 <b>UNION</b> Instruments GmbH	<b>Quick Start Manual</b> <i>INCA – Errors and Service Messages</i>	Datum: 22.02.2017
		Version: V1.08

# 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 Process 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

# 1 Table of contents

<b>1</b>	<b>Table of contents .....</b>	<b>1</b>
<b>2</b>	<b>Introduction.....</b>	<b>2</b>
<b>3</b>	<b>Errors and Service messages .....</b>	<b>3</b>
<b>3.1</b>	<b>Display .....</b>	<b>3</b>
	INCA (display).....	3
	INCActrl (PC) .....	3
<b>3.2</b>	<b>REMARK: Communication error „Errors Password“ .....</b>	<b>4</b>
<b>3.3</b>	<b>Display status LEDs.....</b>	<b>5</b>
<b>3.4</b>	<b>Overview .....</b>	<b>6</b>
<b>3.5</b>	<b>Global errors .....</b>	<b>7</b>
	Error list (Abstract).....	7
<b>3.6</b>	<b>Sensor errors .....</b>	<b>8</b>
<b>3.7</b>	<b>Slave errors .....</b>	<b>9</b>
<b>3.8</b>	<b>Calibration errors .....</b>	<b>10</b>
<b>3.9</b>	<b>Device errors .....</b>	<b>11</b>
<b>3.10</b>	<b>Check message .....</b>	<b>13</b>
<b>3.11</b>	<b>Service message sensor age .....</b>	<b>13</b>
<b>3.12</b>	<b>Service message sensor calibration .....</b>	<b>13</b>
<b>3.13</b>	<b>Service message sensor wear .....</b>	<b>14</b>
<b>4</b>	<b>Errors and Event list .....</b>	<b>15</b>
<b>4.1</b>	<b>State machine errors .....</b>	<b>15</b>
<b>4.2</b>	<b>Fatal state machine error .....</b>	<b>15</b>
<b>4.3</b>	<b>Communication errors.....</b>	<b>15</b>
<b>4.4</b>	<b>Fatal communication errors .....</b>	<b>17</b>
<b>4.5</b>	<b>Sensor errors .....</b>	<b>18</b>
<b>4.6</b>	<b>Fatal sensor errors.....</b>	<b>20</b>
<b>4.7</b>	<b>Command list and task request list errors .....</b>	<b>22</b>
<b>4.8</b>	<b>Menu errors .....</b>	<b>22</b>
<b>4.9</b>	<b>Storage errors .....</b>	<b>23</b>
<b>4.10</b>	<b>SD card errors .....</b>	<b>23</b>
<b>4.11</b>	<b>H-Bus errors .....</b>	<b>24</b>
<b>4.12</b>	<b>INCA Memory errors .....</b>	<b>24</b>
<b>4.13</b>	<b>Event messages (not defined as errors).....</b>	<b>24</b>
<b>5</b>	<b>Legend for warning symbols.....</b>	<b>25</b>

 <b>UNION</b> Instruments GmbH	<b>Quick Start Manual</b> <i>INCA - Errors and Service Messages</i>	Date: 22.02.2017
		Version: V1.08

## 2 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




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

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#### Attention




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

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### 3 Errors and Service messages

#### 3.1 Display

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

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

The **2<sup>nd</sup> line** gives information about the 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)

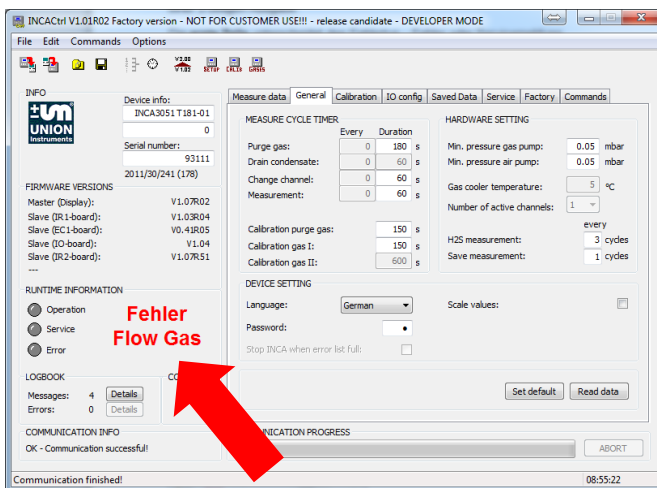



Fig. 2: Output INCACtrl (PC)

 <b>UNION</b> Instruments GmbH	<b>Quick Start Manual</b> <i>INCA - Errors and Service Messages</i>	Date: 22.02.2017
		Version: V1.08

### 3.2 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>)

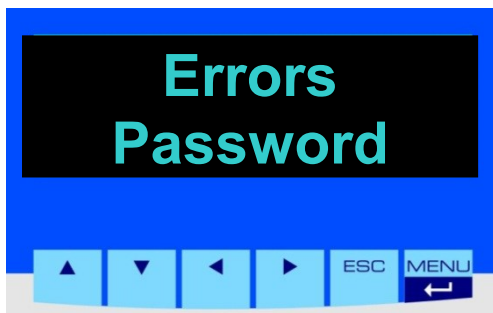


Fig. 3: Output communication error "Errors Password"




### 3.3 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

### 3.4 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
<b>Global error</b> <i>fatalErrorMessage</i>	Fatal error, which has stopped the INCA - Error list with error codes (e. g. 0x1234)
<b>Sensor error</b> <i>runtimeErrSens</i>	Errors, which are reported directly from a sensor PCB. - Errors from PCB-IR (CO <sub>2</sub> , CH <sub>4</sub> , C <sub>2</sub> +) - Errors from PCB-EC bzw. PCB-EC-T (H <sub>2</sub> S, O <sub>2</sub> , H <sub>2</sub> ) - Errors from PCB-CAB (Parox O <sub>2</sub> , SG)
<b>Slave error</b> <i>runtimeErrAddOnSlv</i>	Errors, which are reported directly from a slave PCB. - Errors from PCB-IO - Errors from PCB-EC-T als Flow-Block
<b>Calibration error</b> <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
<b>Device error</b> <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
<b>Check message</b> <i>runtimeServiceCheck</i>	Service message, which reports to perform an inspection of the INCA – see operating manual (> ½ year since last inspection).
<b>Sensor age</b> <i>runtimeServiceAgeUse</i>	Service message, which reports the exceeding of the lifetime of a sensor. - EC-sensors H <sub>2</sub> S, O <sub>2</sub> , H <sub>2</sub>
<b>Sensor calibration</b> <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)
<b>Sensor usage</b> <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 <sub>2</sub> S, O <sub>2</sub> , H <sub>2</sub>

Tab. 1: Overview of Errors and Service messages

### 3.5 Global errors

Output	Cause	Proposal for solution
<div style="background-color: black; color: blue; padding: 5px; text-align: center;"> <b>Errors</b> <b>0x1234</b> </div>	Fatal error	→see error list with error codes e.g. 0x1234 = error code

#### Error list (Abstract)

A complete list can be in chapter 4 - **Errors and Event list**

Error code	Description	Proposal for solution
0x0280 – 0x0289	<b>Fatal communication error</b> <i>The communication to an activated sensor or slave was interrupted and could not be recovered.</i>	- check all 3-wired cable connection (bus) - delete errors and restart system - change malfunctioning board 0x0280=IR1, 0x0281=EC1, 0x0282=IO, 0x0283=EC2, 0x0284=Parox, 0x0285=SG, 0x0286=Flow, 0x0287=IR2, 0x0288=L-OX, 0x0289=B-IO
0x0390	<b>No sensor-slave found</b> <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 (green = OK) →right fuse carrier (F3.1) for LED2 (green = OK)
0x0391, 0x0392	<b>Error calibration data NDIR</b>	- delete errors and restart (commands menu) - change NDIR-sensor
0x0393	<b>Error calibration data µPulse</b>	- delete errors and restart (commands menu) - change µPulse-block with PCB
0x0394, 0x0395	<b>Error calibration data Parox</b>	- delete errors and restart (commands menu) - change Parox-sensor
0x0394, 0x0395	<b>Error calibration data density (SG)</b>	- delete errors and restart (commands menu) - change SG-sensor
0x0398	<b>Error calibration data EC1 (O<sub>2</sub>)</b>	- delete errors and restart (commands menu) - change EC-O <sub>2</sub> -sensor
0x0399	<b>Error calibration data EC2 resp. EC 3 (H<sub>2</sub>S and/or H<sub>2</sub>)</b>	- delete errors and restart (commands menu) - EC-H <sub>2</sub> S and/or EC-H <sub>2</sub> -sensor



### 3.6 Sensor errors

Output	No. and cause	Proposal for solution
<b>Errors CO<sub>2</sub> [No.]</b>	40 – off-limit condition reference 41 – off-limit condition signal 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
<b>Errors CH<sub>4</sub> [No.]</b>	40 – off-limit condition reference (NDIR-2) 41 – off-limit condition signal (NDIR 2) 42 – off-limit condition reference (NDIR-1) 43 – off-limit condition signal (NDIR-1) 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
<b>Errors C<sub>2+</sub> [No.]</b>	42 – off-limit condition reference 43 – off-limit condition signal 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
<b>Errors O<sub>2</sub> [No.]</b>	75 - error signal sensor O <sub>2</sub>	- check cable connection and position of connector - replace sensor
<b>Errors H<sub>2</sub>S [No.]</b>	76 - error signal sensor H <sub>2</sub> S	- check cable connection and position of connector - replace sensor
<b>Errors H<sub>2</sub> [No.]</b>	73 - error signal sensor H <sub>2</sub>	- check cable connection and position of connector - replace sensor
<b>Errors [S] act.</b>	Sensor could not be activated during startup. Sensor is activated in configuration, but could not be detected on internal bus-system. [S] – sensor name	- check cable connection and position of connector - check firmware - replace sensor
<b>Errors [S] OL [C]</b>	Overload detection error (e.g. H <sub>2</sub> S, H <sub>2</sub> ) Reported after detecting a meas. 25% above the given meas. range. -> meas. is aborted and marked in meas. memory [S] – sensor name [C] – channel, where error was last detected	- check calibration of sensor and recalibrate - check meas. range against actual values in process gas

### 3.7 Slave errors

Output	No. and cause	Proposal for solution
<b>Errors</b> <b>IO [No.]</b>	80 – error temperature sensor (peltier gas cooler)	<ul style="list-style-type: none"> <li>- check cable connection and position of connector</li> <li>- replace sensor</li> </ul>
<b>Errors</b> <b>IO act.</b>	Slave could not be activated during startup. Slave is activated in configuration, but could not be detected on internal bus-system.	<ul style="list-style-type: none"> <li>- check cable connection and position of connector</li> <li>- check firmware</li> <li>- replace sensor</li> </ul>

### 3.8 Calibration errors

Output	Cause	Proposal for solution
<b>Errors</b> <b>CalFlowGas</b>	<b>No flow of calibration gas</b> <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"> <li>- check pressure of calibration gas bottle and correct if needed to 20 mbar.</li> <li>- if installed: check pump for process gas and replace if necessary →flow can be checked through display     menu “pGas”</li> <li>- disconnect calibration gas from input and check flow (only if pump installed)</li> <li>- check process gas output for clogging (e.g. frozen)</li> <li>- check pressure sensor of µPulse-, TwinFlow- or PressFlow-block and replace if necessary</li> </ul>
<b>Errors</b> <b>CalFlowAir</b>	<b>No flow of ambient air</b> <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"> <li>- check pump for ambient air and replace if necessary →flow can be checked through display     menu “pAir”</li> <li>- check ambient air filter for clogging and replace if necessary</li> <li>- check process gas output for clogging (e.g. frozen)</li> <li>- check pressure sensor of µPulse-, TwinFlow- or PressFlow-block and replace if necessary</li> </ul>
<b>Errors</b> <b>Cal. set</b>	<b>Error calibration setting</b> <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"> <li>- wrong calibration gas connected</li> <li>- wrong calibration gas setup (INCACtrl)</li> <li>- wrong calibration gas setting (INCACtrl)</li> <li>- sensor-drift too high</li> </ul> <p>REMARK: - error does not occur when calibrating in expert-mode. WARNING: INCA process gas analyzer can be miscalibrated!</p>
<b>Errors</b> <b>Cal. time</b>	<b>Error calibration time</b> <i>At least one calibration point cannot be set due to missing required zero-/span-calibration.</i> <u>1<sup>st</sup> requirement:</u> <i>Zero must be set before span. Last zero calibration is out of date and must be calibrated first.</i> <u>2<sup>nd</sup> 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"> <li>- perform zero-point calibration before span-point calibration</li> <li>- perform span-point calibration before mid-point calibration (only NDIR)</li> </ul>

### 3.9 Device errors

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

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

### 3.10 Check message

Output	Cause	Proposal for solution
<div style="background-color: black; color: white; padding: 5px; text-align: center;"> <b>Check</b> </div>	<b>Check required</b> <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]

### 3.11 Service message sensor age

Output	Cause	Proposal for solution
<div style="background-color: black; color: white; padding: 5px; text-align: center;"> <b>Service [Type] age</b> </div>	<b>Sensor exceeded the specified age</b> <i>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.</i>  <i>[Type] - expected lifetime:</i> <i>O<sub>2</sub> - 24 months</i> <i>H<sub>2</sub>S - 15-18 months</i> <i>H<sub>2</sub> - 15 months</i>	<ul style="list-style-type: none"> <li>- replace sensor</li> <li>- 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)</li> </ul>

### 3.12 Service message sensor calibration

Output	Cause	Proposal for solution
<div style="background-color: black; color: white; padding: 5px; text-align: center;"> <b>Service [Type] ZERO</b> </div>	<b>Sensor calibration zero</b> <i>For reproducible and accurate measurement sensors must be calibrated at least every 12 months. In this case a zero-point (ZERO) calibration has not been performed for the last 12 months.</i>  <i>[Type]: sensor type (e.g. O<sub>2</sub>)</i>	Sensor calibration with defined calibration gas.
<div style="background-color: black; color: white; padding: 5px; text-align: center;"> <b>Service [Type] SPAN</b> </div>	<b>Sensor calibration span</b> <i>For reproducible and accurate measurement sensors must be calibrated at least every 12 months. In this case a span-point (SPAN) calibration has not been performed for the last 12 months.</i>  <i>[Type]: sensor type (e.g. O<sub>2</sub>)</i>	Sensor calibration with defined calibration gas.

### 3.13 Service message sensor wear

Output	Cause	Proposal for solution
<div style="background-color: black; color: white; padding: 5px; text-align: center;"> <b>Service [Type] wear</b> </div> <p>(before V1.09R04 "usage" was displayed instead of "wear")</p>	<p><b>Sensor worn out</b>  <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. O<sub>2</sub>)</i></p>	<p>Replace sensor</p>

## 4 Errors and Event list

### 4.1 State machine errors

Error code	Display description	Full description
0x0100	EVENT OVERFLOW	Firmware development error Too many events were entered into state machine configuration
0x0101	STATE OVERFLOW	Firmware development error Too many states were entered into state machine configuration
0x0102	TIMER LOAD OVERFLOW	Firmware development error Too many timers were initialized in state machine
0x0103	WRONG DEVICE CFG. IS SET	Firmware development error Wrong device configuration is set

### 4.2 Fatal state machine error

Error code	Description	Full description
0x0180	ERROR LIST FULL	Error list is full Can be configured by INCACtrl if this error is supposed to be triggered by software. If not, software will just overwrite oldest errors when new errors occur

### 4.3 Communication errors

Error code	Description	Full description
0x0200	COMM OPEN PORT	WIN32 exception error Opening COM port failed, COM port either not available or already opened up
0x0201	COMM CLEAR BUFFERS RW	WIN32 exception error Clearing of r-w buffers failed and threw an exception
0x0202	COMM SEND DATA	WIN32 exception error Attempt to sending data on serial port failed and threw an exception
0x0203	COMM TIMEOUT RECEIVE	Bus protocol communication error Not all data was received while communicating due to a timeout
0x0204	COMM CLOSE PORT	WIN32 exception error Closing of COM port failed and threw an exception
0x0210	COMM CMD NOT FOUND	Bus protocol configuration error A command was requested which is not supported/defined by bus protocol
0x0211	COMM CMD TIMEOUT REC. HEADER	Bus protocol communication error Receiving header of protocol failed due to a timeout
0x0212	COMM CMD TIMEOUT REC. TAIL	Bus protocol communication error Receiving tail of protocol failed due to a timeout



Error code	Description	Full description
0x0213	COMM CMD CRC16 FAILED	Bus protocol communication error Error receiving correct data - checksum
0x0214	COMM CMD WRONG ADDRESS	Bus protocol communication error Wrong address was received by bus master
0x0215	COMM CMD WRONG LENGTH	Bus protocol communication error An invalid length definition was received
0x0216	COMM CMD SEND DATA	Bus protocol communication error Sending data on bus failed
0x0217	COMM CMD CLEAR RW BUFFERS	Bus protocol communication error Clearing r-w buffers failed
0x0218	COMM NO COM PORT OPEN	Bus protocol communication error No COM port open for communication
0x0219	COMM CMD BUFFER SIZE	Bus protocol communication error Buffer size check failed
0x021A	COMM CMD TIMEOUT RECEIVE	Bus protocol communication error Failed receiving all data due to a timeout
0x021B	COMM CMD TIMEOUT HEADER PRT.2	Bus protocol communication error Failed receiving all data while communicating with extended bus communication due to a timeout
0x0220	COMM SAVE DATA OLD COPY FCTN	Reading saved eeprom (sensor/slave) data error Error in old copy function – function error not further specified since this function will not be used anymore in newer firmware versions (>V1.04).
0x0221	COMM SAVE DATA READ NOT OK	Reading saved eeprom (sensor/slave) data error Slave responded with “not OK” message. Possible solution: More time needed between writing and reading of eeprom data subsequently
0x0222	COMM SAVE DATA	Reading saved eeprom (sensor/slave) data error
0x0223	COMM SAVE DATA READ NOT AVLB.	Reading saved eeprom (sensor/slave) data error Function not supported by slave
0x0224	COMM SAVE DATA READ RANGE	Reading saved eeprom (sensor/slave) data error Too much data was requested from eeprom
0x0225	COMM SAVE DATA WRITE NOT OK	Writing saved eeprom (sensor/slave) data error Slave responded with “not OK” message. Possible solution: More time needed between writing and reading of eeprom data subsequently
0x0226	COMM SAVE DATA WRITE NOT CON.	Writing saved eeprom (sensor/slave) data error No slave eeprom connected at required eeprom number
0x0227	COMM SAVE DATA WRITE NOT AVLB.	Writing saved eeprom (sensor/slave) data error Function not supported by slave
0x0228	COMM SAVE DATA WRITE RANGE	Writing saved eeprom (sensor/slave) data error Too much data supposed to be written to eeprom
0x0229	COMM SAVE DATA EEPROM NOT DEF.	Reading or writing saved eeprom (sensor/slave) data error Eeprom is not defined – needs to be defined

Error code	Description	Full description
0x022A	COMM SAVE DATA PTR. NOT SET	Reading or writing saved eeprom (sensor/slave) data error Pointer to data not set
0x022B	COMM SAVE DATA BUF. TOO LARGE	Reading or writing saved eeprom (sensor/slave) data error Data buffer too large for communication buffer Solution: Increase communication buffer or reduce size of data to be stored on eeprom
0x022C	COMM SAVE DATA NO DATA	Reading or writing saved eeprom (sensor/slave) data error Size of data not set no data can be stored
0x022D	COMM SAVE DATA EEPROM NOT FND.	Reading or writing eeprom (sensor/slave) data error No eeprom found – error code of old copy function
0x0230	COMM CMD TIMEOUT RECEIVE ECHO	Bus protocol communication error No echo received on bus due to a problem with bus hardware
0x0231	COMM TIMEOUT NO ANSWER	Bus protocol communication error No answer was received (from a slave) after requesting data
0x0232	COMM SEND BUFFER OVERFLOW	Bus protocol communication error Length set by protocol command setup function is too large for send buffer
0x0233	COMM RECEIVE BUFFER OVERFLOW	Bus protocol communication error Length set by protocol command setup function is too large for receive buffer

#### 4.4 Fatal communication errors

Error code	Description	Full description
0x280	ERROR COMM SLAVE LOST IR1	Fatal error caused by internal bus communication IR1-sensor was thrown off the bus no reconnection possible (CH <sub>4</sub> , CO <sub>2</sub> )
0x0281	ERROR FATAL SLAVE LOST EC1	Fatal error caused by internal bus communication EC1-sensor was thrown off the bus no reconnection possible (H <sub>2</sub> S, O <sub>2</sub> )
0x0282	ERROR FATAL SLAVE LOST IO	Fatal error caused by internal bus communication IO-slave was thrown off the bus no reconnection possible (mA output, relais output, valve control)
0x0283	ERROR FATAL SLAVE LOST EC2	Fatal error caused by internal bus communication EC2-sensor was thrown off the bus no reconnection possible (H <sub>2</sub> )
0x0284	ERROR FATAL SLAVE LOST PAROX	Fatal error caused by internal bus communication Parox-sensor was thrown off the bus no reconnection possible (O <sub>2</sub> paramagnetic)
0x0285	ERROR FATAL SLAVE LOST SG	Fatal error caused by internal bus communication SG-sensor was thrown off the bus no reconnection possible (SG specific gravity)
0x0286	ERROR FATAL SLAVE LOST FLOW	Fatal error caused by internal bus communication Flow-sensor was thrown off the bus no reconnection possible (flow gas and/or flow air)
0x0287	ERROR COMM SLAVE LOST IR2	Fatal error caused by internal bus communication IR2-sensor was thrown off the bus no reconnection possible (C <sub>2</sub> +, CH <sub>4</sub> selective)

Error code	Description	Full description
0x0288	ERROR COMM SLAVE LOST L-OX	Fatal error caused by internal bus communication Lambda-sensor was thrown off the bus no reconnection possible (O <sub>2</sub> Lambda)
0x0289	ERROR COMM SLAVE LOST B-IO	Fatal error caused by internal bus communication IO-sensor basic was thrown off the bus no reconnection possible (mA output, relais output, valve control)

#### 4.5 Sensor errors

Error code	Description	Full description
0x0300	SENS CMD BUF FULL	Firmware development error Command list for a sensor is full
0x0301	SENS UNKNOWN DATA TYPE	Firmware development error Unknown data type was loaded with command – values can not be copied
0x0302	SENS DIVISION BY ZERO	Firmware development error Values are set in a way so a division by zero could occur
0x0303	SENS UNKNOWN COMMAND	Firmware development error Unknown command type was set with command
0x0304	SENS CMD WRONG TYPE	Firmware development error Type not supported for command list
0x0305	SENS CAL STATUS ZERO IR1	Zero calibration could not be performed on IR channel 1 --- currently not used ---
0x0306	SENS CAL STATUS SPAN IR1	Span calibration could not be performed on IR channel 1 --- currently not used ---
0x0307	SENS CAL STATUS ZERO IR2	Zero calibration could not be performed on IR channel 2 --- currently not used ---
0x0308	SENS CAL STATUS SPAN IR2	Span calibration could not be performed on IR channel 2 --- currently not used ---
0x0309	SENS CAL STATUS ZERO EC1	Zero calibration could not be performed on EC channel 1 --- currently not used ---
0x030A	SENS CAL STATUS SPAN EC1	Span calibration could not be performed on EC channel 1 --- currently not used ---
0x030B	SENS CAL STATUS ZERO EC2	Zero calibration could not be performed on EC channel 2 --- currently not used ---
0x030C	SENS CAL STATUS SPAN EC2	Span calibration could not be performed on EC channel 2 --- currently not used ---
0x030D	SENS EC PRESSURE AIR	Min. pump pressure not reached – check pumps
0x030E	SENS EC PRESSURE GAS	Min. pump pressure not reached – check pumps
0x030F	SENS EC3 PRESSURE AIR	Min. pump pressure not reached – check pumps
0x0310	SENS EC3 PRESSURE GAS	Min. pump pressure not reached – check pumps
0x0311	SENS EC4 PRESSURE AIR	Min. pump pressure not reached – check pumps
0x0312	SENS EC4 PRESSURE GAS	Min. pump pressure not reached – check pumps
0x0313	SENS CALC. VALUE NOT DEFINED	Firmware development error Method not defined in child class
0x0314	SENS FATAL CHNL. ERR NOT DEF.	Firmware development error Method not defined in child class

Error code	Description	Full description
0x0315	SENS ABORT MEAS. NOT DEF.	Firmware development error Method not defined in child class
0x0316	SENS FACTORY CALIB. NOT DEF.	Firmware development error Method not defined in child class
0x0317	SENS IR CALIB. NOT READ	Firmware development error Sensor calibration was not read before trying to reset calibration to factory settings
0x0318	SENS IR PRESS. PROCESS GAS	Error for continuous measurement instrument Minimal required pressure in process gas stream not reached – pressure measured through absolute pressure sensors of IR electronic
0x0319	SENS IR PRESS. CALIB GAS	Error for continuous measurement instrument Minimal required pressure in calibration gas stream not reached – pressure measured through absolute pressure sensors of IR electronic
0x031A	SENS SET FACT. CALIB NOT DEF.	Firmware development error Method not defined in child class
0x031B	SENS TYPE NOT DEFINED	Sensor type not defined – error in calibration
0x031C	SENS SER. NO G NOT DEFINED	Get Sensor-serial number is not defined
0x031D	SENS SER. NO S NOT DEFINED	Set Sensor-serial number is not defined
0x031E	SENS COPY CALIB BUFF. SIZE	
0x031F	SENS COPY CALIB NO DATA	
0x0320	SENS PHASE STR NOT DEFINED	Sensor phase start not defined
0x0321	SENS PHASE FIN NOT DEFINED	Sensor phase finish not defined
0x0322	SENS PHASE ABO NOT DEFINED	Sensor phase abort not defined
0x0323	SENS SET CALIB NOT DEFINED	Set sensor calib data not defined
0x0324	SENS SET CALIB ERR SIZE	Set sensor calib data size error
0x0325	SENS SET CALIB ERR CHNL	Set sensor calib data channel error
0x0326	SENS SAVE CALIB NOT DEFINED	Saved sensor calib data not defined
0x0327	SENS READ CALIB NOT DEFINED	Readed sensor calib data not defined
0x0328	SENS SET CALIB FACT. ERROR	Set sensor calib factor error
0x0329	SENS PRESS NOT AVAILABLE	Sensor pressure not available
0x032A	SENS EC PULSE DIV. ZERO 1	EC Sensor $\mu$ Pulse dividing by 0 error
0x032B	SENS EC PULSE DIV. ZERO 2	EC Sensor $\mu$ Pulse dividing by 0 error
0x032C	SENS EC PULSE DIV. ZERO 3	EC Sensor $\mu$ Pulse dividing by 0 error
0x032D	SENS EC PULSE FACTOR MAX	EC Sensor $\mu$ Pulse factor max.
0x032E	SENS EC PULSE FACTOR MIN	EC Sensor $\mu$ Pulse factor min.

Error code	Description	Full description
0x032F	SENS SET SERIAL NO. (CHNL)	Set sensor serial number (channel)
0x0330	SENS ABORT CAL\AIR PRESS	Abort calibration – air flow was too low
0x0331	SENS ABORT CAL\GAS PRESS	Abort calibration – gas flow was too low
0x0332	SENS RESET CNT. FUNC. MISSING	Sensor counter reset missing
0x0334	SENS PRESS GAS CHNL 1	Gasflow channel 1 too low for measurement
0x0335	SENS PRESS GAS CHNL 2	Gasflow channel 2 too low for measurement
0x0336	SENS PRESS GAS CHNL 3	Gasflow channel 3 too low for measurement
0x0337	SENS PRESS GAS CHNL 4	Gasflow channel 4 too low for measurement
0x0338	SENS PRESS GAS CHNL 5	Gasflow channel 5 too low for measurement
0x0339	SENS PRESS GAS CHNL 6	Gasflow channel 6 too low for measurement
0x033A	SENS PRESS GAS CHNL 7	Gasflow channel 7 too low for measurement
0x033B	SENS PRESS GAS CHNL 8	Gasflow channel 8 too low for measurement
0x033C	SENS PRESS GAS CHNL 9	Gasflow channel 9 too low for measurement
0x033D	SENS PRESS GAS CHNL 10	Gasflow channel 10 too low for measurement
0x033E	SENS OVERLOAD ERROR	Measurement stopped channel 1 Measured value >125% of sensor range (EC-sensors)
0x033F	SENS OVERLOAD ERROR	Measurement stopped channel 2 Measured value >125% of sensor range (EC-sensors)
0x0340	SENS OVERLOAD ERROR	Measurement stopped channel 3 Measured value >125% of sensor range (EC-sensors)
0x0341	SENS OVERLOAD ERROR	Measurement stopped channel 4 Measured value >125% of sensor range (EC-sensors)
0x0342	SENS OVERLOAD ERROR	Measurement stopped channel 5 Measured value >125% of sensor range (EC-sensors)
0x0343	SENS OVERLOAD ERROR	Measurement stopped channel 6 Measured value >125% of sensor range (EC-sensors)
0x0344	SENS OVERLOAD ERROR	Measurement stopped channel 7 Measured value >125% of sensor range (EC-sensors)
0x0345	SENS OVERLOAD ERROR	Measurement stopped channel 8 Measured value >125% of sensor range (EC-sensors)
0x0346	SENS OVERLOAD ERROR	Measurement stopped channel 9 Measured value >125% of sensor range (EC-sensors)
0x0347	SENS OVERLOAD ERROR	Measurement stopped channel 10 Measured value >125% of sensor range (EC-sensors)

#### 4.6 Fatal sensor errors

Error code	Description	Full description
0x0380	SENS GLOB ERROR	Error is returned by a sensor
0x0381	SENS GLOB ERROR IO	Global error occurred in IO board
0x0382	SENS GLOB ERROR IR	Global error occurred in IR board
0x0383	SENS GLOB ERROR EC	Global error occurred in EC board
0x0384	SENS CHNL. ERROR IR1	Fatal channel error occurred in IR channel 1
0x0385	SENS CHNL. ERROR IR2	Fatal channel error occurred in IR channel 2
0x0386	SENS CHNL. ERROR EC1	Fatal channel error occurred in EC channel 1
0x0387	SENS CHNL. ERROR EC2	Fatal channel error occurred in EC channel 2

Error code	Description	Full description
0x0388	SENS GLOB ERROR EC3	Global error occurred in EC3 board
0x038A	SENS ANLG. OUTPUT NOT VALID	Firmware development error Analog output number too large
0x038B	SENS EC CALIB PTR NOT SET	When performing a calibration the
0x038C	SENS EC CALIB ABORT ZERO	Zero calibration for EC sensor aborted
0x038D	SENS EC CALIB ABORT SPAN	Span calibration for EC sensor aborted
0x038E	SENS EC CALIB ABORT MIXER	Mixer calibration for EC sensor aborted
0x038F	SENS EC CALIB ABORT NO DEF.	Zero calibration for EC sensor aborted
0x0390	SENS NO SLAVE FOUND	No slave was found when booting instrument – check bus connections inside the instrument and firmware versions of slave
0x0391	SENS IR BUFFER OVERFLOW	Internal buffer overflow – calibration data not conform to definition – device needs to be recalibrated in factory
0x0392	SENS IR OLD VERS. CALIBRATION	Old version of calibration on IR slave – device needs to be recalibrated in factory
0x0393	SENS EC OLD VERS. CALIBRATION	Old version of calibration on EC slave – device needs to be recalibrated in factory
0x0394	SENS PAROX CAL DATA INVALID	Parox sensor calibration data Invalid data
0x0395	PAROX CAL DATA CRC ERROR	Parox calibration data Error receiving correct data - checksum
0x0396	SG CAL DATA INVALID	Density sensor calibration data Invalid data
0x0397	SG CAL DATA CRC ERROR	Density sensor calibration data Error receiving correct data - checksum
0x0398	EC1 CAL DATA\ERROR - O2	EC O2 error calibration data
0x0399	EC2 CAL DATA\ERROR H2S H2	EC H2S/H2 error calibration data
0x039A	CHNL.\ERROR IR2	Channel error IR2
0x039B	CHNL.\ERROR IR3	Channel Error IR3
0x039C	SENS IR CHNL. 1 PURGE\FLOW 8000	INCA8000 air flow too low
0x039D	SENS IR CHNL. 2 REFERENCE LOW	Reference NDIR sensor channel 2 too low
0x039E	SENS IR TEMP BROKEN	Temperature sensor NDIR is broken

#### 4.7 Command list and task request list errors

Error code	Description	Full description
0x0400	REQUEST LIST TASK NOT DEF.	Firmware development error Task for request list not defined
0x0480	CLIST OVERFLOW	Firmware development error Overflow when adding commands
0x0481	REQUEST LIST OVERFLOW	Firmware development error Overflow adding tasks to request list
0x0482	RESET CALIB. LIST OVERFLOW	Firmware development error A not defined sensor was requested to be set to factory calibration
0x0483	DYN STR. LIST OVERFLOW	Firmware development error Overflow when creating dynamic signal list

#### 4.8 Menu errors

Error code	Short description	Full description
0x0500	MENU OBJECT OVERFLOW	Firmware development error Too many object loaded into menu
0x0501	MENU VALUE NULL POINTER	Firmware development error CMenuValue class object failed to initialize due to NULL pointer
0x0502	MENU TYP UNKNOWN	Firmware development error Defined value type in menu not defined
0x0503	MENU PARSE NUM WRONG ORDER	Error occurred when entering a number, probably too many characters or a minus sign after a number
0x0504	MENU PARSE NUM TOO MANY DOTS	Error occurred when entering a number A number was entered with two or more dots
0x0505	MENU PARSE NUM CONVERSION	Error occurred after entering a number. The entered number could not be converted.
0x0506	MENU ADD SAVE TASK	Firmware development error Adding task to scheduler failed – a changed value was not saved
0x0507	MENU ADD SEND COMM COMMAND	Firmware development error Adding task to scheduler failed – a changed value was not sent to end slave
0x0508	MENU ADD WAIT TASK	Firmware development error Adding task to scheduler failed – a display task will not be performed – restart system
0x0509	MENU MAX INFO ELEMENTS	Firmware development error Too many info elements were added to menu
0x050A	MENU ADD SEND COMMAND	Firmware development error Adding task to scheduler failed – a changed value was not sent to end slave

## 4.9 Storage errors

Error code	Short description	Full description
0x0600	STORE INIT	Error occurred when saving values
0x0601	STORE OPEN FILE FOR READING	WIN32 error Opening file for reading failed
0x0602	STORE OPEN FILE FOR WRITING	WIN32 error Opening file for writing failed
0x0603	STORE ALLOCATE MEMORY	WIN32 error Error allocating memory
0x0604	STORE BUFFER NOT EMPTY	Data buffer not empty
0x0605	STORE BUFFER TOO SMALL	Data buffer too small
0x0606	STORE PTR. SAVE PARAMETERS	Data pointer not set
0x0607	STORE TYPE NOT DEFINED	Storage type not defined
0x0608	STORE NO STORED DATA	Storage of data failed

## 4.10 SD card errors

Error code	Short description	Full description
0x0700	SDCARD POWER ON CMD0	Power on command failed
0x0701	SDCARD INITIALIZE CMD1	Initialize command failed
0x0702	SDCARD READ SECT. SEND CMD	Read section from card failed
0x0703	SDCARD READ SECT. START BYTE	Read section start byte failed
0x0704	SDCARD WRITE SECT SEND CMD	Write section to card failed
0x0705	SDCARD WRITE SECT BUSY	Timeout occurred for writing to card
0x0710	SDCARD FILE IO MOUNT	File mount error
0x0720	SDCARD FILE IO OPEN	File open file error
0x0730	SDCARD FILE IO READ	File read error
0x0740	SDCARD FILE IO WRITE	File writ error
0x0750	SDCARD FILE IO SEEK	File seek error
0x0760	SDCARD FILE IO UNLINK	File delete error
0x0770	SDCARD FILE IO CLOSE	File close error



#### 4.11 H-Bus errors

Error code	Short description	Full description
0x0801	HBUS CRC	H-Bus Error receiving correct data - checksum
0x0802	HBUS	H-Bus unknown command


#### 4.12 INCA Memory errors


Error code	Short description	Full description
0x0900	INCA MEM CHANNEL OVERFLOW	Channel Memory overflow
0x0901	INCA MEM RELATIVE ADR. OVERFLOW	Channel memory address overflow
0x0902	INCA MEM RAM DATA NOT SET	Memory RAM data not set
0x0903	INCA MEM CHNL NOT ACTIVE	Channel memory not active
0x0904	INCA MEM MEAS. NOT AVAILABLE	Channel memory not available


#### 4.13 Event messages (not defined as errors)

Error code	Short description	Full description
0x5000	EVENT BOOTING SYSTEM	System was booted up
0x5001	EVENT ENTER WARMUP	System entered warmup
0x5002	EVENT TIME FORWARD	Daylight saving active time was set forward
0x5003	EVENT TIME BACKWARD	Daylight saving active time was set backward
0x5004	EVENT ENTER ERROR	Message is stored when entering the error state
0x5005	EVENT CALIB PURGE	Event written when calibration purge gas is started
0x5006	EVENT CALIB GAS 1	Event written when calibration gas 1 is started
0x5007	EVENT CALIB GAS 2	Event written when calibration gas 2 is started
0x5008	WATCHDOG RESTART	Message written, when watchdog restart has been performed
0x5009	AUTO RESTART	Message written, when system automatically restarts due to communication failure on start-up
0x500A	ABORT CALIBRATION SYSTEM	A running calibration was aborted by the system
0x500B	ERROR CALIBRATION	Event written on calibration error occurrence
0x500C	ERROR CAL. TIME	Event written on calibration error due to time restrictions which were not met
0x500D	ABORT CALIBRATION USER	A running calibration was aborted by user
0x500E	MESSSAGE CLEAR USER	Event and error lists cleared by user
0x500F	CHECK OF SYSTEM PERFORMED	"Check OK" was confirmed by user

## 5 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.