

RELEASE NOTE SUMMARY



Overview

This document provides a compilation of Release Notes that have been published by Industrial Scientific to date. *Table 1. Document Summary* provides a list of instruments, version numbers, release dates and a brief overview of each Release Notes document. Following Table 1, you will find a copy of the complete version of each document.

Document Summary

Table 1. Release Notes Document Summary

Instrument	Version	Release Date	Summary of Features Added and Issues Addressed
Tango TX1			
	v1.9	5/31/2018	Enhance dock due reminder and refine zeroing when docked.
	v1.8.7	02/08/2018	Allow the use of new EEPROM on sensor boards
	v1.8	01/6/2017	Acknowledgeable gas alerts; new options for maintenance indicators; other enhancements including improved start-up sequence, disable alarms while docked, extended bump and calibration results screen timeout; bug fixes.
	v1.7	01/21/2016	User selectable option to disable sensor's deadband; quicker battery replacement; bug fixes
	v1.6	09/16/2014	User-selectable option enables shutdown while in alarm; supports the CO/H2 low sensor; slight fluctuation in readings no longer causes unnecessary datalog recordings; slight fluctuation in readings no longer causes unnecessary datalog recordings; bug fixes include: Tango now saves a back-up set of the instrument's parameters to reload upon start-up, correction of false shorted alarm LED notification due

Instrument	Version	Release Date	Summary of Features Added and Issues Addressed
			to low battery; correction of false low battery indications, ensures that when the instrument logs an alarm that its time matches when the alarm truly occurred
	v1.51	05/06/2014	Bug fix: Tango instrument has a larger than expected current draw when the Macronix Flash IC is used.
	v1.5	03/07/2014	Bug fix addressed the following issue: Tango Gaining Time in the Field. This bug was causing the instrument's internal clock to gain time.
	v1.4	11/11/2013	Reduce sensor warm-up time when the Tango is docked; Tango increased communication speed with the DS2; Reduced battery power consumption when left docked; Improves Tango's alarm indicator self-test; Omit sensor fault reading from the event log; Digital sensor communication improvement; Always On mode enabling through Manufacturing.

Tango TX1

v1.9 – released May 31, 2018

Upgrade recommendation

- Critical – All instruments must be upgraded to ensure continued safe operation.
- Recommended – Industrial Scientific recommends you upgrade the instrument firmware to ensure optimal performance.
- Optional – Users may upgrade instruments to take advantage of new features.

What enhancements are in Tango v1.9 firmware?

- An enhancement to the dock due reminder has been made that will prevent an instrument from displaying the “Dock Overdue” reminder immediately after a firmware upgrade is performed, immediately after an instrument that has never been powered on is docked, or when an instrument remains on a docking station for an extended period of time.
- An enhancement to zeroing when docked has been made to prevent calibration from altering the zero baseline.

v1.8.7 – released February 8, 2018

Upgrade recommendation

- Critical – All instruments must be upgraded to ensure continued safe operation.
- Recommended – Industrial Scientific recommends you upgrade the instrument firmware to ensure optimal performance.
- Optional – Users may upgrade instruments to take advantage of new features.

What enhancements are in Tango v1.8.7 firmware?

- Tango v1.8.7 was released to support internal process enhancements. All units in the field are backwards compatible and therefore do not require this upgrade.

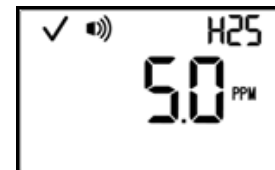
- Minor bug fixes
The following minor bugs were addressed during this firmware update: TANGO-480, TANGO-581, TANGO-590, TANGO-591, TANGO-644, TANGO-654

v1.8 – released January 6, 2017**Upgrade recommendation**

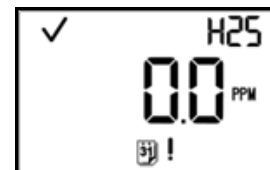
- Critical – All instruments must be upgraded to ensure continued safe operation.
- Recommended – Industrial Scientific recommends you upgrade the instrument firmware to ensure optimal performance.
- Optional – Users may upgrade instruments to take advantage of new features.

What enhancements are in Tango v1.8 firmware?**Acknowledgeable Gas Alerts**

This optional alert level acts as an early warning below the low alarm setpoint. When the gas concentration exceeds the Acknowledgeable Gas Alert setpoint, the instrument activates indicators to alert operators that they may be approaching a dangerous condition. Operators can acknowledge and temporarily silence the alert while they continue working or take preliminary or mitigating actions.

**New options for maintenance indicators – Dock Due**

The dock due option displays a notification when the instrument should be placed on a docking station for calibration, bump testing, or data synchronization (based on the calibration due, bump due, and sync intervals respectively). When enabled, the dock due indicator replaces the bump and calibration due indicators.



Users of iNet® Control or DSSAC can optionally choose to have the dock due indicator trigger based on different alarm conditions as they occur (i.e. Low, High, TWA, and/or STEL). This can help encourage

timely reporting of alarm events regardless of the scheduled intervals between bump tests and calibrations.

Audible and visual confidence indicator

The confidence indicator can now be set to use both audible and visual indicators simultaneously. Note: use of this option will lower the expected instrument runtime below the typical 2 years.

Settable intervals and “Display only” option for maintenance indicators

To help safety personnel balance the benefit of notifying operators of required maintenance with the impact of decreased expected instrument runtime, the interval of audible and visual indicators for all optional maintenance indicators (calibration due, bump due, and dock due) can now be set between 1 and 60 minutes. Alternatively, these maintenance indicators can be set to show notifications only on the instrument’s display, without using audible and visual indicators. This can notify users of required maintenance without impacting instrument runtime, though it does require users to look at the display for this information.

Other Enhancements

- Improved startup sequence -The startup sequence of the Tango TX1 has been changed from a countdown to a sequence of screens showing gas setpoints for calibration, gas alerts (if enabled), low alarm, high alarm, TWA, and STEL. This allows the operator to review these settings to ensure they are correct before using the equipment.
- Disable alarms while docked -This option allows the user to select whether they would like the instrument’s audible alarm to sound when on a docking station.
- Extended bump and calibration results screen timeout - To avoid alarms being recorded in the logs directly after maintenance, the results screens following bump and calibration have had their timeouts extended to 25 seconds to give technicians time to remove gas from the instrument.

v1.7 – released January 21, 2016

Upgrade recommendation

- Critical – All instruments must be upgraded to ensure continued safe operation.
- Recommended – Industrial Scientific recommends you upgrade the instrument firmware to ensure optimal performance.
- Optional – Users may upgrade instruments to take advantage of new features.

What enhancements are in Tango v1.7?

Disable deadband

To comply with EN45544 approval, the user must have the ability to disable the sensor’s deadband. In Tango version 1.7 a screen has been added to the setup mode that provides the user the ability to enable/disable the sensor’s deadband. When disabled (0), the sensor’s minimum reading will be

reduced to 0 ppm. When enabled (1), the minimum detection limit for the CO and CO/H₂ Low will be 3 ppm, H₂S 0.5ppm and NO₂ and SO₂ will be 0.2 ppm.

Setup Screen for Enable/Disable of the Deadband



Quicker battery replacement

The Tango backup power is set up so that, if the battery is removed, the backup memory is powered by the supercap. The intention is to allow plenty of time (up to 1 hour) to change the battery, without losing the time/date. However, in previous Tango versions, if the battery is changed before the supercap is depleted, the instrument would retain its previous Battery Fail state. This means that users would wait up to 1 hour for the supercap to fully discharge before they can change the battery. In version 1.7, the low battery flag is cleared from the instrument when the battery is removed and the on/off button is depressed for two seconds. This eliminates the need to wait for the supercap to drain; making battery exchanges quicker.

Other Enhancements

- Tango sensor zero shift if docked for extended periods of time - In previous Tango firmware versions, if the Tango was left on the docking station for an extended period of time, the Tango would indicate a false positive reading when powered on. In version 1.7, the AFE ICs are disabled when entering Docked Low Power, and then enabled and initialized correctly when exiting Docked Low Power. This eliminates false high readings when the instrument is powered on.
- Tango date and time reset if left on dock for extended periods of time - In previous Tango firmware versions, if the Tango was left on the docking station for an extended period of time, the date and time on the Tango would reset to 01/01/2012. This issue has been resolved in Tango firmware version 1.7 as part of the fix to the Tango high current draw when docked issue.
- Tango indicating “Cal Due” if left on dock for extended periods of time - In previous Tango firmware versions, if the Tango was left on the docking station for an extended period of time, the Tango may indicate a “Cal Due” warning. In Tango version 1.7, large reading spikes causing the “Cal Due” warning have been eliminated during extended time on dock.
- Tango experiencing high current draw when docked for extended periods of time - In previous Tango firmware versions, if the Tango was left on the docking station for an extended period of time, the Tango would “wake-up” unexpectedly causing premature battery discharging. In Tango version 1.7, the Tango will remain in its “sleep” mode until otherwise commanded by the docking station. This allows Tango to stay on dock without added battery runtime reduction.

- Tango battery algorithm adjusted to compensate for temperature changes - In previous Tango firmware versions, environmental temperature swings have caused the Tango to misinterpret the battery capacity causing the Tango to fail a perfectly healthy battery. In Tango version 1.7, the battery algorithm has been adjusted to reduce the impact of environmental temperature swings.
- Regulate voltage to supercap to prevent overcharging.
- Prior to Tango version 1.7, the supercap was being overcharged causing it to leak. In Tango version 1.7, a method has been added to control the charging of the supercap to prevent overcharging.

v1.6 – released September 16, 2014

Upgrade recommendation

- Critical – All instruments must be upgraded to ensure continued safe operation.
- Recommended – Industrial Scientific recommends you upgrade the instrument firmware to ensure optimal performance.
- Optional – Users may upgrade instruments to take advantage of new features.

What enhancements are in Tango v1.6?

Shutdown in alarm setting

If the Tango is not used in the “always on” mode, this option, when enabled, allows the user to shut down the instrument while in alarm. When this option is disabled, the user will not be able to shut down the instrument while it is in alarm. The factory default of this setting is enabled. To take advantage of this enhancement when using Tango with the DS2 docking station, the following must be upgraded:

- DS2 docking station firmware to version 9.2
- Docking station server to version 9.2
- Docking Station Server Admin Console (DSSAC) to version 9.2
- iNet DS Docking Station requires no updates.

CO/H2 low sensor

For applications requiring carbon monoxide detection in an environment containing hydrogen, Tango instruments with firmware version 1.6 supports the new 6H CO/H2 low sensor. When this sensor is present, “COL” will appear on the display in the upper right hand corner.

Datalog recording enhancements

In an effort to reduce the datalog download time and help increase battery efficiency, the Tango will no longer datalog a reading that fluctuates by only one count.

Other enhancements

- Unexpected Tango shutdown can cause loss of instrument configuration or corrupt data - If the Tango encounters an unexpected shutdown (ex. dead battery, power interrupt, etc.) and the instrument was in the process of writing to the data flash, corrupted data may cause the instrument to display 'Conf' (factory uninitialized mode). To correct this in version 1.6, the Tango now saves a back-up set of the instrument's parameters to reload upon start-up.
- False shorted alarm LED notification due to low battery - When the battery is low in power, Tango has communicated a false shorted LED indication to iNet. This has been corrected to ensure that, if the battery is low, it does not cause a false shorted LED alarm.
- Tango false low battery indications - If the instrument has been turned off for a long period of time, the difference in battery resistance seen by the battery algorithm upon start up may be significant enough to calculate a false low battery condition. Version 1.6 corrects this by performing a battery resistance check every 24 hours when the instrument is in a powered down state.
- Tango Internal Clock Gaining Time - This issue was causing the instrument's internal clock to gain time. This fix ensures that when the instrument logs an alarm that its time matches when the alarm truly occurred. The gaining of time was occurring whether the instrument was on or off.

v1.51 – released May 6, 2014

Upgrade recommendation

- Critical – All instruments must be upgraded to ensure continued safe operation.
- Recommended – Industrial Scientific recommends you upgrade the instrument firmware to ensure optimal performance.
- Optional – Users may upgrade instruments to take advantage of new features.

What enhancements are in Tango v1.51?

Currently Tango has two suppliers for its Flash Chips – Macronix and Numonyx. Prior to version 1.51, Tango units with the Macronix Flash IC were experiencing higher than expected power draw. The Tango firmware has been modified to address this issue.

v1.5 – released March 7, 2014

Upgrade recommendation

- Critical – All instruments must be upgraded to ensure continued safe operation.
- Recommended – Industrial Scientific recommends you upgrade the instrument firmware to ensure optimal performance.
- Optional – Users may upgrade instruments to take advantage of new features.

What enhancements are in Tango v1.5?

Some Tango users may have experienced an issue where the instrument's internal clock gained time. This fix ensures that when the instrument logs an alarm that its time matches when the alarm truly occurred. Because cycling the power of the Tango resets the clock, this error was primarily noticed by Tangos used in the optional "Always On" mode.

v1.4 – released November 11, 2013**Upgrade recommendation**

- Critical – All instruments must be upgraded to ensure continued safe operation.
- Recommended – Industrial Scientific recommends you upgrade the instrument firmware to ensure optimal performance.
- Optional – Users may upgrade instruments to take advantage of new features.

What enhancements are in Tango v1.4?

- Reduce sensor warm-up time when the Tango is docked. By reducing the instrument's start-up time, the dock to green light has been reduced by an additional 20 seconds.
- The communication speed to the DS2 has been increased through the Tango's IrDA.
- Reduced battery power consumption when left docked.
- If the Tango is left on the docking station and is not communicating, the instrument will go into a low power mode extending the battery life.
- The below self-test errors have been corrected. Previous Tango revisions would upload these errors to iNet even though the alarm indications were working correctly.
 - 415 (speaker missing/disconnected)
 - 611 (right LED missing)
 - 621 (left LED missing)
 - 631 (blue LED missing)
 - 641 (white LED missing)
 - 417 (vibrating motor missing)
- In prior Tango revisions, if a sensor was in a fault condition, it would be included with the operational sensor's reading in the unit's event log. In this revision, the sensor in a fault condition is omitted from the operational sensor's reading in the event log. [TANGO-218] – Digital sensor communication improvement. With this improvement, temporary communication disconnection errors will be greatly reduced.