Appendix H: User Manual

Please refer to the following pages.

Wireless Transceiver System

427 Series

Technical Manual

Version 1.0

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Copyright Information

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ICS, LLC's products are intended for use in normal commercial applications. Applications requiring extended temperature range or unusual environment requirements such as military, medical life-support or life-sustaining equipment are specifically not recommended without additional testing for such application

Limited Warranty

For a period of one (1) year from the date of purchase, ICS, LLC warrants the transceivers against defects in materials and workmanship. ICS, LLC will not honor this warranty (and this warranty will be automatically void) if there has been any:

1. Tampering, signs of tampering, or opening of the transceiver's case.
2. Use of AC power adapters and cables other than those originally supplied with the transceivers.
3. Repair or attempt to repair by anyone other than an ICS, LLC authorized technician.

This warranty does not cover and ICS, LLC will not be liable for, any damage or failure caused by misuse, abuse, acts of God, accidents, electrical irregularity, or other causes beyond ICS, LLC's control, or claim by other than original purchaser.

FCC Notice

! Warning This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference
2. This device must accept any interference received, including interference that may cause undesired operation.

! Warning Changes or modifications not expressly approved by ICS, LLC will void the user's authority to operate the equipment.

These statements apply to the following ICS Wireless Transceiver System Models:

Model ICS 427-01A Wireless Loadcell Transceiver

FCC ID: XL5-ICS427-01A

And

Model ICS 427-01B Wireless Indicator Transceiver

FCC ID: XL5-ICS427-01B

Table of Contents

Overview

The ICS 427 Wireless transceiver system is designed to allow wireless connectivity from a loadcell(s) to an indicator. It eliminates the requirement for a local indicator or RS-232 modem transceiver.

This is a bi-directional wireless system that is composed of two transceivers, one that is designated as the transmitter and the other designated as the receiver. The transceivers are designed to be used in pairs, and will only operate with their respectable partner.

The loadcell transceiver, (Transmitter) supplies source excitation voltage to the connected loadcell(s), which can be connected in quantities of 1, 4, 6, or 8. The transceiver then receives the respective mV/V output signal from the connected loadcell(s) or J-box to be transmitted to the Indicator transceiver (Receiver).

The Indicator transceiver (Receiver) receives the transmission from the loadcell transceiver (Transmitter) and recreates mV/V signal. The mV/V output signal is then connected to the signal input connections of an indicator that meets operational requirements.

Transceiver Specifications

Transmitter (Loadcell)

Source Voltage	3 – 12VDC
Internal Battery Voltage	3.6VDC
Internal Battery Life	100+hrs w/4 loadcells

(Will accept 1-8 Loadcells. Battery life varies with qty of cells applied)

AC Power Adapter Input	110VAC
AC Power Adapter Output	5VDC 2A
Loadcell Connection	5 Wire shielded
Antenna Frequency Band	902-928 MHz
Range (Line of Sight)	100+ m
Range (Non Line of Sight)	50+m
Operating Temperature	-40°C -- +85°C
Excitation Voltage	3.3VDC
Signal Input	≤3.9mV/V

Receiver (Indicator)

Source Voltage	5-10VDC

(supplied by indicator excitation Voltage)

Signal Output	2mV/V
Indicator Connection	5 Wire Shielded
Antenna Frequency Band	902-928 MHz
Range (Line of Sight)	100+m
Range (Non Line of Sight)	50+m
Operating Temperature	-40°C -- +85°C
Accuracy	1/5,000 for any Indicator

Enclosures

Standard Anodized Enclosure

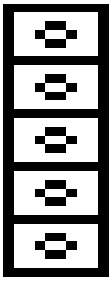
Loadcell Transceiver (Left) **Indicator Transceiver (Right)**

Stainless Steel Nema 4 Enclosure (Optional)

Loadcell Transceiver (Left) Indicator Transceiver (Right)

Transceiver Connections

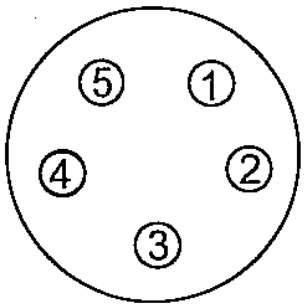
Stainless Steel Nema 4 Enclosure



E+ - - - - - - - - - - - - - - - Excitation +
S+ - - - - - - - - - - - - - - - -Signal +
S- - - - - - - - - - - - - - - - -Signal –
E- - - - - - - - - - - - - - - - -Excitation
Gnd - - - - - - - - - - - - - - -Ground

FIG 1.1

Standard Anodized Enclosure



Indicator		Load cell
+E 1	----------	+Excitation
+S 2	----------	+Signal
-S 3	----------	-Signal
-E 4	----------	-Excitation
GND 5	----------	GND

FIG 1.2

Loadcell Transceiver Installation

(Anodized Enclosure) See fig 1.2

1. Connect the enclosed 5 pin female plug to the loadcell / Scale as follows:
   a. Pin 1 = Excitation +
   b. Pin 2 = Signal +
   c. Pin 3 = Signal –
   d. Pin 4 = Excitation –
   e. Pin 5 = Shield (If so equipped)
2. Connect 5 pin plug to transmitter.
3. Connect the enclosed antenna to the transmitter
4. Transmitter is equipped with an internal rechargeable battery pack. To charge the battery pack, plug in enclosed power adapter.

(Stainless Enclosure)

See **Fig 1.1** for loadcell / scale connections.

For remaining connections follow steps 3 and 4 of instructions above.

****Loadcell transceiver will not power up until the receiver is powered up and communicating. Once power is turned off to the indicator transceiver, or communication is lost, the loadcell transceiver will enter "SLEEP MODE" to save battery life.****

Indicator Transceiver Installation

(Anodized Enclosure Only) See Fig 1.2

1. **(Depending on the indicator that is used, a cable may need to be made to go from the indicator to the transmitter plug)** Connect the enclosed 5 pin female plug to the loadcell connection from the indicator as follows:
   a. Pin 1 = Excitation +
   b. Pin 2 = Signal +
   c. Pin 3 = Signal –
   d. Pin 4 = Excitation –
   e. Pin 5 = Shield (If so equipped)
2. Connect the enclosed antenna to the receiver.

3. The power to the receiver is supplied by the excitation voltage from the indicator
4. Power the indicator up and ensure that the transmitter and receiver are communicating (the signal LED will flash rapidly when communicating).
5. Follow calibration procedures for the indicator used.
6. To power down wireless units, remove power to the indicator.

(Stainless Steel Enclosure)

See **Fig 1.1** for indicator connections.

For remaining connections follow steps 2-6 of the instructions above.

Jumper Settings "Loadcell Transceiver Only"

(Selects number of loadcells used up to 8 loadcells)

1. There is a jumper located on the circuit board in the loadcell transceiver. The factory default setting is set for 4 loadcells.
2. To change the jumper setting, remove the end plate with the 5 pin connector, or for stainless enclosure, remove cover plate. The Jumper has 4 positions. The positions are labeled 1,4,6, and 8, which corresponds to the number of loadcells being used.
3. Move the jumper to the selected position and replace the end plate, or cover plate.

****Changing Jumper settings will affect indicator calibration, recalibration will be required.****

Power Requirement

Loadcell Transceiver

1. Internal 3.6VDC rechargeable battery
2. 110VAC adapter

Indicator Transceiver

DC operational source voltage supplied from indicator's + and – excitation connections.

Unit Operation

Turning Transceivers On/Off

Indicator Transceiver

The indicator transceiver receives its source voltage from the excitation voltage of the connected indicator. Once the indicator is powered up, the transceiver is automatically powered up with it.

Loadcell Transceiver

The loadcell transceiver receives its source voltage from either the internal rechargeable battery or the supplied 110 VAC adapter. If the unit is running on its internal rechargeable battery, it will not power up until it has received a signal from the indicator transmitter (this is an internal sleep mode that is used to prolong battery life.) If at any time during operation the transceivers lose connectivity, the transceiver will return to sleep mode until connection is restored. If the loadcell transceiver is connected to the supplied 110 VAC adapter, it will remained powered up continuously.

Calibration

****The transceivers require no calibration, adjustment, or programming for indicator calibration.****

Follow manufacturer provided calibration instructions for the connected indicator .

LED Indicator Lights

(For Anodized Enclosure Only)

Signal Indicator

Green LED – **Good signal strength** – LED will flash 10 times per second.

Poor signal strength, or loss of signal – LED will flash once for every 1.5 sec while searching for signal.

(Transmitter will enter sleep mode after 5 seconds of signal loss. Transmitter will reactivate once signal strength is re-obtained.

Battery Indicator

Green LED - **Good Battery Strength**

Red LED - **Low Battery strength**

DC Power Indicator

Orange LED - **Recharging Battery –** Unit will function properly while battery is recharging, or running solely on DC power

Troubleshooting

Problem	Solution
Indicator transceiver will not power up.	Check indicator connections, Power is supplied from excitation voltage.
Loadcell Transceiver will not power up.	Check power connections. Charge battery.
Inaccurrate weight readings on indicator.	Check Power connections. Charge battery. Check loadcell connections. Recalibrate indicator.
Unstable weight readings or severely erratic readings.	Check loadcell/indicator connections. Check for connectivity. Check Power connections. Charge Battery
Loss of connectivity between transceivers.	Check connections. Transceivers may also be out of range. Check Power connections. Charge battery
Low battery light is illuminated on loadcell transceiver.	Plug in supplied AC power adapter to recharge battery.

****To obtain optimal battery life, battery must be charged with supplied charger for a minimum of 8 hours when recharging****

For further technical assistance please contact the technical support department.

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Notes