB-CAB (Parox O ₂ , SG)
Slave error <i>runtimeErrAddOnSlv</i>	Errors, which are reported directly from a slave PCB. - Errors from PCB-IO - Errors from PCB-EC-T als Flow-Block
Calibration error <i>runtimeCalErrDisp</i>	Errors, which occur during a calibration (aborting or not preventing the start of a calibration) - gas and/or air flow - calibration settings - calibration times
Device error <i>runtimeErrData1</i>	Errors, which are reported during runtime when process data exceeds ranges. - gas and/or air flow - temperature/control NDIR1 and NDIR2 - temperature/control case - temperature/control gas cooler
SERVICE MESSAGES	
Type	Description
Check message <i>runtimeServiceCheck</i>	Service message, which reports to perform an inspection of the INCA – see operating manual (> ½ year since last inspection).
Sensor age <i>runtimeServiceAgeUse</i>	Service message, which reports the exceeding of the lifetime of a sensor. (> 26 months since factory calibration). - EC-sensors H ₂ S, O ₂ , H ₂
Sensor calibration <i>runtimeServiceCalTime</i>	Service message, which reports the need for a recalibration of a sensor (> 1 year since last calibration). - zero point (ZERO) - span point (SPAN)
Sensor usage <i>runtimeServiceCalUse</i>	Service message, which reports a low sensor signal for calibration. (cal. operation Span-factor > 4x cal. factory Span-factor) - EC- sensors H ₂ S, O ₂ , H ₂

Tab. 1: Overview of Errors and Service messages

Global errors

Output	Cause	Proposal for solution
	Fatal error	→see error list with error codes e.g. 0x1234 = error code


Error list (Abstract)

A complete list can be found in the service manual.


Error code	Description	Proposal for solution
0x0390	No sensor-slave found <i>No sensor- or slave-PCB found. Communication of internal bus is malfunctioning.</i>	- check all 3-wired cable connection (bus) short-circuit, unplugged connector, etc. - check fuses and PCB-FanSafe LED3 & LED2 →left fuse carrier (F3.2) for LED3 (grün = OK) →right fuse carrier (F3.1) für LED2 (grün = OK)
0x0391, 0x0392	Error calibration data NDIR	- delete errors and restart (commands menu) - change NDIR-sensor
0x0393	Error calibration data µPulse	- delete errors and restart (commands menu) - change µPulse-block with PCB
0x0394, 0x0395	Error calibration data Parox	- delete errors and restart (commands menu) - change Parox-sensor
0x0394, 0x0395	Error calibration data density (SG)	- delete errors and restart (commands menu) - change SG-sensor
0x0398	Error calibration data EC1 (O₂)	- delete errors and restart (commands menu) - change EC-O ₂ -sensor
0x0399	Error calibration data EC2 resp. EC 3 (H₂S and/or H₂)	- delete errors and restart (commands menu) - EC-H ₂ S and/or EC-H ₂ -sensor

Sensor errors

Output	No. and cause	Proposal for solution
Errors CO₂ [No.]	48 – not stable detector signal 51 – lamp/detector defect 54 – error pressure sensor 56 – error pressure sensor 57 – error pressure sensor 60 – error temperature sensor	(on error 48 first check for strong ambient temperature changes, such as an open door of case) replace NDIR-1
Errors CH₄ [No.]	48 – not stable detector signal (NDIR-2) 49 – not stable detector signal (NDIR-1) 51 – lamp/detector defect (NDIR-2) 52 – lamp/detector defect (NDIR-1) 54 – error pressure sensor 56 – error pressure sensor 57 – error pressure sensor 60 – error temperature sensor	(on error 48 or 49 first check for strong ambient temperature changes, such as an open door of case) replace NDIR-1 or NDIR-2
Errors C₂₊ [No.]	49 – not stable detector signal 52 – lamp/detector defect 54 – error pressure sensor 56 – error pressure sensor 57 – error pressure sensor 60 – error temperature sensor	(on error 49 first check for strong ambient temperature changes, such as an open door of case) replace NDIR-2
Errors O₂ [No.]	75 - error signal sensor O ₂	- check cable connection and position of connector - replace sensor
Errors H₂S [No.]	76 - error signal sensor H ₂ S	- check cable connection and position of connector - replace sensor
Errors H₂ [No.]	73 - error signal sensor H ₂	- check cable connection and position of connector - replace sensor

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Slave errors

Output	No. and cause	Proposal for solution
	80 – error temperature sensor (peltier gas cooler)	<ul style="list-style-type: none"> - check cable connection and position of connector - replace sensor


Calibration errors

Output	Cause	Proposal for solution
Errors CalFlowGas	No flow of calibration gas <i>Calibration aborted due to missing pump pressure and/or missing flow of calibration gas – no gas flow detected. If no pump installed, then too low input pressure at inputs.</i>	<ul style="list-style-type: none"> - check pressure of calibration gas bottle and correct if needed to 20 mbar. - if installed: check pump for process gas and replace if necessary →flow can be checked through display menu "pGas" - disconnect calibration gas from input and check flow (only if pump installed) - check process gas output for clogging (e.g. frozen) - check pressure sensor of μPulse-, TwinFlow- or PressFlow-block and replace if necessary
Errors CalFlowAir	No flow of ambient air <i>Calibration aborted due to missing (pump) pressure and/or missing flow of ambient air – no gas flow detected.</i>	<ul style="list-style-type: none"> - check pump for ambient air and replace if necessary →flow can be checked through display menu "pAir" - check ambient air filter for clogging and replace if necessary - check process gas output for clogging (e.g. frozen) - check pressure sensor of μPulse-, TwinFlow- or PressFlow-block and replace if necessary
Errors Cal. set	Error calibration setting <i>Calibration point was not performed on at least one sensor due to exceeding limiting values</i>	<p>→ specific sensor(s) causing the error can be checked via INCACtrl</p> <ul style="list-style-type: none"> - wrong calibration gas connected - wrong calibration gas setup (INCACtrl) - wrong calibration gas setting (INCACtrl) - sensor-drift too high <p>REMARK: - error does not occur when calibrating in expert-mode. WARNING: INCA process gas analyzer can be miscalibrated!</p>
Errors Cal. time	Error calibration time <i>At least one calibration point cannot be set due to missing required zero-/span-calibration.</i> <u>1st requirement:</u> <i>Zero must be set before span. Last zero calibration is out of date and must be calibrated first.</i> <u>2nd requirement (only NDIR):</u> <i>Span must be set before mid-point calibration.</i>	<p>→ specific sensor(s) causing the error can be checked via INCACtrl</p> <ul style="list-style-type: none"> - perform zero-point calibration before span-point calibration - perform span-point calibration before mid-point calibration (only NDIR)


Device errors

Output	Cause	Proposal for solution
Errors FlowGas	No flow of process gas <i>Missing pressure and/or missing flow of process gas – no gas flow detected.</i>	<ul style="list-style-type: none"> - check pressure at currently measured process gas input - if installed: check pump for process gas and replace if necessary →flow can be checked through display menu "pGas" - disconnect currently measured process gas input and check flow - check process gas output for clogging (e.g. frozen) - check pressure sensor of μPulse-, TwinFlow- or PressFlow-block and replace if necessary
Errors FlowAir	No flow of ambient air <i>Missing pump pressure and/or missing flow of ambient air – no gas flow detected.</i>	<ul style="list-style-type: none"> - check pump for ambient air and replace if needed →flow can be checked through display menu "pAir" - check ambient air filter for clogging and replace if necessary - check process gas output for clogging (e.g. frozen) - check pressure sensor of μPulse-, TwinFlow- or PressFlow-block and replace if necessary
Errors PWM IR[No.]	Error heater control NDIR <i>Error NDIR-heater control. Control has exceeded limiting values for more than 2 hours.</i> <i>[No.]: 1 or 2; marking the NDIR-sensor system reporting the error</i>	<ul style="list-style-type: none"> - check case fan and replace if necessary - check location of installation (e.g. for direct sunlight) – relocate if necessary - if installed: check internal heater for malfunctioning and replace if necessary - check heater data of NDIR
Errors Tmp. IR[No.]	Error temperature NDIR <i>Error exceeding NDIR-temperature limiting values. Not output during the 1st hour of operation after a restart.</i> <i>[No.]: 1 or 2; marking the NDIR-sensor system reporting the error</i>	<ul style="list-style-type: none"> - check case fan and replace if necessary - check location of installation (e.g. for direct sunlight) – relocate if necessary - if installed: check internal heater for malfunctioning and replace if necessary - check heater data of NDIR

<p>Errors AD IR[No.]</p>	<p>Error heater stability NDIR <i>Error exceeding NDIR-heater control limiting values. Not output during the 1st hour of operation after a restart.</i></p> <p><i>[No.]: 1 or 2; marking the NDIR-sensor system reporting the error</i></p>	<ul style="list-style-type: none"> - close case, if open - check case fan and replace if necessary - check location of installation (e.g. for direct sunlight) – relocate if necessary - if installed: check internal heater for malfunctioning and replace if necessary - check heater data of NDIR
<p>Errors Tmp. cool</p>	<p>Error temperature gas cooler <i>Error exceeding gas cooler temperature limiting values. Not output during the 1st hour of operation after a restart.</i></p>	<ul style="list-style-type: none"> - check gas cooler fan and replace if necessary - check location of installation (e.g. for direct sunlight) – relocate if necessary - check gas cooler temperature sensor and replace if necessary
<p>Errors PWM cool</p>	<p>Error control gas cooler <i>Error exceeding gas cooler control limiting values for more than 2 hours.</i></p>	<ul style="list-style-type: none"> - check gas cooler fan and replace if necessary - check location of installation (e.g. for direct sunlight) – relocate if necessary - check gas cooler temperature sensor and replace if necessary
<p>Errors Tmp. case</p>	<p>Error temperature case <i>Error exceeding inner case temperature limiting values. Not output during the 1st hour of operation after a restart.</i></p>	<ul style="list-style-type: none"> - check case fan and replace if necessary - check location of installation (e.g. for direct sunlight) – relocate if necessary - if installed: check internal heater for malfunctioning and replace if necessary
<p>Errors PWM PI-[No.]</p>	<p>Error PI-control <i>Error exceeding PI-control limiting values for more than 2 hours.</i></p> <p><i>[No.]: 1 or 2; marking the PI-control reporting the error</i></p>	<p>→ depends on connected component</p> <p>Heater:</p> <ul style="list-style-type: none"> - check all fans and replace if necessary - check internal heater for malfunctioning and replace if necessary - check temperature sensor and replace if necessary - check location of installation (e.g. for direct sunlight) – relocate if necessary

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Check message

Output	Cause	Proposal for solution
	Check required <i>Check interval overrun. INCA process gas analyzer requires an inspection every ½ year. Can be performed by operator (→see manual).</i>	Perform and keep record of check according to manual and confirm by pressing: MENU→COMMANDS→CHECK OK→[Enter]

Service message sensor age

Output	Cause	Proposal for solution
<p>Service [Type] age</p>	<p>Sensoralter überschritten Some sensors (e.g. electrochemical sensor) have a pre-defined lifetime expectancy. Message appears after an explicit overrun of the lifetime expectancy of a sensor.</p> <p>[Type] - expected lifetime: O_2 - 24 months H_2S - 15-18 months H_2 - 15 months</p>	<ul style="list-style-type: none"> - replace sensor - all (other) EC-sensors should be checked for the lifetime expectancy (can be checked by looking at factory calibration date: „Date calib. factory“ in calibration data of each EC-sensor)

Service message sensor calibration

Output	Cause	Proposal for solution
Service [Type] ZERO	Sensor calibration zero <i>For reproducible and accurate measurement sensors must be calibrated at least every 12 months.</i> <i>In this case a zero-point (ZERO) calibration has not been performed for the last 12 months.</i> [Type]: sensor type (e.g. O ₂)	Sensor calibration with defined calibration gas.
Service [Type] SPAN	Sensor calibration span <i>For reproducible and accurate measurement sensors must be calibrated at least every 12 months.</i> <i>In this case a span-point (SPAN) calibration has not been performed for the last 12 months.</i> [Type]: sensor type (e.g. O ₂)	Sensor calibration with defined calibration gas.
Service [Type] MID	Sensor calibration mid <i>For reproducible and accurate measurement sensors must be calibrated at least every 12 months.</i> <i>In this case a mid-point (MID) calibration has not been performed for the last 12 months.</i> [Type]: sensor type (e.g. O ₂)	Sensor calibration with defined calibration gas.

Service message sensor wear

Output	Cause	Proposal for solution
<div style="background-color: black; color: white; padding: 5px; text-align: center;"> Service [Type] wear </div> <p>(before V1.09R04 "usage" was displayed instead of "wear")</p>	<p>Sensor worn out <i>Lifetime expectancy of some sensors (e.g. electrochemical sensors) can be reduced by gases, which the sensor has a cross sensitivity to or gets contaminated.</i> <i>After a span calibration the wear of a sensor is detected.</i></p> <p><i>[Type]: sensor type (e.g. O₂)</i></p>	<p>Replace sensor</p>

Legend for warning symbols

Warning



Highlights an operation or maintenance procedure, condition, statement, etc.

If not strictly observed, could result in injury, death, or long-term health hazards of personnel.

Caution



Highlights an operation or maintenance procedure, condition, statement, etc.

If not strictly observed, could result in injury, damage to or destruction of analyzer or loss of effectiveness.

Note



Highlights an essential operating procedure, condition, statement, etc.
