



**SmaRT BU-x18XF and BU-xH18XF  
Base Units**

**User Manual**

U069.3.3

This document is the property of Cervis, Inc. and cannot be copied, modified, e-mailed, or reproduced without the express prior written consent of Cervis, Inc.

Cervis, Inc. reserves the right to change this manual or edit, delete, or modify any information without prior notification.

## FCC Statements

### 15.19 – Two Part 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 and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

### 15.21 – Unauthorized Modification

**NOTICE:** The manufacturer is not responsible for any unauthorized modifications to this equipment made by the user. Such modifications could void the user's authority to operate the equipment.

### 15.105(b) – Note:

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 base unit.
- Connect the equipment into an outlet on a circuit different from that to which the base unit is connected.

## Industry Canada Statement

This device complies with Canadian RSS-210.

The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit RF field in excess of Health Canada limits for the general population; consult Safety Code 6, obtainable from Health Canada's website <https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/radiation/safety-code-6-health-canada-radiofrequency-exposure-guidelines-environmental-workplace-health-health-canada.html>.

*Le présent appareil est conforme à la norme CNR-210 d'Industrie Canada.*

*L'installateur de cet équipement radio doit s'assurer que l'antenne est située ou orientée de façon à ne pas émettre un champ RF dépassant les limites de Santé Canada pour la population générale; consulter le Code de sécurité 6, disponible sur le site Web de Santé Canada <https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/radiation/safety-code-6-health-canada-radiofrequency-exposure-guidelines-environmental-workplace-health-health-canada.html>.*

## Industry Canada Statement

This device complies with 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.

*Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. Le fonctionnement est soumis aux deux conditions suivantes : (1) cet appareil ne doit pas causer d'interférences, et (2) cet appareil doit accepter toute interférence, y compris les interférences susceptibles de causer un fonctionnement non désiré de l'appareil.*

## IC Unlicensed Devices EIRP Statements for Removable Antennas

**Part 1:** Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

*Partie 1 : Conformément à la réglementation d'Industrie Canada, cet émetteur radio ne peut fonctionner qu'avec une antenne dont le type et le gain maximal (ou inférieur) sont approuvés pour l'émetteur par Industrie Canada. Pour réduire les interférences radioélectriques potentielles avec d'autres utilisateurs, le type d'antenne et son gain doivent être choisis de telle sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne soit pas supérieure à celle nécessaire pour une communication réussie.*

**Part 2:** This radio transmitter (LOBSRF-305) has been approved by Industry Canada to operate with the antenna type listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

*Partie 2 : Cet émetteur radio (LOBSRF-305) a été approuvé par Industrie Canada pour fonctionner avec le type d'antenne indiqué ci-dessous avec le gain maximal admissible et l'impédance d'antenne requise pour chaque type d'antenne indiqué. Il est strictement interdit d'utiliser avec cet appareil un type d'antenne ne figurant pas dans cette liste ou ayant un gain supérieur au gain maximum indiqué pour ce type.*

## RoHS Compliance Statement

Cervis, Inc. complies with the requirements of **Restriction of Hazardous Substances (RoHS/WEEE) Specification** based on in-house practice and declaration of compliance from our vendors. For additional information concerning RoHS compliance, please contact Cervis, Inc. at:

**CERVIS, Inc.**

170 Thorn Hill Road • Warrendale, PA 15086

Phone: 724.741.9000 • Fax: 724.741.9001



This product may contain material that may be hazardous to human health and the environment. In compliance with EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE):

- ✓ Do not dispose of the product as unsorted municipal waste.
- ✓ This product should be recycled in accordance with local regulations. Contact local authorities for detailed information.
- ✓ This product may be returnable to the distributor for recycling. Contact your distributor for details.

## Table of Contents

Table of Contents .....	iii
List of Figures .....	iii
List of Table .....	iii
Note to the Manual User .....	iv
Related Documents .....	iv
Cautions and Notes .....	iv
1.0 Safety Instructions .....	1
1.1 What You MUST Do .....	1
1.2 What You MUST NOT Do .....	1
2.0 BU-x18XF Base Unit .....	2
3.0 Smart BU-x18XF Options .....	3
3.1 BU-x18XF/BU-xH18XF Base Unit Installation .....	4
3.2 BU-x18XF Base Unit Wiring Diagram and Connectors Pinout .....	5
4.0 Smart BU-x18XF in Smart Remote Control Systems .....	6
5.0 Associate Mode .....	7
6.0 BU-x18XF and BU-xH18XF Specifications .....	8
7.0 LED Diagnostic Troubleshooting .....	9
Appendix A: Exposure to Radio Frequency Energy .....	10
Appendix B: Agency Identification Label Locations .....	10
Appendix C: BU-218XF Declaration of Conformity .....	11

## List of Figures

Figure 1. Smart BU-x18XF/BU-xH18XF Base Unit .....	2
Figure 2. BU-xH18XF Base Unit Mounting Dimensions .....	4
Figure 3. BU-x18XF/BU-xH18XF Field Wiring .....	5
Figure 4. Smart BU-x18XF/BU-xH18XF with Smart Remote Control Unit Examples .....	6
Figure 5. Remote control unit to BU-x18XF/BU-xH18XF Associate Example .....	7
Figure 6. Agency Identification Label Locations .....	10

## List of Table

Table 1. Smart BU-x18XF and BU-xH18XF Options .....	3
Table 2. BU-x18XF/BU-xH18XF P1 and P2 Connectors Pinout .....	5
Table 3. Smart BU-x18XF and BU-xH18XF Specifications .....	8
Table 4. Smart BU-x18XF LED Troubleshooting Hints .....	9

## Note to the Manual User

- ✓ **Note:** The standard SmaRT base unit is available to operate at 900 MHz or 2.4 GHz using Channel-Hopping Direct Sequence Spread Spectrum (DSSS) wireless technology. To avoid repetition and possible confusion, the base unit may be referred to as the “BU-x18XF” or “BU-xH18XF” throughout this document, where “x” represents either 900 MHz as “9”—for BU-918XF or BU-9H18XF—or 2.4 GHz as “2”—for BU-218XF or BU-2H18XF.

## Related Documents

**System-related Cervis, Inc. Engineered System Approval document**  
**Appropriate SmaRT remote control unit user manual**

Contact us with questions during installation or troubleshooting at (724) 741-9000.

## Cautions and Notes

Cautions warn the user that certain circumstances or conditions warrant that the user be aware of a presence of danger that may result in harm—or even death—to personnel or destruction of equipment. Please see the following example:



### Caution!

Prevent inadvertent movement of the machine while establishing the communication link between SmaRT base units and remote controls. Always disconnect power from the base unit before attempting to enter Associate mode.

Notes—such as the following example—provide information that may be useful to the user or are pertinent to system operation.

- ✓ **Note:** Cervis-provided harness wires are either color-coded or individually numbered to aid in properly wiring the controlled devices to the P1 and P2 base unit connectors.



## 1.0 Safety Instructions

### Caution!



**Carefully** read these instructions to install and use the system properly, to keep it in safe working condition, and to reduce the risks of misuse.

**Do not** use this system in potentially explosive atmospheres.

Any use other than that specified in this manual is **DANGEROUS**.

Strict adherence to the following instructions is a **MUST**.

✓ **Note:** To comply with United States Federal Communications Commission (FCC) radio frequency (RF) exposure compliance requirements, this device and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter.



### Caution!

Certain adjustments may need to be made while the controlled machinery is active. All personnel must be at a safe distance from the machine during these adjustments to avoid risk of injury or accidental death.

## 1.1 What You MUST Do

- **Strictly adhere** to the installation instructions contained in this manual.
- Make sure that professional and competent personnel carry out the installation.
- Make sure that all site and prevailing safety regulations are fully followed.
- Make sure that this manual is **permanently available** to the operator and maintenance personnel.
- Keep the remote control unit out of reach of **unauthorized personnel**.
- At the beginning of each work day, make sure that the **Stop Button** and other safety measures are working.
- When in doubt, press the **Stop Button**.
- Whenever several systems have been installed, make sure the remote control unit you are about to use is the right one. **Identify** the machine controlled by the remote control unit on the remote unit label (customer-supplied).
- An **audible or visual warning device** indicating that the machine is electrically active and that the remote control unit has control should be installed on the machine.
- **Service** the equipment periodically.
- When carrying out repairs, only use parts supplied by Cervis, Inc. dealers.

## 1.2 What You MUST NOT Do

- **Never** make changes to the system that have not been studied and approved by Cervis, Inc.
- **Never** power the equipment with anything other than with the specified power supply.
- **Never** allow unqualified personnel to operate the equipment.
- **Never** leave the equipment **ON** after use. Always use the **Stop Button** to avoid accidental movements.
- **Never** use the system when visibility is limited.
- **Never** abuse the remote unit. Avoid dropping.
- **Never** use the system if failure is detected.

## 2.0 BU-x18XF Base Unit



*Figure 1. SmaRT BU-x18XF/BU-xH18XF Base Unit*

The versatile BU-x18XF and BU-xH18XF base units—where x=2 for 2.4 GHz, or 9 for 900 MHz operation—feature 18 FET (field effect transistor) high-side switching outputs or switch-to-ground digital inputs, factory configurable dual 0–10 VDC or 0–20 mA analog inputs that can also be configured as digital outputs/inputs, and Control Area Network (CAN) Bus control capability. Eight pairs of base unit FET channels can be equipped with high-side current sense for better valve coil pair control. Table 1 on page 3 lists available configurations and options.

The BU-x18XF and BU-xH18XF accept a broad range of input power, with operating voltages ranging from 7 VDC to 28 VDC. The rugged, weatherproof translucent enclosure allows these units to operate worry-free in harsh weather conditions. Color-keyed or wire-numbered weatherproof cable harnesses connect the controlled devices. These base units create a robust communications link with up to eight SmaRT remote control units in congested radio environments using Channel-Hopping Direct Sequence Spread Spectrum (DSSS) wireless technology. Base units and remote control units feature seamless association without the need to open the enclosures. There is a variety of available SmaRT remote control units to choose from, multiple examples of which are shown in Figure 4.

### Features

- 18 solid-state FET outputs/inputs
- Two 0–10 V or 4–20 mA inputs, or digital input/outputs (factory configurable)
- 900 MHz or 2.4 GHz Channel-Hopping Direct Sequence Spread Spectrum technology
- Dual uniquely keyed connectors for ease of wiring
- Diagnostic LEDs
- +7 to +28 VDC power
- Compact design
- Rugged, weatherproof construction
- Communicates with up to eight SmaRT remotes
- Optional RS-232 models for *SmaRT Connect* use (see Table 1, Figure 3, or Table 2)

### 3.0 Smart BU-x18XF Options

Table 1. Smart BU-x18XF and BU-xH18XF Options

**Common 18 Channel Features: FETs; 7–28VDC Input Power**

Model	Freq.	RF	Antenna	Analog Chan.	Serial Port	Display	Smart Connect
BU-218XF-EXT	2.4 GHz	2 mW	External	NA	CAN	No	No
BU-218XF-INT	2.4 GHz	2 mW	Internal	NA	CAN	No	No
BU-218XF-EXT-DIS	2.4 GHz	2 mW	External	NA	CAN	Yes	No
BU-218XF-INT-DIS	2.4 GHz	2 mW	Internal	NA	CAN	Yes	No
BU-218XF-EXT-DIS-AI2	2.4 GHz	2 mW	External	(2) 4–20 mA IN	CAN	Yes	No
BU-218XF-INT-DIS-AI2	2.4 GHz	2 mW	Internal	(2) 4–20 mA IN	CAN	Yes	No
BU-218XF-EXT-AI2	2.4 GHz	2 mW	External	(2) 4–20 mA IN	CAN	No	No
BU-218XF-INT-AI2	2.4 GHz	2 mW	Internal	(2) 4–20 mA IN	CAN	No	No
BU-218XF-EXT-DIS-AV2	2.4 GHz	2 mW	External	(2) 0–10 V IN	CAN	Yes	No
BU-218XF-INT-DIS-AV2	2.4 GHz	2 mW	Internal	(2) 0–10 V IN	CAN	Yes	No
BU-218XF-EXT-AV2	2.4 GHz	2 mW	External	(2) 0–10 V IN	CAN	No	No
BU-218XF-INT-AV2	2.4 GHz	2 mW	Internal	(2) 0–10 V IN	CAN	No	No
BU-2H18XF-EXT-CAN	2.4 GHz	100 mW	External	NA	CAN	No	No
BU-2H18XF-INT-CAN	2.4 GHz	100 mW	Internal	NA	CAN	No	No
BU-2H18XF-EXT-DIS-CAN	2.4 GHz	100 mW	External	NA	CAN	Yes	No
BU-2H18XF-INT-DIS-CAN	2.4 GHz	100 mW	Internal	NA	CAN	Yes	No
BU-2H18XF-EXT-DIS-AI2-CAN	2.4 GHz	100 mW	External	(2) 4–20 mA IN	CAN	Yes	No
BU-2H18XF-INT-DIS-AI2-CAN	2.4 GHz	100 mW	Internal	(2) 4–20 mA IN	CAN	Yes	No
BU-2H18XF-EXT-AI2-CAN	2.4 GHz	100 mW	External	(2) 4–20 mA IN	CAN	No	No
BU-2H18XF-INT-AI2-CAN	2.4 GHz	100 mW	Internal	(2) 4–20 mA IN	CAN	No	No
BU-2H18XF-EXT-DIS-AV2-CAN	2.4 GHz	100 mW	External	(2) 0–10 V IN	CAN	Yes	No
BU-2H18XF-INT-DIS-AV2-CAN	2.4 GHz	100 mW	Internal	(2) 0–10 V IN	CAN	Yes	No
BU-2H18XF-EXT-AV2-CAN	2.4 GHz	100 mW	External	(2) 0–10 V IN	CAN	No	No
BU-2H18XF-INT-AV2-CAN	2.4 GHz	100 mW	Internal	(2) 0–10 V IN	CAN	No	No
BU-2H18XF-EXT-SC*	2.4 GHz	100 mW	External	NA	RS-232	No	Yes
BU-2H18XF-INT-SC*	2.4 GHz	100 mW	Internal	NA	RS-232	No	Yes
BU-9H18XF-EXT	900 MHz	10 mW	External	NA	CAN	No	No
BU-9H18XF-INT	900 MHz	10 mW	Internal	NA	CAN	No	No
BU-9H18XF-EXT-DIS	900 MHz	10 mW	External	NA	CAN	Yes	No
BU-9H18XF-INT-DIS	900 MHz	10 mW	Internal	NA	CAN	Yes	No
BU-9H18XF-EXT-DIS-AI2	900 MHz	10 mW	External	(2) 4–20 mA IN	CAN	Yes	No
BU-9H18XF-INT-DIS-AI2	900 MHz	10 mW	Internal	(2) 4–20 mA IN	CAN	Yes	No
BU-9H18XF-EXT-AI2	900 MHz	10 mW	External	(2) 4–20 mA IN	CAN	No	No
BU-9H18XF-INT-AI2	900 MHz	10 mW	Internal	(2) 4–20 mA IN	CAN	No	No
BU-9H18XF-EXT-DIS-AV2	900 MHz	10 mW	External	(2) 0–10 V IN	CAN	Yes	No
BU-9H18XF-INT-DIS-AV2	900 MHz	10 mW	Internal	(2) 0–10 V IN	CAN	Yes	No
BU-9H18XF-EXT-AV2	900 MHz	10 mW	External	(2) 0–10 V IN	CAN	No	No
BU-9H18XF-INT-AV2	900 MHz	10 mW	Internal	(2) 0–10 V IN	CAN	No	No
BU-9H18XF-EXT-SC*	900 MHz	10 mW	External	NA	RS-232	No	Yes
BU-9H18XF-INT-SC*	900 MHz	10 mW	Internal	NA	RS-232	No	Yes

\*Device does not have CAN interface available. SC connectivity using the RS-232 port allows the user to directly configure the BU-x18XF and BU-xH18XF using Smart Connect.

## 3.1 BU-x18XF/BU-xH18XF Base Unit Installation



**Caution!**

During installation, disable the machine on which the base unit will be installed.

When mounting the base unit and connecting the wiring harnesses, use the configuration diagrams supplied by Cervis, Inc. as a guide. Dimensions for drilling mounting holes are shown in Figure 2. Wiring diagram and connector pinout is shown in Figure 3.

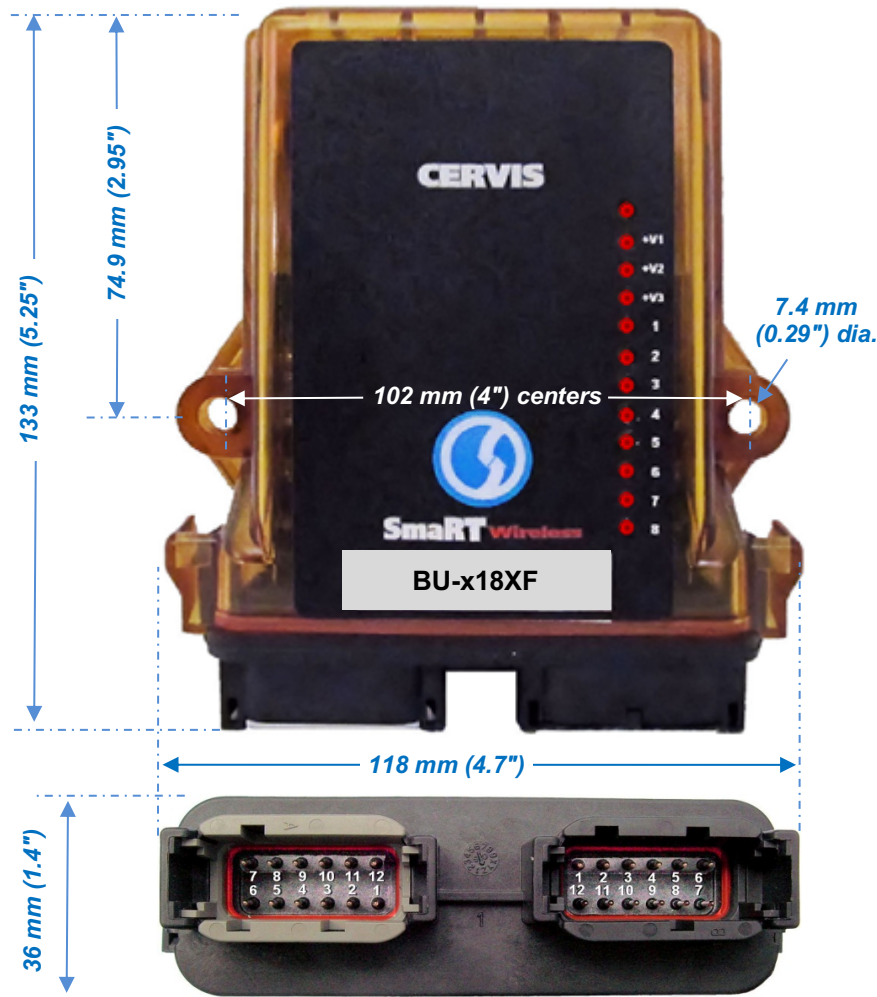


Figure 2. BU-xH18XF Base Unit Mounting Dimensions

### 3.2 BU-x18XF Base Unit Wiring Diagram and Connectors Pinout

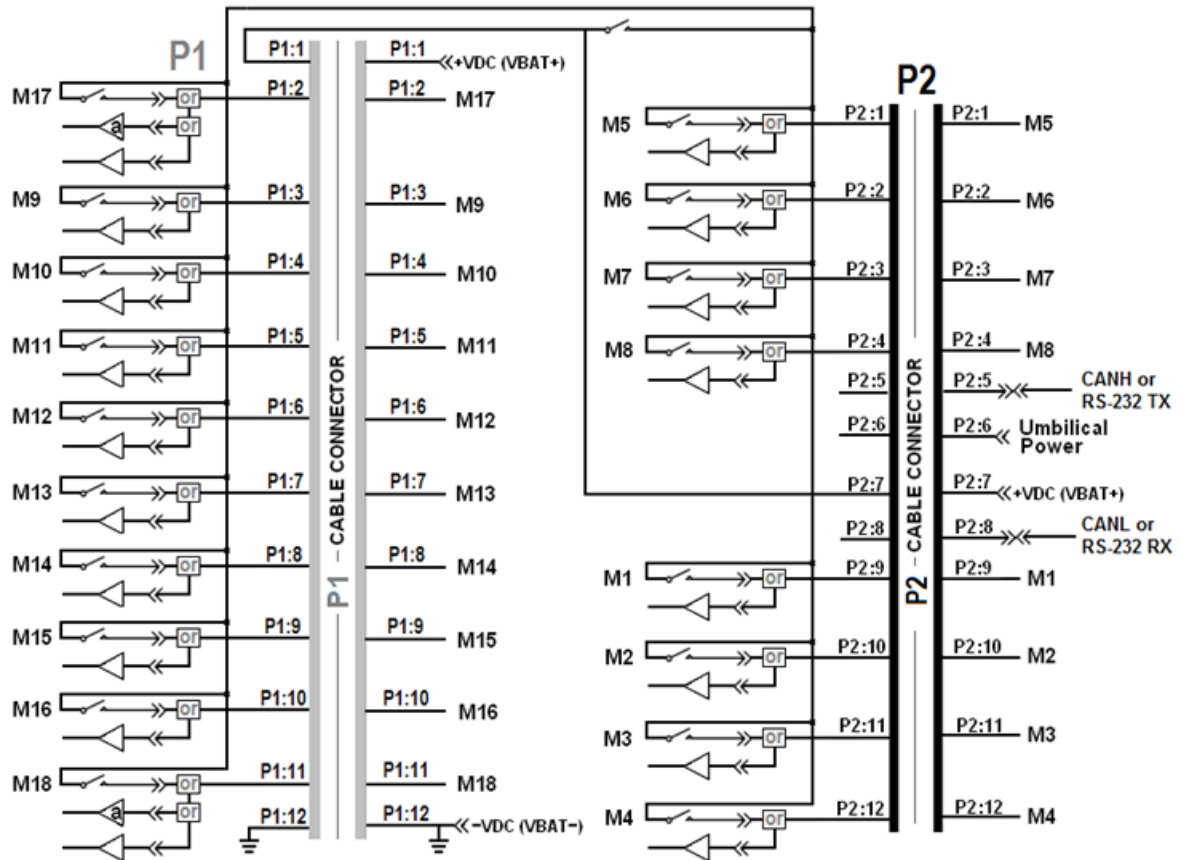


Figure 3. BU-x18XF/BU-xH18XF Field Wiring

Table 2. BU-x18XF/BU-xH18XF P1 and P2 Connectors Pinout

P1 Pin	Assigned	P1 Pin	Assigned
P1:1	+VDC	P1:7	M13
P1:2	M17	P1:8	M14
P1:3	M9	P1:9	M15
P1:4	M10	P1:10	M16
P1:5	M11	P1:11	M18
P1:6	M12	P1:12	-VDC

P2 Pin	Assigned	P2 Pin	Assigned
P2:1	M5	P2:7	+VDC
P2:2	M6	P2:8	CANL or RS-232 RX
P2:3	M7	P2:9	M1
P2:4	M8	P2:10	M2
P2:5	CANH or RS-232 TX	P2:11	M3
P2:6	Umbilical PWR	P2:12	M4

## 4.0 SmARt BU-x18XF in SmARt Remote Control Systems

The basic standard SmARt Remote Control System consists of at least one SmARt base unit, a SmARt remote control unit, and the wiring harness used to connect the base unit to the controlled apparatus. A single base unit can communicate with multiple SmARt remote control units—up to eight—a variety of which are available, including the PTO-xH06, the PG-xH14 pistol-grip, the OO-218, the MCB-xH4JS handheld remotes, and the SmARt Console Remote examples shown in Figure 4.

Communications between the base unit and the remote control units are established at the factory using the Associate process, which can also be easily performed on site when necessary using the SmARt remote control unit. Associate processes for each remote control unit are described in detail in each SmARt remote manual and Cervis, Inc. Engineering SpecSheet.



Figure 4. SmARt BU-x18XF/BU-xH18XF with SmARt Remote Control Unit Examples



## 5.0 Associate Mode

Communication between the SmaRT BU-x18XF and SmaRT remote control units is established while the system is at the factory before it is shipped. The process can also be applied in the field when necessary—when a remote is replaced or added, for example. Access to and the exact button or switch sequencing used while in Associate mode varies depending on the type of SmaRT remote control unit the base unit is to communicate with. Please reference the appropriate SmaRT remote control manual or Cervis, Inc. Engineering Spec Sheet for complete Associate Mode details.



**Caution!**

Prevent inadvertent machine movement while establishing the communication link between SmaRT base units and remote control units. Always disconnect power from the base unit before attempting to enter Associate.

### Associate Example

The following example shows the steps taken to associate a standard SmaRT PTO-x06 six-button handheld remote control unit to a SmaRT BU-x18XF base unit.

1. Disconnect power from the base unit, and turn OFF the handheld remote control unit.
2. Stand near the base unit in unobstructed, clear line-of-sight with the remote control unit in hand.
3. Simultaneously press and hold the Associate (B1) and Dissociate (B2) buttons. The RX and ER LEDs light.
4. Continue to hold both buttons until the TX and RX LEDs light steady.
5. When the TX and RX LEDs light, release B1 and B2. The ER and BA LEDs light.

✓ **Note:** *If the next button press is not immediately performed (approximately 2 sec.), all LEDs flash, and the Associate procedure is aborted. Restart the process to establish the communication link.*

6. Immediately press and hold the Associate button (B1). All LEDs light.
7. The TX LED begins to slowly blink. Continue to hold B1.
8. Apply power to the base unit.  
The remote control unit and base unit begin to establish a communication link while the Associate button is held. Once the process is complete, all LEDs light briefly and then go out.
9. Release the Associate button.

The TX and RX LEDs flash, indicating that the remote control unit is sending and receiving messages. The SmaRT System is ready for use.



**Figure 5. Remote Control Unit to BU-x18XF/BU-xH18XF Associate Example**

## 6.0 BU-x18XF and BU-xH18XF Specifications

Table 3. *SmaRT BU-x18XF and BU-xH18XF Specifications*

Item	Description			
Power	V <sub>in</sub>	+7 to +28 VDC		
Radio	Frequencies	BU-218XF: 2405 – 2480 MHz @ 2 mW BU-2H18XF: 2405 – 2480 MHz @ 100 mW BU-9H18XF: 906 – 924 MHz @ 10 mW		
	License	License-Free		
	Modulation	Channel-Hopping DSSS		
	Antenna	Internal or External (RP-TNC)		
Environment	Operating Temp	–20° C to 55° C (–4° F to 131° F)		
	Storage Temp	–40° C to 85° C (–40° F to 185° F)		
	Humidity	0 to 100%		
	Vibration/Shock	IEC60068-2-6 10 Hz to 150 Hz @ 1.0 g peak acceleration 10.0 g peak shock acceleration		
LED Indicators (12 Red)	Unmarked	Polarity reversed when lit steady		
	+V1, +V2, +V3	Voltage – OK when lit steady		
	1	Health (blinks once per second when active)		
	2	RF TX (flashes when active)		
	3	RF RX (flashes when active)		
	4	CAN TX (flashes when active)		
	5	CAN RX (flashes when active)		
	6	Output (blinks once per second when active)		
	7	Input (blinks once per second when active)		
8	Error (solid when active)			
Enclosure	Dimensions	mm: 133 x 118 x 36 (inch: 5.25 x 4.7 x 1.4)		
	Durability	High Impact Polymer		
	Mounting Holes	mm: 7.40 dia.; 102 center-to-center Inch: 0.29 dia.; 4.00 center-to-center		
Outputs/Inputs	Eighteen	FET—Open Drain		
	Current	3 A per channel 15 A Max. total @ 50° C (122° F)		
Digital I/O (18)	Assignments	M1(Ch1) P2–9	M2 (Ch2) P2–10	M3 (Ch3) P2–11
		M4 (Ch4) P2–12	M5 (Ch5) P2–1	M6 (Ch6) P2–2
		M7 (Ch7) P2–3	M8 (Ch8) P2–4	M9 (Ch9) P1–3
		M10 (Ch10) P1–4	M11 (Ch11) P1–5	M12 (Ch12) P1–6
		M13 (Ch13) P1–7	M14 (Ch14) P1–8	M15 (Ch15) P1–9
		M15 (Ch16) P1–10	M17 (Ch17) P1–2	M18 (Ch18) P1–11
Analog (2) (factory configurable)	0–10 V or 4–20 mA	M17(Ch17) P1–2	M18 (Ch18) P1–11	
		CAN Bus	SAE J1939	
SmaRT Connect	See Table 1	Only units marked with –SC are RS-232 capable (CAN is not available) allowing <i>SmaRT Connect</i> use.		



## 7.0 LED Diagnostic Troubleshooting

*Table 4. SmaRT BU-x18XF LED Troubleshooting Hints*

Indication	Cause	Solution†
<b>Unmarked LED active</b>	Input power polarity is reversed.	<ul style="list-style-type: none"> <li>✓ Adjust wiring connections to achieve correct polarity.</li> </ul>
<b>+V1, +V2, +V3</b>	Electrical signals not activating the LEDs.	<ul style="list-style-type: none"> <li>✓ Is +VDC input power present?</li> </ul>
<b>RTX/RRX (LEDs 2 &amp; 3) not active</b>		<ul style="list-style-type: none"> <li>✓ Check for obstructions preventing line-of-sight transmission.</li> <li>✓ Check that the remote control unit is active.</li> <li>✓ Re-associate the remote control unit with the base unit.</li> </ul>
<b>CTX/CRX (LEDs 4 &amp; 5) not active</b>		<ul style="list-style-type: none"> <li>✓ Check CAN wiring.</li> <li>✓ Check that the remote control unit is active.</li> <li>✓ Re-associate the remote control unit to the base unit.</li> </ul>
<b>In/Out LEDs (LEDs 6 &amp; 7) not active</b>		<ul style="list-style-type: none"> <li>✓ Check that the remote control unit LEDs are active when the appropriate buttons are pushed.</li> <li>✓ Check that the startup sequence was followed.</li> </ul>
<b>ERR LED (LED 8) active</b>	Over-temperature or over-current channel indication.	<ul style="list-style-type: none"> <li>✓ Check the outputs for loose wiring, etc.</li> <li>✓ Active channel current consumption less than 1A typical. (This is not a problem in cases where less than 1A draw is a normal condition.)</li> </ul>
<b>Health LED (LED 1) blinking rapidly</b>	Indicates an internal problem.	<ul style="list-style-type: none"> <li>✓ Contact Cervis, Inc. service department.</li> </ul>

† – If the recommended solutions do not resolve the issue, contact the Cervis, Inc. service department.

## Appendix A: Exposure to Radio Frequency Energy

SmaRT handheld remote control units contain radio transceivers. When active, remote control units send out radio frequency (RF) energy through an internal antenna.

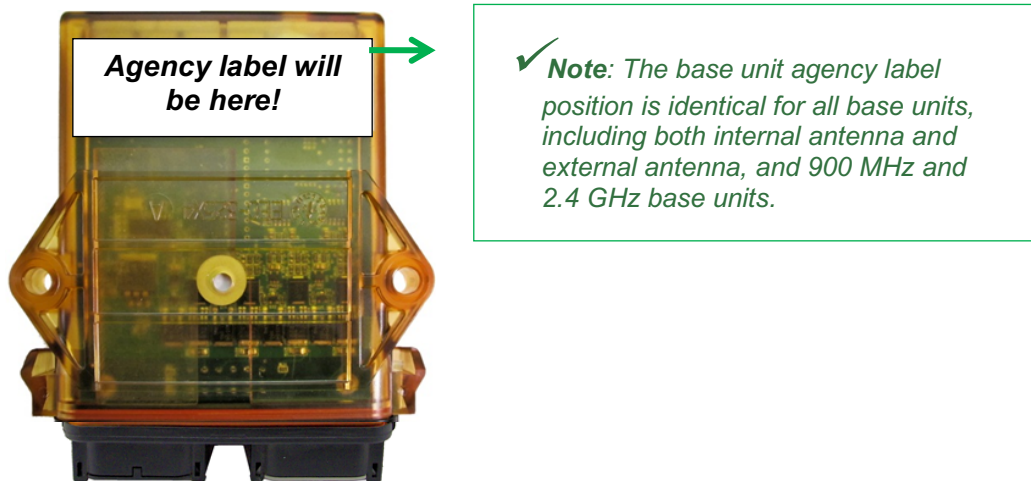
For optimal performance—and to ensure that human exposure to RF energy does not exceed the recommended guidelines—always follow these instructions and precautions:

When using the handheld remote control unit:

1. Hold the remote control unit so that the top buttons are away from the body in the direction of the base unit.
2. Keep the remote control unit at least 15mm ( $\frac{5}{8}$  inch) away from the body, and only use carrying cases, belt clips, or holders that are approved by Cervis, Inc.

When active, a SmaRT base unit sends out RF through its external antenna. Base units using an external antenna should be mounted to ensure that the antenna is at least 20cm away from the human body. Only use the external antennas recommended by Cervis, Inc.

## Appendix B: Agency Identification Label Locations



**Figure 6. Agency Identification Label Locations**

## Appendix C: BU-2H18XF Declaration of Conformity



# Declaration of Conformity

### EU DECLARATION OF CONFORMITY

**Manufacturer:** Structured Mining Systems, Inc.  
 (d.b.a. Cervis, Inc.)  
 170 Thorn Hill Road  
 Warrendale, PA 15086 USA  
 Telephone No. (724) 741-9000

**Date:** February 14, 2018

This declaration of conformity is issued under the sole responsibility of the manufacturer. The undersigned hereby declares, on behalf of Structured Mining Systems, Inc. (d.b.a. Cervis, Inc.) of Warrendale, Pennsylvania, that the below referenced list of Industrial (ISM) radio equipment products, to which this declaration relates, is in conformity with the provision of the following European Union harmonization legislation:

- Council Directive 1999/5/EC (R&TTE)
- Council Directive 2006/95/EC (Low Voltage)
- Council Directive 2004/108/EC (Electromagnetic Compatibility)

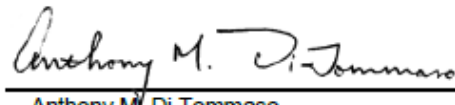
Relevant Harmonized Standards or Other Technical Specifications:

- |                                |                                |
|--------------------------------|--------------------------------|
| ETSI EN 300 328-2 v1.2.1:2001  | ETSI EN 301 489-1 v1.9.2:2011  |
| IEC 60950-1 Ed 2.2; 2013-05-28 | ETSI EN 301 489-17 v2.2.1:2012 |

The technical documentation is maintained at the corporate headquarters of Structured Mining Systems, Inc. (d.b.a. Cervis, Inc.), 170 Thorn Hill Road, Warrendale, PA.

**Products:** (see other sections/areas of the product user manual for product images, accessories, components, and software, which allow the radio equipment to operate as intended)

<u>MODEL NUMBER</u>	<u>PART NUMBER</u>	<u>BATCH OR SERIAL NUMBER RANGE</u>
BU-2H18XF-EXT	07144500	_____ to _____
BU-2H18XF-INT	07144501	_____ to _____
BU-2H18XF-EXT-DIS	07144502	_____ to _____
BU-2H18XF-INT-DIS	07144503	_____ to _____
BU-2H18XF-EXT-DIS-AI2	07144504	_____ to _____
BU-2H18XF-INT-DIS-AI2	07144505	_____ to _____
BU-2H18XF-EXT-SC	07144515	_____ to _____
BU-2H18XF-EXT-AI2	07144506	_____ to _____
BU-2H18XF-INT-AI2	07144507	_____ to _____
BU-2H18XF-EXT-DIS-AV2	07144508	_____ to _____
BU-2H18XF-INT-DIS-AV2	07144509	_____ to _____
BU-2H18XF-EXT-AV2	07144510	_____ to _____
BU-2H18XF-INT-AV2	07144511	_____ to _____
BU-2H18XF-INT-SC	07144516	_____ to _____

  
 \_\_\_\_\_  
 Anthony M. Di Tommaso

February 14, 2018

\_\_\_\_\_ Date

Director of Product Development, Quality, & Finance

