ANYLOAD®

TECHNICAL MANUAL

V20-05

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I. ABOUT THIS MANUAL

Thank you for choosing Anyload WL900 wireless transmitter. This WL900 technical manual provides installation, setup, operation, and configuration information for the WL900 wireless transmitter. This manual is intended to be used by trained service technicians and installers. It is recommended to go through the manual in details before installing, operating or configuring the instrument. For further information please contact Anyload Weigh & Measure Inc. authorized dealer.

II. DISCLAIMER

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III. SAFETY

Standard safety practices are required before conducting any installation, maintenance, or procedure on device. It is recommended to read and understand the instructions and warnings in this manual before performing any procedure on device. Failure to follow the instructions and warnings could result in injury or death.

Definition of the safety symbols is described in table below.

Symbol	Description
	WARNING! Indicates a potentially hazardous situation which may result in serious injury or death Indicates a potentially dangerous procedure which may cause injury or death
	CAUTION! Indicates a potentially wrong procedure which may result in damage to device Indicates a potentially wrong procedure which may result in loss of warranty
	NOTICE! Indicates a procedure which may need more instructions Indicates a procedure which has more information available

1. INTRODUCTION

1.1 MAIN FEATURES

- Designed exclusively for weighing industry.
- Easy connecting weight indicators to remote displays and secondary devices.
- Stainless steel tech friendly NEMA4/IP65 enclosure.
- Keypad and display for easy setup and configuration.
- Screw terminal wiring and strain reliefs for data inputs.
- Lightning ESD protection on communication lines.
- AC wall adaptor with detachable connector.
- Standard seven segments display for setup and diagnostics.
- Automatic learn mode to set communication baud rates.
- Automatic learn mode to detect incoming strings format.
- Menu driven setup function using a membrane keypad.
- Traffic light RED/GREEN control.
- Breather ventilation to avoid condensation inside enclosure.
- Designed and developed by Anyload Weigh & Measure Inc. in Canada.
- Universal worldwide emission approvals: FCC, IC, C-Tick.
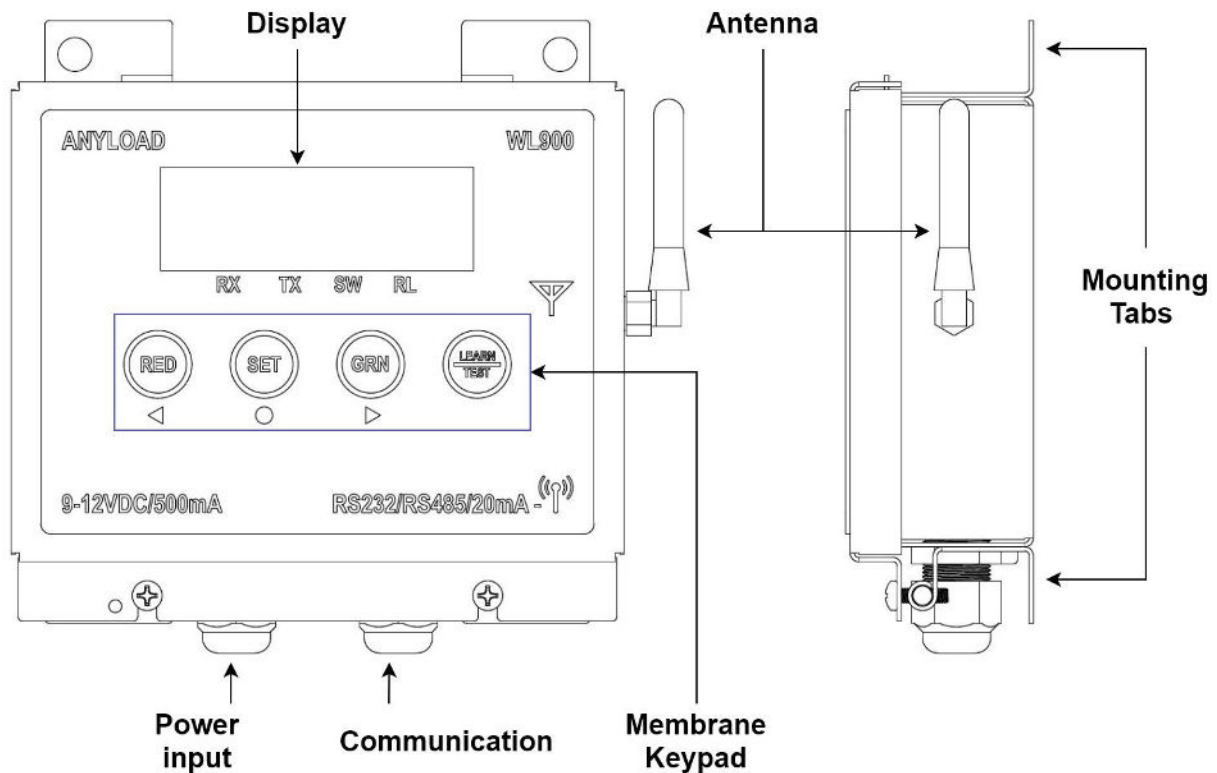
1.2 TECHNICAL SPECIFICATIONS

Item	Specification	Description
1	Indoor / Urban Range	100m (300ft)
2	Outdoor / Line of Sight	300m (1000ft)
3	Output Power	250mW (24dBM)
4	Frequency Range	900MHZ (920MHZ)
5	Throughput	10Kbps (9600bps)
6	Antenna	Whip RPSMA
7	Display Digits	0.4" (10 mm) height, 6 digits, 7 Segment display
8	Micro Controller	50MHZ ARM Cortex M® processor
9	Status Indication	4 annunciators for RX, TX, SW, RL
10	Membrane Keypad	4 keys domed membrane keypad with LEARN
11	Communication Ports	3 independent serial ports for RS232, RS422/RS485, and 20mA current loop
12	Communication Baud	Auto learn 300,600,1200,2400,4800,9600,19200,38400,57600 baud rate
13	Digital Output	1 form C relay output rated at 2A / 60VDC
14	Digital inputs	1 independent dry contact switch input
15	Main Enclosure	Stainless steel NEMA 4 / IP65 weather proof suitable for outdoor applications
16	Power Supply, External	Input: 100-240VAC, 0.6A, 50/60Hz / Output: 12VDC, 2.0A, 25W Wall adaptor
17	Power Consumption	12VDC @ 0.5A typical
18	Operating Temperature	-40°F to 120°F (-40°C to 50°C)
19	Operating Humidity	20%RH to 90%RH
20	Enclosure Ventilation	GORE ® breather vent to avoid condensation
21	Physical Dimensions	5.7" W X 5.6" H X 1.7" D (144 mm X 142 mm X 44 mm)
22	Total Weight	1.0 kg (2 lbs) approximately including wall adaptor
23	Industry Approvals	FCC, IC, C-Tick
24	Regional Frequency	US / CAN / AUS / EU

2. INSTALLATION

2.1 SAFETY PRECAUTIONS

Please practice safety before conducting any installation, maintenance, or procedure on device.

- ✓ It is necessary to practice safety checks before any installation or maintenance.
- ✓ Do not operate this device unless all instructions in this manual have been read.
- ✓ All installation and maintenance shall be conducted by trained service technicians.
- ✓ Avoid any alteration or changes to the device other than factory provided options.
- ✓ Disconnect power source before any installation or maintenance.
- ✓ Make sure proper grounding is provided at the site.
- ✓ Make sure device is properly grounded if custom wiring is provided.
- ✓ Make sure all warning signs are visible and not damaged or altered.
- ✓ Follow warning and caution notes in this manual.

FCC ID: MCQ-XBPS3B

IC: 1846A-XBPS3B

This product 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 that may cause undesireable operation.

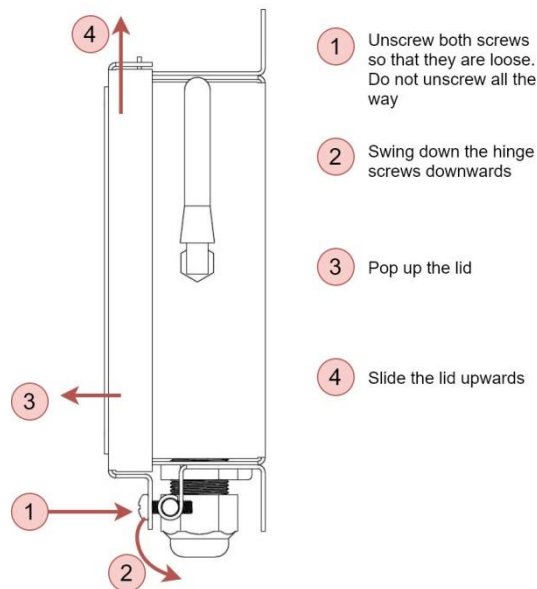| Symbol	Description
	WARNING! Make sure the power source is disconnected before any installation Make sure the site has proper grounding
	CAUTION! Any unauthorized change or alteration in default wiring may void warranty Any installation and wiring must be handled by authorized personnel
	NOTICE! Refer to the local electrical code for the wiring color codes Refer to the installation section for instructions to how to access to the wiring terminals

2.2 MAIN ENCLOSURE

The main enclosure of the WL900 is latch design metal enclosure protected by two hinged screws on the bottom for easy service. The enclosure is a weather proof stainless steel with internal rubber gasket for weather proofing. All internal parts are installed on standoffs mounted inside of the enclosure.
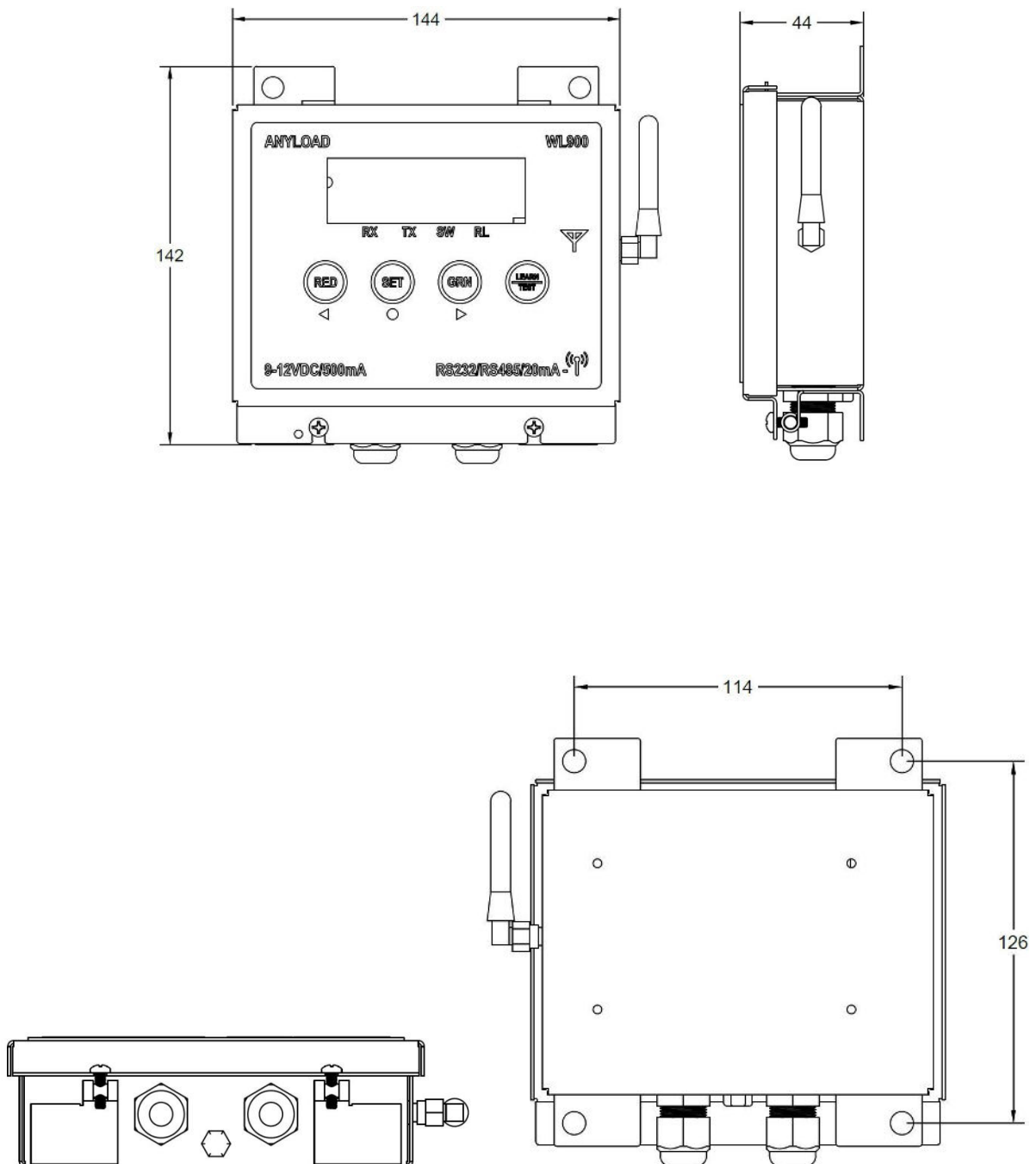
2.3 OPENING ENCLOSURE

To open the cover, unscrew the two screws at the bottom and swing the screw hinge down. The cover should pop up a little bit from the gasket pressure. Then slide the cover up to remove the cover.

①	Unscrew both screws so that they are loose. Do not unscrew all the way
②	Swing down the hinge screws downwards
③	Pop up the lid
④	Slide the lid upwards

2.4 WALL MOUNTING

To mount the WL900 to a wall use the 4 tabs at each corner as mounting points.

Symbol	Description
i	**NOTICE!** Make sure the site has proper grounding Make sure the power source is disconnected before any installation Any installation and wiring must be handled by authorized personnel

3. WIRING

3.1 CONTROLLER BOARD TERMINALS

All communication signals, switch input, and relay output can be terminated to the controller board via accessible screw terminals. These terminals are designed to accept serial data communication signals, dry contact switch input, and a relay output. The signals can be entered via cable strain reliefs to the enclosure. The power supply is detachable, and can be disconnected from enclosure.
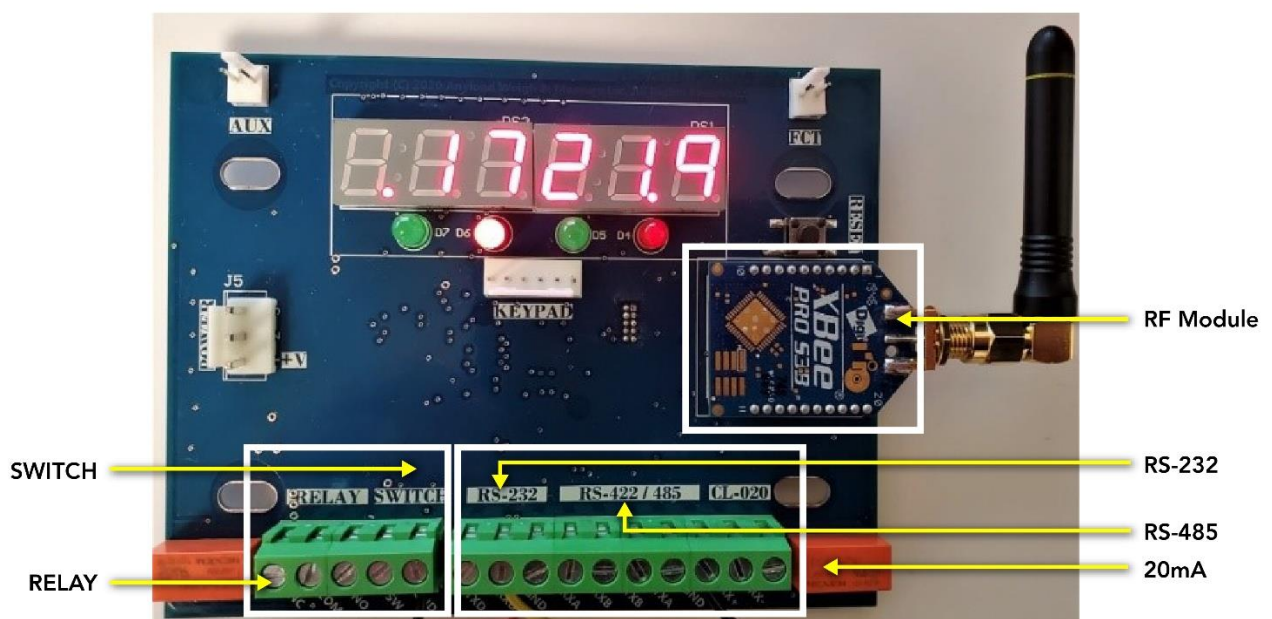
Item	Protocol	Distance
1	RS-232	50 feet (15 m)
2	RS-422/RS-485	1000 feet (300 m)
3	20mA	500 feet (150 m)

Symbol	Description
	NOTICE! Availability of the options is subject to confirmation by manufacturer and may vary by firmware version Refer to the configuration section for instructions on how to configure the functions of wireless transmitter Refer to the installation section for instructions on how to access the wiring terminals

3.2 ELECTRICAL POWER WIRING

The WL900 wireless transmitter is a 12 VDC powered devise and comes with a 12VDC/2.0A wall adapter. Please use the supplied power adapter.

Item	AC Power Supply	Description
1	Input	AC 100-240V~ 0.6A 50-60HZ
2	Output	DC 12V 2A 25W
3	Specifications	Wall adaptor, AC/DC Switching Power Supply, LPS
4	Protection	Short circuit, Over load, Over voltage protected,
5	Approvals	UL / cUL Approved, CE Mark

3.3 SERIAL COMMUNICATION WIRING

The WL900 wireless transmitter provides industry standard serial communication ports with installation via screw terminals. The ports are automatically detected and adjusted upon start up. There are three communication ports available as RS-232, RS-422, RS-485, and 20mA current loop in both active and passive mode. The serial communication wires coming from indicator shall be entered to the unit via bottom strain reliefs and be terminated to the proper terminals.

Communication	Indicator	WL900	Description
RS-232 Communication	GND	GND	Signal Ground
	TX	RXD	Transmit to Receive Data
	-	TXD	Transmit Data

Communication	Indicator	WL900	Description
RS-422 Communication **RS-485 Communication**	GND	GND	Signal Ground
	TXB	RXB	Negative Transmit to Negative Receive Data
	TXA	RXA	Positive Transmit to Positive Receive Data
	-	TXB	Negative Transmit Data
	-	TXA	Positive Transmit Data

Communication	Indicator	WL900	Description
20mA Current Loop **(Passive or Active)**	TX-	RX-	Negative Transmit to Negative Receive Data
	TX+	RX+	Positive Transmit to Positive Receive Data

3.4   808AH/BH/CH RF MODULE INSTALLATION

The hardware configuration of the 808AH/BH/CH large display to a wireless display is explained below. The wireless conversion kit consists of:

- Wireless module
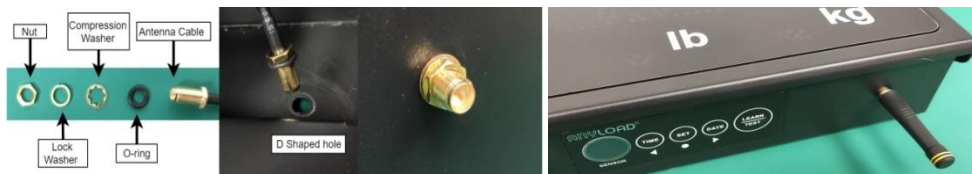- Antenna
- Antenna cable

- *ASSEMBLY INSTRUCTIONS:*

Install the wireless module in the correct orientation on the main board. Make sure the pins are aligned properly. Mount the other end of the antenna cable on the large display enclosure.

Install the antenna outside the unit at the bottom.

Symbol	Description
	NOTICE! The Wireless kit is an electronic sensitive device The wireless kit must be installed, and handled with care to avoid any ESD damage Make sure the power source is disconnected before any installation

3.5 SWITCH AND RELAY WIRING

The input switch SWITCH can be used on transmitter configuration to control the output relay on receiver side. The switch only accepts dry contact as input configuration.

The relay RELAY can be used on receiver configuration to receive traffic light commands to control external traffic lights.

To use functions related to the Switch and Relay, refer to the configuration, and troubleshooting sections of this technical manual.

Terminal	Relay	Description
1	NC	GREEN External Traffic Light
2	COM	Common for External Voltage
3	NO	RED External Traffic Light
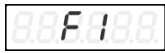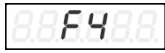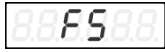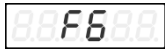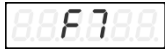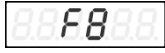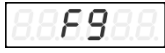
Terminal	Switch	Description
1	SW	High Side
2	GND	Signal Ground

Symbol	Description
	WARNING! The switches only accept dry contact as inputs The relay contact is limited to 2A/60VDC Make sure the site has proper grounding
	CAUTION! The switches only accept dry contact as inputs Any unauthorized change or alteration in default wiring may void warranty Any installation and wiring must be handled by authorized personnel
	NOTICE! The switch and relay functions are disabled as default Refer to the configuration section for instructions to how to configure inputs and outputs Refer to the installation section for instructions to how to access to the wiring terminals

4. CONFIGURATION

4.1 FUNCTION SETUP MENU

The function setup menu is consisted of different function blocks used to set different configuration values of WL900 RF transceivers. There are five function blocks currently available for configuration showed in the table below.

Block	Menu	Description
F1	**DISPLAY**	Functions Related to Digits Display
F2	**UTILITIES**	Functions Related to Utilities and Special Programs
F3	**-**	N/A
F4	**SERIAL**	Functions Related to Data Communications and Serial Ports
F5	**AUXILIARY**	Functions Related to Switch Inputs and Relay Outputs
F6	**-**	N/A
F7	**-**	N/A
F8	**-**	N/A
F9	**DIAGNOSTIC**	Advance Diagnostics

4.2 OPERATING MODES

Mode	Description
Transmitter	Default setting is used to connect weight indicators to remote displays.
Receiver	Alternative setting is used in receiver mode to connect weight indicators to PC or traffic lights.
Custom	N/A

4.3   MEMBRANE KEYPAD

The setup menu is used to configure main operating functions of the WL900 Wireless Transmitter. A four keys membrane keypad, located at front of the enclosure, is used to enter into, exit from, and navigate through setup menu functions.

To enter into setup menu, press and hold ◁ & ▷ keys together for two seconds. To exit from setup menu, use the same keys combination. To navigate through menus, press short or hold ◁ or ▷ keys. To enter into or exit from a sub menu press ◯ key. To change a sub menu value, press ◁ or ▷ keys. To exit from setup, without saving, press and hold TEST button.
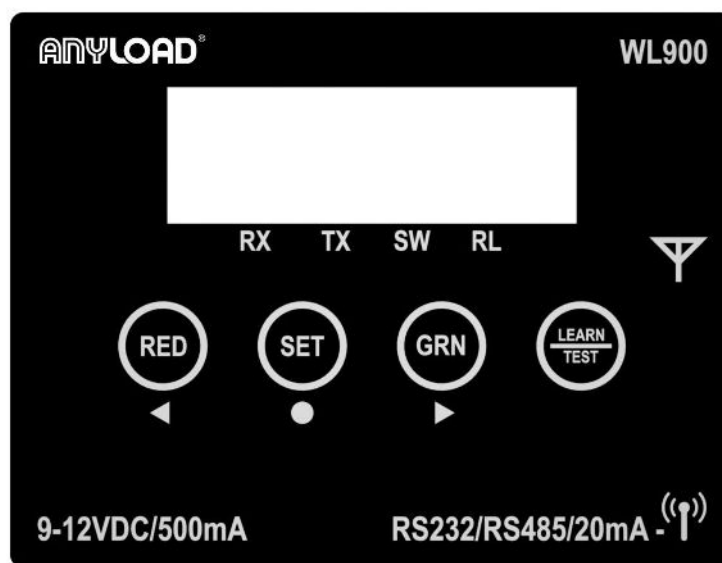
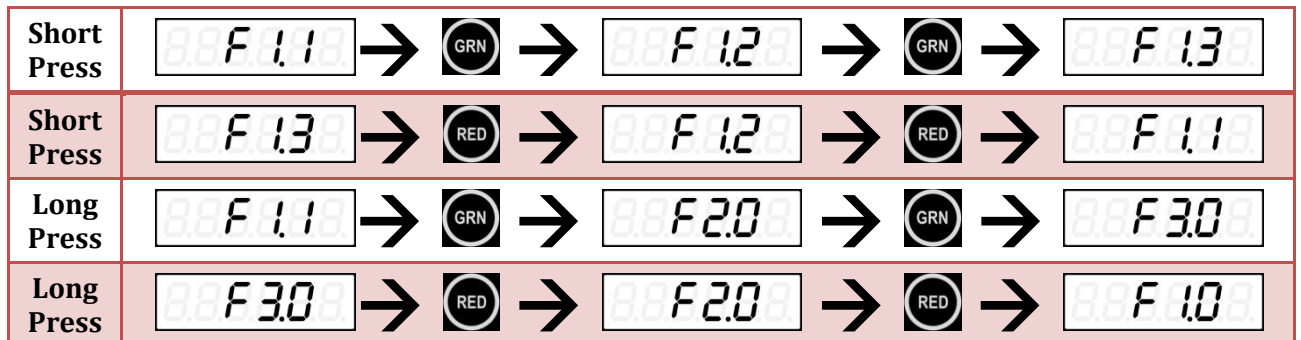| Keypad	Key	Function	Description
LEARN TEST	LEARN TEST	Short press: LEARN Long press: TEST	LEARN: Attempts to learn communication baud and format of an incoming data. TEST: Advance testing and adjusting the display.
RED	◁	Short press: FX.X - 0.1 Long press: FX.X - 1.0	LEFT : Short Press: Decrements subsection categories, FX.X. Long Press: Decrements section categories, FX.
SET	◯	Short press: SET Long press: ABORT	SET: Short Press: Entering into section categories FX.X. Short Press: Accepting the value of a subsections FX.X. Long Press: Returning to section categories FX.
GRN	▷	Short press: FX.X + 0.1 Long press: FX.X + 1.0	RIGHT : Short Press: Increments subsection categories, FX.X. Long Press: Increments section categories, FX.

- *ENTERING INTO SETUP MENU*

Press and hold ◁ & ▷ keys together simultaneously for two seconds to enter setup menu, the SETUP message will appear. Then first function block F1.0 will be displayed.

Long Press					
	(RED) & (GRN)	→	*SEtUP*	→	*F 1.0*

- *NAVIGATING THROUGH MENU*

To navigate through the menu, press ◁ or ▷ keys. A short press will cause FX.X to increase or decrease by 0.1 (move within the submenu) and a long press will increase or decrease by 1 (exit the submenu and go to the root menu).

Short Press	*F 1.1*	→	(GRN)	→	*F 1.2*	→	(GRN)	→	*F 1.3*
Short Press	*F 1.3*	→	(RED)	→	*F 1.2*	→	(RED)	→	*F 1.1*
Long Press	*F 1.1*	→	(GRN)	→	*F2.0*	→	(GRN)	→	*F3.0*
Long Press	*F3.0*	→	(RED)	→	*F2.0*	→	(RED)	→	*F 1.0*

- *EDITING SUBMENU VALUES*

Press ◯ key to enter the shown submenu and the current setting of that submenu will be displayed. Press ◁ or ▷ keys to change the value of the submenu as required.

Short Press	*F 1.1*	→	(SET)	→	*00*	→	(GRN)	→	*01*
Short Press	*F 1.1*	→	(SET)	→	*01*	→	(RED)	→	*00*
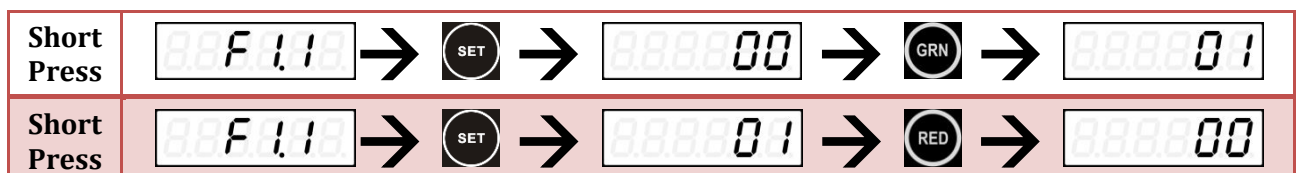
- *SETTING SUBMENU VALUE*

Press ◯ key to accept the selected value and return to the submenu. A FX.X message showing corresponding function block will be displayed.

Short Press	*01*	→	(SET)	→	*F 1.1*	→	(GRN)	→	*F 1.2*

- *EXITING FROM SETUP MENU*

Press and hold ◁ & ▷ keys together simultaneously to save and exit the setup menu. A SAVED message will be displayed and then it will reset. To exit without saving, press and hold TEST button.

Long Press					
	(RED) & (GRN)	→	*SAuEd*	→	*rESEt*

4.4 F1 DISPLAY SETTING

Function	Value	Setting	Description
F1.0 Factory Reset	**0** 1	**Abort** Factory	If set 1, transmitter will reset its functions to default factory settings.
F1.1 Setup Lockout	**0** 1	**Allowed** Prevented	If set 1, any changes to settings is prevented. This is useful to disable setup menu to avoid unwanted changes.
F1.4 Brightness Setting	**100** 80 50 20	**100 %** 80 % 50 % 20 %	Brightness level is shown in percentage.
F1.6 Startup Test	0 **1**	Disabled **Enabled**	Runs display test at startup as default.

4.5 F2 UTILITY SETTING

Function	Value	Setting	Description
F2.0 Utility Programs	**0** 1	**0** 1	Utility programs used for different modes. The programs availability may vary based on the firmware. Refer to Section 5 and 6.
F2.1 Network Address	**0** 1 2 3 4 5 6 7 8 9	**Id 0** Id 1 Id 2 Id 3 Id 4 Id 5 Id 6 Id 7 Id 8 Id 9	Network and multiple address setting. Not available with this version. 0 is set as default.
F2.2 Data Timeout Default	**10** 20 30 40 50 60	**10 sec** 20 sec 30 sec 40 sec 50 sec 60 sec	It sets display timeout in seconds if communication is lost. It is used for regular programs as default unless mentioned otherwise. The display shows dashes if received data is timed out.

4.6 F4 Communication Setting

Function	Value	Setting	Description
F4.0 Communication Mode	`Auto` `bAud`	**Auto** Manual	If set to Auto, It will learn the communication baud rate at startup. If set to Manual, it uses its previously saved value to be the communication baud rate.
F4.1 Communication Port	`rS-232` `rS-422` `CL-020` `rF-900`	**RS232** RS422/485 20mA Loop RF Wireless	It shows currently used communication port for serial communication. It is set to RS232 as default. Wireless option is not available with this version.
F4.2 Serial Communication Baud Rate	300 600 1200 2400 4800 **9600** 19200 32800 57600	300 600 1200 2400 4800 **9600** 19200 32800 57600	It sets and shows current communication baud rate. If F4.0 set to Auto, it shows current baud rate detected. If F4.0 set to Manual, it shows current baud rate setting.
F4.3 Parity	**0** 1 2	**8 bits** 7 bits even 7 bits odd	8 bits data no parity as default. 7 bits data even parity. 7 bits data odd parity.
F4.4 Stop Bit	**0** 1	**1 stop bits** 2 stop bits	1 stop bits as default 2 stop bits
F4.5 Current Loop Active Mode	`PAS iv` `ACt iv`	**Passive** Active	It sets 20mA current loop mode to passive or active mode. Set to passive mode if the indicator supplies current as default. Set to active mode if the indicator is in passive mode. To use this function refer to indicator user manual for proper setting.
F4.6	2400 4800 **9600** 19200	2400 4800 **9600** 19200	It sets communication baud rate if wireless option is installed. Not available with this version. 9600 is set as default.

4.7 F5 Auxiliary Setting

| Function	Value	Setting	Description
F5.0 Switch Function	**0** 1 2	**Disabled** Momentary Latch	If set to Disable, SWITCH is disabled as default. If set to Momentary, active as push buttons. If set to Latch, active in latched mode. Refer to Section 5, 6.
F5.1 Relay Function	**0** 1	**Disabled** Enabled	If set to1, relay function is active. It operates based on SWITCH current state. It is disabled as default. Refer to wiring chapter and relay section of this technical manual.
F5.2 Traffic Light Function	**0** 1	**Disabled** 1	Disable as default controlled by software. Refer to Section 5, 6.

5. UTILITIES

5.1 APPLICATIONS

The following illustrations will show how the WL900 wireless transmitter can be used in conjunction with the indicators, external switches, and large displays.

6. TROUBLESHOOTING

The WL900 RF transceivers have comprehensive tools for troubleshooting, including diagnostic lights, onboard push buttons, error codes, message codes, and advance diagnostics inside setup menu.

6.1 CONTROLLER BOARD
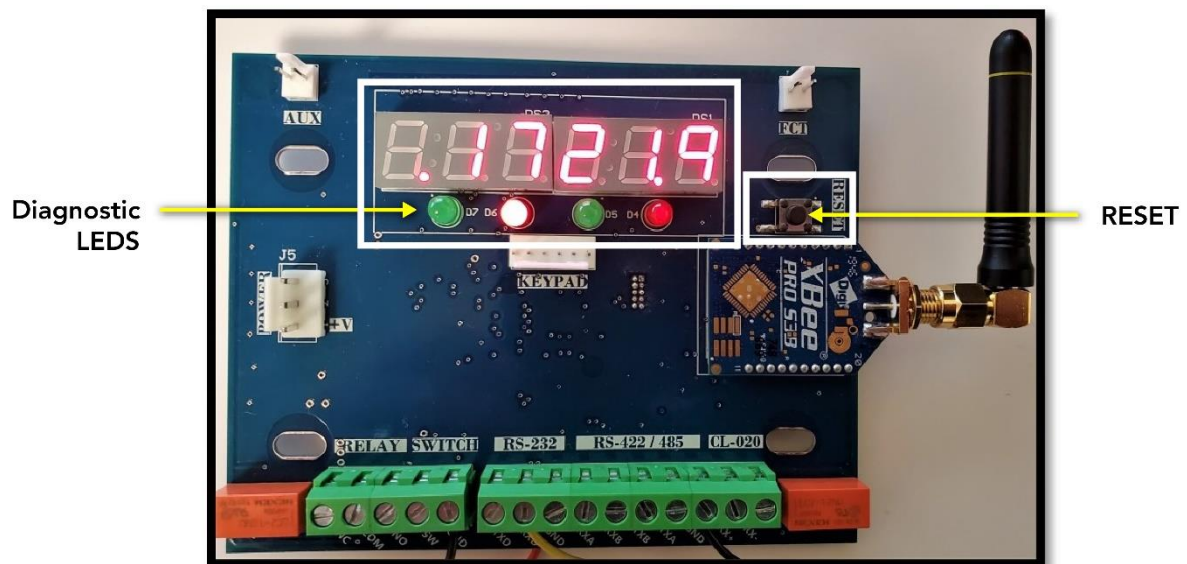
6.2 ERROR CODES

Error	Description	Action
--E1--	Communication baud rate failure	Check wirings for proper connection
--E2--	Incoming string protocol failure	Check Indicator to be in continuous mode
--E3--	Wireless communication failure	Check installed RF module
--E4--	Factory setting failure	Perform factory reset
--E5--	Memory checksum failure	Perform factory reset

6.3 DISPLAY MESSAGES

Message	Description	Reason
------	Shows dashes or blanks display	Data communication failure
LEArn	LEARN for auto learn baud and protocol	Auto learn mode to detect baud rate and protocol
SAvEd	SAVED for saving setup information	Setup data stored in flash memory
tESt	TEST for running a display test	Display tests segments and brightness

6.4 PUSH BUTTONS

Button	Description	Function
RESET	Runs a cycle test Loads startup values Shows version number	Performs a hardware reset

6.5 DIAGNOSTIC LIGHTS

LED	Normal	Function
RX	Flashing GREEN	Receive data from RF module
TX	Flashing RED	Transmit data out of RF module
SW	Solid GREEN	Switch is closed
RL	Solid RED	Relay is activated

6.6 ADVANCE DIAGNOSTIC

Function	Value	Setting	Description
F9.0 Character	XXXXXX	None	Character counter Shows number of ASCII characters received in buffer
F9.1 Numeric	XXXXXX	None	Numeric counter Shows number of ASCII numeric received in buffer
F9.2 String	XXXXXX	None	String counter Shows number of complete strings received in buffer
F9.3 Checksum	XXXXXX	None	Data checksum Shows memory checksum check failure
F9.4 Signal	XX	None	RF signal strength Shows wireless signal strength if it is installed
F9.5 Sensor	XXXX	None	N/A
F9.6 Version	XX-XX	None	Displays software version
F9.7 Model	XX-XX	None	Displays model number
F9.8 Protocol	XX	None	Reserved
F9.9 Reset	0 1	Abort Initialize	Alternative setup reset Resets all setup values to default, except string settings

6.7 TRAFFIC LIGHT

The WL900 transmitter can be paired easily with the 808BH remote display series to control RED/GREEN built in traffic light on remote display. The on board RED/GRN buttons on WL900 can be used to control RED/GREEN on remote display. The WL900 is set as default in transmit mode. The 808BH remote display settings to control RED/GREEN are as follows:

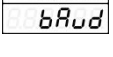| Function	Value	Setting	Controlled by Commands
F2.0 Utility Programs	3	3	Remote display is set to accept RED/GREEN commands
F5.0 Switch Function	0	Disabled	If set to Disable, both SW1 and SW2 are disabled as default.
F5.2 Traffic Light Function	1	GREEN / RED	Solid RED / GREEN.

The on board RED/GRN buttons can be used to control RED/GREEN as follows:

Keypad	Key	Function	Description
RED	◁	Press and Hold	Sends out RED command to 808BH remote display with RED/GREEN
GRN	▷	Press And Hold	Sends out GREEN command to 808BH remote display

Symbol	Description
i	**NOTICE!** Refer to the troubleshooting diagnostic lights and push buttons section for more information Refer to the configuration section for more information on advance diagnostic

6.8 RECEIVER MODE

The WL900 can be also set in receiver mode to accept RED/GREEN commands, and activate a relay to control external traffic lights. The WL900 settings are as follows:

Function	Value	Setting	Controlled by Commands
F2.0 Utility Programs	0 **1**	0 **1**	Include commands in the indicator string: For RED use "&", and for GREEN use "*". Example: 10000LBGR* <CR> will display 10000 lb and GREEN
F4.0 Communication Mode	*Auto* *bAud*	Auto **Manual**	Set to Manual baudrate.
F5.0 Switch Function	**0**	**Disabled**	Set to 0.
F5.1 Relay Function	0 **1**	Disabled **Enabled**	Set to 1, to activate the RELAY function.
F5.2 Traffic Light Function	0 **1**	Disabled **1**	Set to 1, to activate function.

The commands used by programmable indicators to activate relay on WL900 are as follows:

ASCII	Command	Function
&	RED	Set traffic light to RED
*	GREEN	Set traffic light to GREEN

Symbol	Description
	WARNING! The switches only accept dry contact as inputs The relay contact is limited to 2A/60VDC Make sure the site has proper grounding
	CAUTION! The switches only accept dry contact as inputs Any unauthorized change or alteration in default wiring may void warranty Any installation and wiring must be handled by authorized personnel
	NOTICE! The switch and relay functions are disabled as default Refer to the configuration section for instructions to how to configure inputs and outputs Refer to the installation section for instructions to how to access to the wiring terminals

Please Contact Our Authorized Dealer for Technical Assistance:

North America Toll Free: 1-855-ANYLOAD (269-5623)
Email: info@anyload.com
Web: www.anyload.com

Content is subject to change without notice.

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