ANOVA SC415Cxx4-5 Cellular Dialer User Manual

SC415Cxx4/5 Cellular Dialer User Manual
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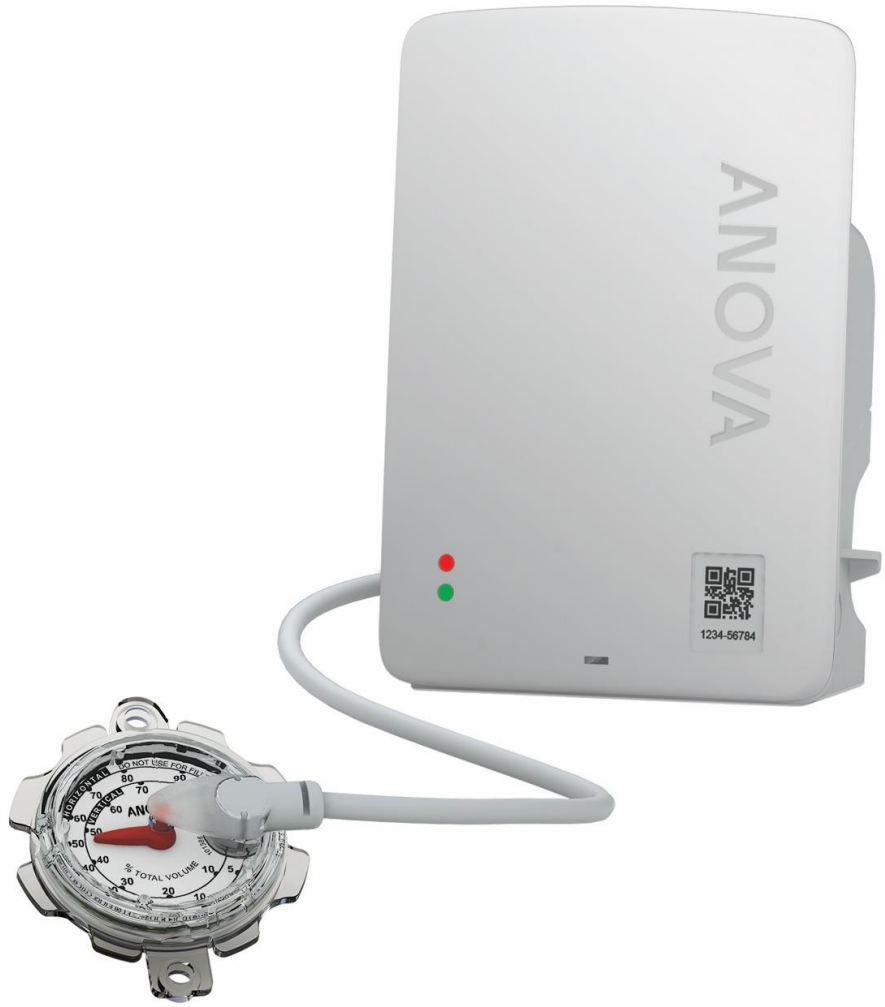

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Document: ML000080 rev 3

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Change History

Revision / ECN	Date	Description of Change	Prepared	Reviewed
1	20-05-20	First Issue	JH	GR
2 DN17644	04-05-21	Address change	JH	GR
3 DN18643	19-05-21	Update FCC statement. Add IC statements.	JH	GR

Contents

Overview

System

The SC415 Cellular Dialer is part of a telemetry system designed to provide continuous monitoring of gas tank installations. Tank level and other status information is transferred from the remote site to the enterprise database according to a defined reporting schedule.
Sites communicate with a server using the mobile telephone network (LTE Cat-M1). The server stores the site

information in an industry standard SQL database that can easily be integrated into other processes in the supply chain.

Site Equipment

Each cellular telemetry site consists of two primary components:

- SC415 Cellular Dialer – Connects to sensor(s) and performs data logging and Server communications via a cellular network.
- Sensor(s) – Senders are attached to the float gauge and provide locally wired tank level information for the SC415 Cellular Dialer.

SC415 Cellular Dialer Installation

NOTE: This product should only be installed by qualified personnel.

Overview

The SC415 Cellular Dialer is specifically designed to mount on LP-Gas tanks and monitor existing tank float gauges via a Sender, eliminating the need for expensive intrinsic safety barriers and wiring. The SC415 communicates daily with the server via a cellular network, transferring all the recorded tank level data to the server.

Location

The location of the Dialer is a prime consideration.

- Not close to pipes, metal work or other solid obstacles (other than the body of the tank upon which it is mounted).
- As high off the ground as possible.
- The location should minimise the chance of the Dialer being subject to physical shock or vibration.

NOTE: The cellular network signal strength is often improved by mounting the Dialer higher or further away from metal objects.

Installing a Dialer and Sender on a Tank

A range of mounting options are available for common installation situations. Detailed pictorial instruction sequences for these mounting options are provided in the following documents:

Installation Type	Description	Document#
Above Ground Tank Dual Lock pr e-fitted	Above ground tank with Dual Lock re-closable fasten er pre-fitted. A	AD880014
Multi-valve Mount	Cable tie attachment to Pressure Relief Valve	AD880017

Only the most common options are listed in this table. Contact Anova for assistance with other mounting scenarios.

Commissioning

To Commission the SC415, a Service call needs to be made to initiate a connection to the server. This is done by Activating the dialler as shown in Figure 1. When the magnetic Activation Tool is sensed by the SC415 the red LED will illuminate. Refer to APPENDIX A for details of the activation sequence(s).

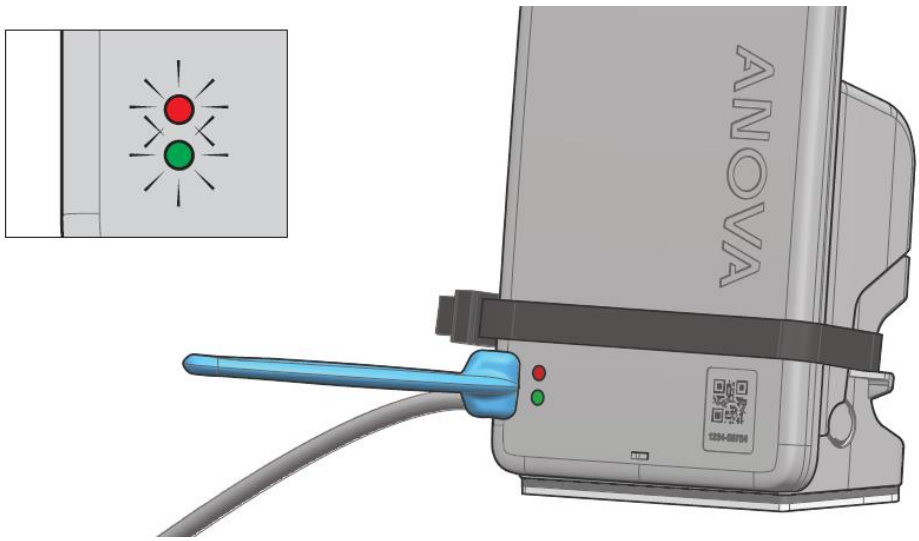


Figure 1 SC415 Activation

A Service call activation initiates a connection to a server using the cellular network. The LEDs will indicate the status of the connection process which could take a minute or two. If the connection is successful the SC415 will retrieve its operational parameters from the server.
The outcome of Service call is shown for 5 seconds before the SC415 returns to sleep state. The green LED remaining on for 5 seconds indicates that the Dialer has made a successful connection, has been configured and is now in operational state. The red LED remaining on for 5 seconds indicates the either a connection or configuration problem.

SC415 Operation

Overview

The SC415 provides two field connectors for connecting Senders. In most applications only one of these will be used, preferably the A connector. The SC415 incorporates a Real Time Clock (RTC) to schedule sampling and regular reporting. It communicates with a server using a packet data service (TCP socket) on the cellular network. The SC415 takes a level data sample from the Senders every 30 minutes and records temperature data at the time of making a call. This data is delivered daily to a server at a configured reporting time and this connection is referred to as a ‘Reporting” call.
The SC415 has 3 states, Transport, Operational and Decommissioned. During production, the SC415 is placed into Transport state. In Transport state, the SC415 remains in its sleep state and will not sample or make Reporting calls. In Operational state, the SC415 collects sample data and makes daily Reporting calls. In Decommissioned state, the SC415 makes a Reporting call on the first day of the month, but does not take samples or make daily Reporting calls. A user can initiate a call to the server by manually activating the device. This is referred to as a Service call.

Installation

During installation, the installer must initiate a Service call to connect to the server. See APPENDIX A for detailed

activation sequence. On a successful connection to the server, the SC415 will receive its configuration, its reporting call time will be set and it will return any initial sample values to the server. The SC415 will typically change state from Transport or Decommissioned to Operational state during this connection. A service call can also be made by a service technician or delivery driver after the SC415 has been Commissioned. This allows configuration changes to be made and any stored data to be return to the server.

Normal Operation

Once the SC415 is in Operational state, it will make daily Reporting calls at the configured reporting call time. The SC415 will make up to 3 attempts to connect to the server. If all three attempts are unsuccessful, the SC415 return to its sleep state. Another reporting call will be initiated at the reporting time on the following day. During the Reporting call, sample history, temperature data and current sensor values are delivered to the server.

Sampling

The SC415 samples each enabled Sender channel every 30 minutes on the hour and ½ hour. Temperature is sampled at the time of making the call. The SC415 has sufficient memory to hold 7 days of sample history. This prevents loss of sample data in situations where the SC415 fails to connect to the server at its regular Reporting call time. If the SC415 fails to connect on 7 consecutive days, the oldest sample data will be overwritten with new sample data and the older data will be lost.

Decommissioning

When the SC415 is being removed from a site, it should be Decommissioned. In Decommissioned state, the SC415 stops sampling and making daily Reporting calls. The device can only be decommissioned by the server setting it into Decommissioned state. This can occur either during a Service call or a regular Reporting call.

APPENDIX A – SC415 Activation Sequence

The following table describes the SC415 user interface. Holding the SC664A activation tool adjacent to the LEDs causes the SC415 to exit its sleep mode. The period that the activation tool is held adjacent to the LEDs determines the modes that the SC415 enters. Less than 4 seconds provides a battery status, between 4 and 9 seconds initiates a service call and more than 10 seconds enters test mode. The LED sequences provide status and result indications for each mode.

Magnet (secs)	LED (secs)	RED	GREEN	RESULT
1-4	1-4	Flash Fast Together	Flash Fast Together	Battery Dead
		Solid	Off	Battery OK
4-9	4-9	Solid	Flash Fast	Activate Dialer*
10+	–	Flash Fast Alternate	Flash Fast Alternate	Test mode
	35-60	Heart Beat Flash	Off	GPS fix A
	5	Solid	Off	GPS fix failure
	5	Off	Solid	GPS fix OK
	–	Fast flash	Off	Connecting to network
	–	Fast flash	Off	Connected to server
	–	Solid	Flash Fast	Retry delay
	5	Solid	Off	Result — connection failure or server not OK
	5	Off	Solid	Result — connect & server OK

Table 1: SC415 Activation Sequence

* To make a service call, activate the Dialer by holding the activation tool next to the LEDs until the green LED starts flashing (5-10 seconds), then remove activation tool. ^ GPS fix only occurs the first time the Dialer is activated within any 15-minute period.

APPENDIX B – Controlled Content

This document contains the content of the Installation & Maintenance Guide that is relevant to the US market and which is subject to control by certification bodies.

Applicable Model Numbers

This document applies to products with model numbers SC415Cnrs, where

- n is numeric (denotes cellular network type)
- r is numeric (denotes included options)
- s must be “4” or “5”

Device Description

The SC415 Cellular Dialer is designed to be mounted directly on a propane tank in a hazardous area. The equipment consists of a battery powered RF transceiver mounted in a non-metallic enclosure. The Dialer communicates via cellular telephony to a remotely located monitoring station. The apparatus provides for cabled connection to level transducers or meters via proprietary connector interfaces. The SC415 Cellular Dialer is certified for use in Zone 0 hazardous gas environments and may be used in Zones 0, 1, and 2 as well as

unclassified locations. The SC415 Cellular Dialer is not certified for use in explosive dust environments.

Hazardous Area Use

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Transport

The SC415 Cellular Dialer is powered by a lithium primary cell and contains a lithium-chemistry-based supercapacitor. Transport of such equipment is subject to the currently applicable Dangerous Goods Regulations. Please refer questions regarding necessary transportation declarations to Silicon Controls.

Installation

Temperature Rating

The SC415 is certified for storage and use in ambient temperatures ranging between -30°C and +60°C. Any external sources of heating or cooling must be taken into consideration during installation to ensure that the rated ambient temperature range of the equipment is not exceeded.

Sensor Rating

Any sensors to be connected to the SC415 Cellular Dialer must be compatible with the SC415's published entity parameters. Appropriately skilled technical personnel should make this determination through comparison of the sensor and SC415 entity parameters.

Anti-Static Procedures

Standard Operating Practices (SOP) for personnel and external equipment earthing should be heeded prior to installation of the SC415 Cellular Dialer; to ensure that accumulated static charges on the installer are dissipated prior to approaching the hazardous area.

Maintenance

Maintaining the Cellular Dialer

The following should be inspected every time the tank is filled:

- Housing is clean and has no cracks or significant abrasions
- Mounting plate is securely fastened to the mounting surface
- Outer sheath of the sensor cable(s) are not damaged
- Sensor(s) are properly fitted and fixed in place

Anti-Static Procedures

Standard Operating Practices (SOP) for personnel and external equipment earthing should be heeded prior to undertaking maintenance of the SC415 Cellular Dialer; to ensure that accumulated static charges on the installer are dissipated prior to approaching the hazardous area.
WARNING: Potential electrostatic charging hazard:

- Clean housing with damp cloth only to avoid static discharge

Servicing

The SC415 Cellular Dialer is a sealed and encapsulated enclosure. There are no serviceable parts and no attempt should be made to prise the enclosure apart. The provided I/O sensor ports are the only external connections provided.

Battery

The SC415 Cellular Dialer is powered by an internal, non-replaceable primary (i.e. non-rechargeable) cell.

Battery Safety
Do not dispose of in fire. The battery and super-capacitor contained within the SC415 contain Lithium and must be disposed of by an approved contractor. If transporting used batteries in bulk to an approved recycler, the following information should be quoted:

PROPER SHIPPING NAME: Waste Lithium Batteries
UN NUMBER: 3090
LABEL REQUIREMENTS: MISCELLANEOUS, HAZARDOUS WASTE
DISPOSAL CODE: D003

Technical Specifications

Environmental	
Operating temp. Ambien t pressure Weatherproofi ng	-30’C to +60’C 80kPa – 110kPa Case: IP20: plus internal encapsulation
Physical	
Dimensions Weight Cas e material External connections	117mm H x 80mm W x 48mm D (excJ. cable) 300g Injection Moulded Grey Plastic 2 x 3 way polarized connectors
Elechical	
Power source Clock Sen sor inputs Diagnostics	Integrated primary battery (non-replaceable) Real time clock Voltage. resistance or dry contact LED (2). RSSI. battery, temperature. cable. sensor
Cellular Comms	
Protocol: one of: Aerial Data Services	‘2G’ GSM. ‘3G’ GSM. I xRTT COMA. LTE Cat-M I. LTE Cat-NB I. LTE Cal-I Internal Omni-directional CSD. GPRS
Location (GNSS)	
Constellations Antenna Accuracy	GPS + GLONASS Integrated internal -5m horizontal
Compliance	
EMCJSafety Intrinsic Sa fety Radio	EN60950-1:2006+A2:2013. EN62311:2008. FCC 15B EN60079-0:2012+A11:2013. EN60079-11:2012. CSA C22.2 No. 60079-0:15. ed. 3. CSA C22.2 No. 60079-11:14 ed. 2. IEC60079-0: 2011 ed. 6 Cor. 2. IEC60079-11:2011 ed. 6 Ca. 1. UL60079-0:2013 ed. 6. UL60079-11:2014 ed. 6. UL913 ed.8:2015. (Ex is DC T3) EN301489-1. EN301489-52. EN301511 v9.0.2. FCC 15C

Model Numbers (US market)

SC415 Cellular Dialer

SC415anrs-bct – Cellular Dialer

a =	C = US (AEx)
n =	5 = LTE Cat-M1 (ME910) 6 = LTE Cat-M1/2G (ME910)
r =	1 = GNSS fitted 2 = GNSS not fitted 5 = GNSS fitted / TMR switch 6 = GNSS not fitted / TMR switch
s =	4 = Gas Groups IIA, IIB, IIC 5 = Gas Groups IIA, IIB
bct =	[blank] = PCB conforms to CD710017 rev 1
or	
b =	A…Z (module identification)
c =	A…Z (network operator identification)
t =	1 = PCB conforms to CD710017 rev 1 2 = PCB conforms to CD710017 rev 2

Devices manufactured prior to 2020Q3 omit the suffix characters “-bct”.

UL / cUL Certification (UL File #E235320)

Applicable Models:	SC415Cxx4

Hazardous Area Installation Instructions

The following instructions apply to equipment models listed above which are covered by UL file number E235320:

- SC415Cxx4: The equipment may be used with flammable gases and vapours with apparatus groups A, B, C, D, IIA, IIB and IIC and with temperature classes T1, T2 and T3
- The equipment is only certified for use in ambient temperatures within the range -30°C to +60°C and should not be used outside this range.
- Installation shall be carried out in accordance with the applicable standard or code of practice by suitably trained personnel.
- The equipment is designed to be a disposable, non-repairable item. Equipment should be recycled by an approved contractor, as it contains lithium based components.
- 500Vrms isolation is not provided between Field Sensor A and B circuits. Isolation is provided between Field Sensor A, B circuits and enclosure.
- WARNING: Potential electrostatic charging hazard: clean housing with damp cloth only to avoid static discharge.
- In the event of a warranty claim, obtain a Return Materials Authorisation from Silicon Controls prior to returning the equipment, freight paid, to:
  Silicon Controls, 33 Waterloo Road Macquarie Park NSW 2113 Australia

12.3 SC415Cxx5 Label Marking

Marking	c UL US LISTED **7HA7**
Certification code	Class I Division 1 Groups C D T3 Class I Zone 0 AEx ia IIB T3 Ga Class 1 Zone 0 Ex ia IIB T3 Ga -30°C ≤ Ta ≤ +60°C
Label	**SC415Cxx4-xxn CELLULAR DIALER** CL.I DIV.1 GR. ABCD T3 & CL.I ZN 0 AEx ia IIC T3 Ga Ex ia IIC T3 Ga REF. CONTROL DRAWING AD000028. -30°C≤ Ta ≤ +60°C **Exia INTRINSICALLY SAFE / Exia SÉCURITÉ INTRINSÈQUE** (YYYY) SILICON CONTROLS NSW 2113 AUSTRALIA WARNING - POTENTIAL ELECTROSTATIC CHARGING HAZARD AVERTISSEMENT – DANGER POTENTIEL DE CHARGES ÉLECTROSTATIQUES c UL US LISTED 7HA7 TELEMETERING EQUIPMENT FOR USE IN HAZ. LOC. AW701272 rev 3

SC415Cxx5 Control Drawings

Contact Silicon Controls for drawing number AD000029.

The text SC415Cxx5-xxn is replaced with the appropriate model number; the date (YYYY) is replaced with the year of manufacture. Models produced prior to 2020Q3 omit the suffix –xxn; n may be implied as “1”.

UL / cUL Certification (UL File #E235320)

Applicable Models:	SC415Cxx5

Hazardous Area Installation Instructions

The following instructions apply to equipment models listed above which are covered by UL file number E235320:

- SC415Cxx5: The equipment may be used with flammable gases and vapours with apparatus groups C, D, IIA and IIB and with temperature classes T1, T2 and T3
- The equipment is only certified for use in ambient temperatures within the range -30°C to +60°C and should not be used outside this range.
- Installation shall be carried out in accordance with the applicable standard or code of practice by suitably trained personnel.
- The equipment is designed to be a disposable, non-repairable item. Equipment should be recycled by an approved contractor, as it contains lithium based components.
- 500Vrms isolation is not provided between Field Sensor A and B circuits. Isolation is provided between Field Sensor A, B circuits and enclosure.
- WARNING: Potential electrostatic charging hazard: clean housing with damp cloth only to avoid static discharge.
- In the event of a warranty claim, obtain a Return Materials Authorisation from Silicon Controls prior to returning the equipment, freight paid, to:
  Silicon Controls, 33 Waterloo Road Macquarie Park NSW 2113 Australia

SC415Cxx5 Label Marking

Marking	c UL US LISTED **7HA7**
Certification code	Class I Division 1 Groups C D T3 Class I Zone 0 AEx ia IIB T3 Ga Class 1 Zone 0 Ex ia IIB T3 Ga -30°C ≤ Ta ≤ +60°C
Label 2	**SC415Cxx5-xxn CELLULAR DIALER** CL.I DIV.1 GR. C D T3 & CL.I ZN 0 AEx ia IIB T3 Ga Ex ia IIB T3 Ga REF. CONTROL DRAWING AD000029. -30°C≤ Ta ≤ +60°C **Exia INTRINSICALLY SAFE / Exia SÉCURITÉ INTRINSÈQUE** (YYYY) SILICON CONTROLS NSW 2113 AUSTRALIA WARNING - POTENTIAL ELECTROSTATIC CHARGING HAZARD AVERTISSEMENT – DANGER POTENTIEL DE CHARGES ÉLECTROSTATIQUES 7HA7 c UL US LISTED TELEMETERING EQUIPMENT FOR USE IN HAZ. LOC. AW701273 rev 3

SC415Cxx5 Control Drawings

Contact Silicon Controls for drawing number AD000029.
The text SC415Cxx5-xxn is replaced with the appropriate model number; the date (YYYY) is replaced with the year of manufacture. Models produced prior to 2020Q3 omit the suffix –xxn; n may be implied as “1”.

FCC Regulations

This device complies with Part 15 of the FCC Rules and Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.
This device complies with FCC/ISED radiation exposure limits set forth for an uncontrolled environment and meets the FCC radio frequency (RF) Exposure Guidelines and RSS-102 of the ISED radio frequency (RF) Exposure rules.

RF Exposure Information / Informations d’exposition RF (MPE)

This device has been tested and meets applicable limits for Radio Frequency (RF) exposure.
This equipment should be installed and operated with minimum distance of 20cm between the radiator & your body.

FCC Class B digital device notice

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

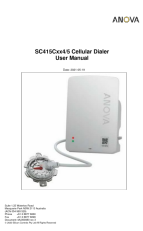
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

CAN ICES-3 (B) / NMB-3 (B)

This Class B digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de classe B est conforme à la norme canadienne ICES-003.

Document: ML000080 rev 3

Documents / Resources

	ANOVA SC415Cxx4-5 Cellular Dialer [pdf] User Manual SC415C61, XV2SC415C61, SC415Cxx4, SC415Cxx4-5, Cellular Dialer