



WB PNEUMATIC SYSTEM OPERATIONAL MANUAL



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Original Instructions



Warranty

Will-Burt warrants its WB Pneumatic System to be free from defects in material and workmanship for a period of two (2) years, with such time period running from the date of shipment by Will-Burt. Will-Burt shall not be responsible for any damage resulting to or caused by its products by reason of failure to properly install, maintain or store the product; use of the product in a manner inconsistent with its design; unauthorized service, alteration of products, neglect, abuse, accident, or acts of God. This warranty does not extend to any component parts not manufactured by Will-Burt; provided, however, Will-Burt's warranty herein shall not limit any warranties by manufacturers of component parts which extend to the buyer.

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Document History

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3901001	00	March. 2021	Initial release for prototype product
3901001	01	September 2021	Superseded for prototype product manual
3901001	02	December 2021	Article 6.5.1 is added.
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3901001	04	June 2022	Specification Table is revised and Accessory Table is added.
3901001	05	September 2022	Revised document.

Safety Summary

This section describes safety precautions for the Will-Burt Pneumatic System. These are recommended precautions that personnel must understand and apply throughout many phases of installation, operation, transportation, maintenance, storage, and troubleshooting. Additional residual risks and precautions that apply to specific procedures and steps may be listed with the procedure or steps to which they apply. Be sure the read and understand the entire manual, and contact The Will-Burt Company with any questions, before performing any procedure outlined in this manual.

Signal Word Definitions

Per the ANSI Z535.4 standard, the following signal words and definitions are used to indicate hazardous situations:

DANGER

DANGER indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.

WARNING

WARNING indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.

CAUTION

CAUTION indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It is also used to alert against unsafe practices.

General Safety Instructions

The following are general safety precautions that are not related to any specific procedures. These are recommended precautions that personnel must understand and apply throughout installation, operation, transportation, maintenance, storage, and troubleshooting. Additional precautions that apply to specific procedures and steps may be listed with the procedure or step to which they apply.

DANGER

Electrocution Hazard! Contact with high voltage will result in death or serious injury. Observe general safety precautions for handling equipment using high voltage. Do not locate or operate mast near electrical lines, cables or other unwanted sources of electricity. Be sure to allow sufficient clearance on all sides of the mast to allow for side sway. Do not operate mast in lightning. Be certain electrical cables are undamaged and properly terminated. Always disconnect power before performing service, repair or test operations.

⚠ DANGER

Relocation/Driving Hazard! Do not relocate the system during operation or while the mast is extended to any height above the nested position or powered up. Do not move vehicle until the mast has been securely nested and isolated from power. Power-up and operate the mast only if the vehicle is stationary and securely parked with the parking brake properly applied. Do not move vehicle without the vehicle interlock circuit installed to confirm the mast is nested. Relocating the system during operation or after mast is extended could result in death or serious injury. Contact Will-Burt Engineering for special on-the-move situations for military only use.

⚠ DANGER

Shock Hazard! Hazardous voltages are present in this equipment and may also be present in any associated items. Observe general safety precautions for handling equipment using high voltage. Always disconnect power before performing repair or test operations. Contact with high voltage will result in death or serious injury.

⚠ WARNING

Safety Instruction – Read Manual! Failure to follow operating instructions could result in death or serious injury. Read and understand the operating instructions before using the mast.

⚠ WARNING

Resuscitation! Personnel working with or near high voltages should be familiar with modern methods of resuscitation. Such information may be obtained from the Bureau of Medicine and Surgery.

⚠ WARNING

Trained Personnel Only! Only trained and qualified personnel should perform installation, operation, and maintenance procedures. Death or serious injury could result if proper procedures are not observed.

⚠ WARNING

Safety Equipment! Helmets or hard hats, eye protection, gloves, and safety shoes shall be properly worn while working in the deployment area. Improperly secured payload components, ice formations, etc. could be dislodged from the mast and fall. Death or serious injury could result if proper safety equipment is not properly worn.

⚠ WARNING

Crush Hazard – Mast Failure! Do not stand directly beneath the mast or its payload. Be certain the payload is properly installed and secured. Death or serious injury could result if mast fails suddenly.

⚠ WARNING

Health and Safety Hazard! Solvent used to clean parts is potentially dangerous. Follow solvent manufacturer's safety procedures and recommendations. Avoid inhalation of fumes and also prolonged contact to skin. Death or serious injury could occur if solvents are not handled properly.

⚠ WARNING

Burst Hazard! Over-pressurizing system will trip safety valve and could result in death or serious injury. Do not exceed maximum operating pressure of 2.4±0.1 bar for Pneumatic System.

⚠ WARNING

Fire Hazard! Cleaning solvent, used for maintenance, is flammable and can be explosive resulting in death or serious injury. Do not smoke. Use cleaning solvent in a well-ventilated area. Keep cleaning solvent away from ignition sources. Always store cleaning solvent in the proper marked container.

⚠ WARNING

Pinch Point Hazard! Moving parts can crush and cut resulting in death or serious injury. Keep clear of moving parts while operating mast.

⚠ WARNING

Safety Instruction – Observe Proper Lifting Procedures! Use extreme caution while lifting the WB Pneumatic System and when WB Pneumatic System is suspended to avoid injury and equipment damage. All operators should be aware of and follow the applicable local, regional, and national standards and codes of practice for slinging and transporting equipment. Death or serious injury could result if proper procedures are not followed.

⚠ WARNING

Safety Instruction – Operation! For outdoor use only. Do not use in areas that have been classified as hazardous as defined in Article 500 of the National Electric Code.

⚠ WARNING

Safety Instruction – Operation! At all times prior to system operation, ensure all electrical cables and pneumatic connections are undamaged, properly terminated and clear.

⚠ WARNING

Safety Instruction – Potential Air Contaminants! If internally mounted in a vehicle, air from the mast and any accumulated water will discharge into the vehicle. Appropriate drainage location shall be defined by the installer.

⚠ CAUTION

Equipment Damage – Qualified Personnel! All persons installing and maintaining this equipment should be suitably qualified and work to local, regional, and national standards and codes of practice.

⚠ CAUTION

Equipment Damage – Over-Running! This equipment should not be operated continuously for more than 30 minutes. Over-running could cause overheating and damage the unit.

⚠ CAUTION

Lifting Hazard – Manually Lifting! Manually lifting over 55 lb. (25 kg) is prohibited. In the UK, all lifting equipment must be thoroughly examined annually by a competent person according to the Lifting Operations and Lift Equipment Regulations 1998. Equivalent regulations exist in other EU states.

⚠ CAUTION

Frozen Water Hazard! Water freezing inside mast may render mast inoperable and cause major equipment damage such as tube deformation. Ensure the drain at the base plate is not obstructed.

The following list contains reasonably foreseeable misuses of the mast system according to EN ISO 12100 5.3.2. These uses shall be avoided:

- Operating the mast with an obstruction in the functional space that prevents full extension or retraction
- Operating the mast near overhead power lines
- Operating the mast without the mast and operating space visible to the operator
- Driving the vehicle with the mast in a deployed position (any height above the nested position) or powered-up or without opening venting the mast to atmosphere
- Operating the mast or leaving deployed in wind speeds higher than the specified maximum velocity
- Operating the mast on a non-level surface greater than the specified maximum angle
- Installing a payload greater than the maximum rated payload (weight and sail area) of the mast

Symbols

The following are symbols that are used with the system and their meaning. Contact The Will-Burt Company with any questions before performing any procedure outlined in this manual.



This symbol indicates an electrocution hazard or hazardous voltage hazard. There is DC voltage present inside the mast and control box. Do not operate mast near electrical lines or during lightning events. Contact with high voltage will result in death or serious injury.



This symbol indicates a pinch point hazard. Keep fingers and hands clear of moving parts.



This symbol indicates a tip-over hazard. The mast must be properly supported during transport, installation, maintenance and operation. System tip-over could result in death or serious injury.



This symbol indicates a general warning. In this unit, this symbol indicates a frozen water hazard. Do not block the mast drain port at the base of the unit. Water must be permitted to exit the mast to avoid ice damage to the mast.



This symbol indicates a burst hazard. The Pneumatic System provides air pressure. Never operate the Pneumatic System with worn and/or improper hoses/equipment.



This symbol is used to remind users to read and understand the operator's manual before operating the Mast System. Failure to follow operating instructions could result in death or serious injury. Read and understand operator's manual before operating or installing the mast system.



This symbol indicates a hard hat is required when working under the mast operating area. Failure to wear a hard hat could result in death or serious injury.



This symbol indicates an electrical ground connection point.



This symbol is used to indicate the center of gravity (COG) of a fully nested mast.

Specification Compliance

CE Declaration of Conformity

Latest Declaration of Conformity available upon request.

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Section 1 Introduction

This manual describes installation, operation, transportation, maintenance, storage, and troubleshooting procedures for the WB Pneumatic System. Procedures and characteristics for units customized to meet customer-specific needs may vary. These procedures assume the use of standard catalog mast systems. Procedures and characteristics for pneumatic systems customized to meet customer-specific needs may vary.

Review this manual in its entirety. Contact The Will-Burt Company with any questions before performing any procedure outlined in this manual. The views depicted in this manual are provided for clarification and are subject to change without notice. Views are not to scale.

A typical WB Pneumatic System consists of:

- Compressor Unit
- Pneumatic Air Passage System
- Switching Control System
- Hand-Held Remote Control (HHRC)
- Hose Connection Units (Intake and Exhaust)

The WB Pneumatic System is intended to be installed and operated by trained professionals to extend and retract pneumatic masts. The WB Pneumatic System is intended for stationary use. Contact The Will-Burt Company with any questions on the intended use or available training programs for installation and operation.

1.1 Safety Precaution Notification

Refer to the Safety Summary for precautions to be observed while installing, operating or maintaining this equipment.

1.2 Definitions of Terms

“WB Pneumatic System” refers to the entire system (compressor unit, pneumatic air passage system, switching control system, hand-held remote control and hose connection unit).

1.3 Specifications

The main technical characteristics of the WB Pneumatic System are given in Table 1-1 below:

Table 1-1 Specifications

PART NUMBER	MODEL NUMBER	DESCRIPTION	POWER	VOLTAGE	MAX. CURRENT (Amp.)	Flow Rate @0 bar (LPM)	Max Pressure Switch Setting bar (psi)		Safety Valve Pressure Setting bar (psi)		Suitable For	Operating Temperature
5766201	390-0101-01-OC1010-00B-WB	WB 200 PNEU SYSTEM 110VAC	1100W	110VAC	20	200	2.4	35	3.7	55	HD/SHD	-10°C - +55°C
5766401	390-0103-01-OC1010-H1B-WB	WB 200 PNEU SYSTEM 220VAC	1100W	220VAC	12	200	2.4	35	3.7	55	HD/SHD	-10°C - +55°C
5766301	390-0102-00-OC1010-H1B-WB*	WB 280 PNEU SYSTEM 110VAC	1500W	110VAC	12	280	2.4	35	3.7	55	UHD	-10°C - +55°C
5766501	390-0104-00-OC1010-H1B-WB*	WB 280 PNEU SYSTEM 220VAC	1350W	220VAC	12	280	2.4	35	3.7	55	UHD	-10°C - +55°C
5802201	390-0111-00-OC1010-H1B-WB	WB 280 PNEU SYSTEM 110VAC	1500W	110VAC	20	280	2.4	35	3.7	55	HD +	-10°C - +55°C
5802301	390-0112-00-OC1010-H1B-WB	WB 280 PNEU SYSTEM 220VAC	1500W	110VAC	20	280	2.4	35	3.7	55	HD +	-10°C - +55°C
5766601	390-0105-00-OC1010-H1B-WB	WB 135 PNEU SYSTEM 220VAC	780W	220VAC	12	135	1.4	20	2.4	35	STD	-10°C - +55°C
5857701	390-0105-00-OC1010-S1B-WB	WB 135 PNEU SYSTEM 220VAC	780W	220VAC	12	135	1.4	20	2.4	35	STD	-10°C - +55°C
5766701	390-0106-00-OC1010-S1B-WB	WB 135 PNEU SYSTEM 110VAC	780W	110VAC	12	135	1.4	20	2.4	35	STD	-10°C - +55°C
5766801	390-0301-01-OC1010-H1B-WB	WB 135 PNEU SYSTEM 12VDC	780W	12VDC	80	135	1.4	20	2.4	35	STD	-10°C - +55°C
5857801	390-0301-01-OC1010-S1B-WB	WB 135 PNEU SYSTEM 12VDC	780W	12VDC	80	135	1.4	20	2.4	35	STD	-10°C - +55°C
5766901	390-0302-00-OC1010-H1B-WB	WB 135 PNEU SYSTEM 24VDC	780W	24VDC	50	135	1.4	20	2.4	35	STD	-10°C - +55°C
5857901	390-0302-00-OC1010-S1B-WB	WB 135 PNEU SYSTEM 24VDC	780W	24VDC	50	135	1.4	20	2.4	35	STD	-10°C - +55°C
5773501	390-0109-01-HM0510-H1B-WB	WB 250 PNEU W/BUILT IN HEATER 24VDC	1100W	24VDC	50	250	2.4	35	3.7	55	HD +	-35°C - +55°C
5773601	390-0107-00-HM0510-H1B-WB	WB 280 PNEU W/BUILT IN HEATER 110VAC	1500W	110VAC	20	280	2.4	35	3.7	55	HD +	-35°C - +55°C
5773701	390-0108-01-HM0510-R4B-WB	WB 280 PNEU W/BUILT IN HEATER 220VAC	1500W	220VAC	12	280	2.4	35	3.7	55	HD +	-35°C - +55°C
5826301	390-0108-01-HC0510-H1B-WB	WB 280 PNEU W/BUILT IN HEATER 220VAC	1500W	220VAC	12	280	2.4	35	3.7	55	HD +	-35°C - +55°C
5798101	390-0110-00-OC1010-H1B-WB	WB 250 PNEU SYSTEM 24VDC	1100W	24VDC	50	250	2.4	35	3.7	55	HD +	-10°C - +55°C

*Ask WB for availability.

1.4 Shipping

The WB Pneumatic System ships in a cardboard box or wooden box.

1.5 Finishing

Cover: RAL 7048 Light Gray Semi-Gloss color

Front/Back Panel: RAL 9005 Black Semi-Gloss color

1.6 Accessories

This section describes the accessories list for WB Pneumatic System usage. Contact The Will-Burt Company for further details.

Table 1-2 Optional Equipment

S/N	DESCRIPTION	P/N	UNIT
1.	HHRC FOR W-B PNEU SYSTEM (WITH 5 METER CABLE)	5767001	EA
2.	HHRC FOR W-B PNEU SYSTEM (WITH 10 METER CABLE)	5857601	EA
3.	KEY, COMPRESSOR CONNECTOR – WB PNEU SYSTEMS	5844601	EA
4.	INTAKE FILTER G1/4"	5825201	EA
5.	INTAKE FILTER G1/2"	5825101	EA
6.	MUFFLER KIT	5825301	EA
7.	POWER CABLE, 1 METER	5825401	EA
8.	POWER CABLE, 5 METERS	5825501	EA
9.	POWER CABLE, 10 METERS	5825601	EA
10.	POWER CABLE, 20 METERS	5825701	EA
11.	HHRC EXTENSION CABLE, 5 METERS	5825801	EA
12.	HOSE PU, 12 mm DIAMETERS, 1 METER LENGTH	5825901	EA
13.	HOSE PU, 12 mm DIAMETERS, 5 METERS LENGTH	5826101	EA
14.	HOSE PU, 12 mm DIAMETERS, 10 METERS LENGTH	5826201	EA
15.	HOSE PU, 12 mm DIAMETERS, 20 METERS LENGTH	5826301	EA
16.	HAND PUMP	5813401	EA

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Section 2 Installation

This section describes the installation of the WB Pneumatic System and provides general procedures that must be followed to ensure a successful installation. Use care to understand and follow all precautions while installing.

2.1 Pre-Installation Check

Before installing the WB Pneumatic System, ensure:

- All installers read and understand the entire installation procedure.
- The mounting structure is clean, level, has no obstruction for air intake and has sufficient room to mount the WB Pneumatic System.

2.2 Attaching to Mounting Location

To mount the system, proceed as follows:

1. Place the pneumatic system in a suitable location. It is recommended to install the pneumatic system in a vehicle, shelter or container.
2. Mark the fixing points to drill a minimum Ø7mm diameter hole in the platform where it will be deployed.
3. Install the pneumatic system with a minimum of 4 ea M6 screws.

Note: If the system is used in outdoor operations, the protective cover should be used carefully during operation to prevent any foreign material (water, sand/dust, etc.) from entering the system.

2.3 Electrical Connections

To electrically connect the system, proceed as follows:

1. Connect one end of the power cable to the WB Pneumatic System power connector.
2. Connect the other end to an appropriate power source according to the diagrams in Section 6 based on the power requirements for the compressor model.
3. Hand-Held Remote Control (HHRC): Connect the HHRC cable to the WB Pneumatic System Remote Control Connector. The HHRC will now operate as the WB Pneumatic System "UP/DOWN" Buttons. The "UP/DOWN" buttons are Momentary Contacts.
Note: When the HHRC's cable is connected to the WB Pneumatic System, the "UP/OFF/DOWN" switch on the WB Pneumatic System Panel will not operate.

2.4 Attaching the Air Connections

To attach the air connections:

1. Connect the female end of the hose connection unit to the WB Pneumatic System “Air Intake” male hose connector.
2. Connect the other to the mast and/or where air flow is required.
3. Connect the exhaust hose to the bottom “Air Exhaust” female connector.

2.5 WB Pneumatic System Controls

The WB Pneumatic System controls and Indicators are shown (Figure 2-1).

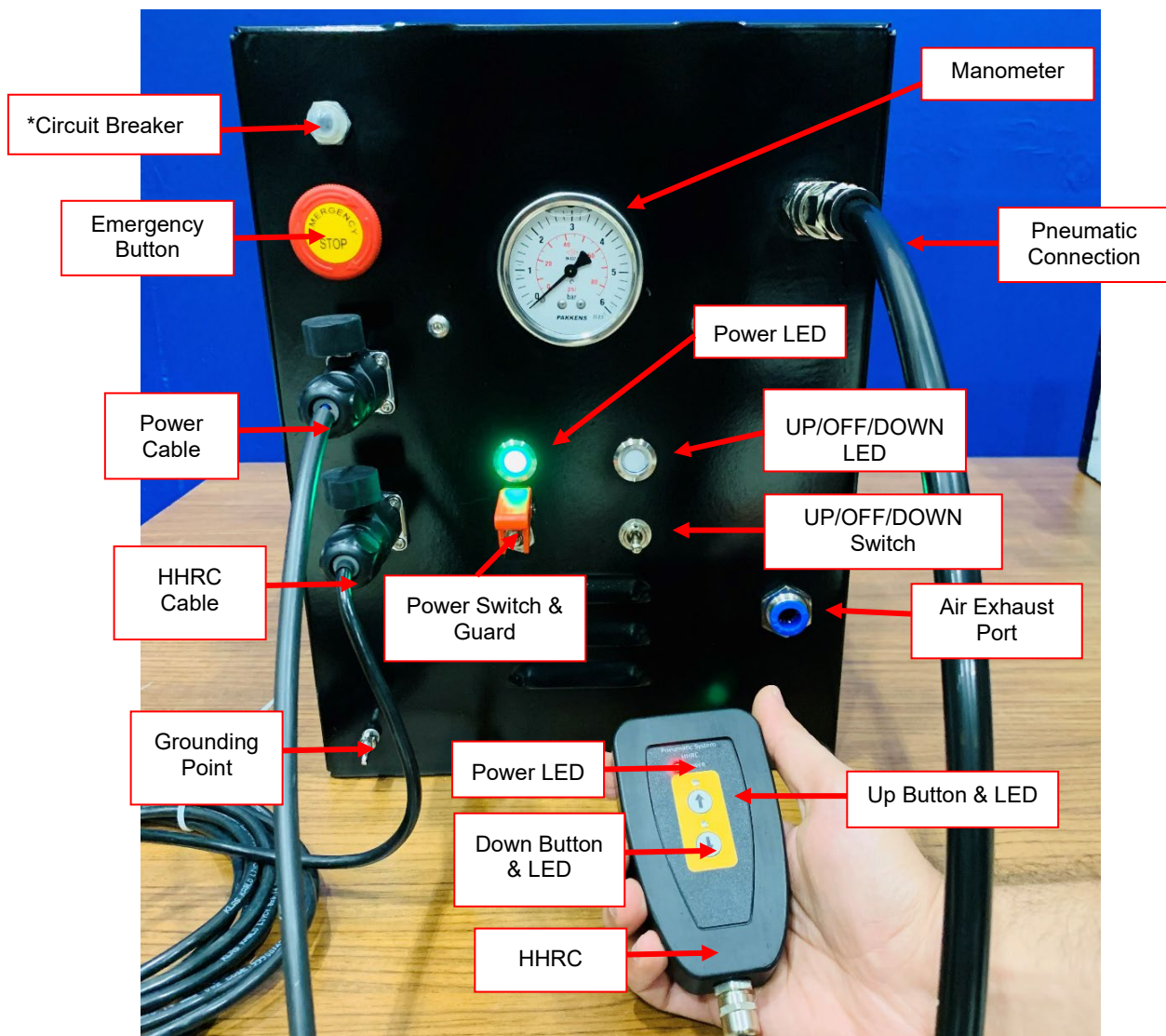


Figure 2-1 WB Pneumatic System Controls

*NOTE: Circuit Breaker is not used in 12VDC models. There is a built-in fuse for protection.

Section 3 Operation

This section describes the operation of the WB Pneumatic System. Use care to understand and follow all precautions while operating.

3.1 Send Air Flow to the Mast

This section describes how to send air flow into the mast.

⚠ CAUTION

Equipment Damage – Over-Running! This equipment should not be operated continuously for more than 30 minutes. Over-running could cause overheating and damage the unit.

To send air flow to the mast, proceed as follows:

1. Open the guard and turn the power “ON/OFF” switch on. Check that the power LED is lit green (Figure 3-1).



Figure 3-1 Power On

If the LED is not lit green, check that the emergency button is pushed out and/or the circuit breaker is pushed in. If the emergency button is pushed in while the power switch is turned on, the "UP/OFF/DOWN" LED will turn red (Figure 3-2).

To power-up the system, turn the emergency button clockwise to release the emergency stop function (red LED will turn off).

Note: The circuit breaker is not used in 12VDC models. There is a built-in fuse for protection.

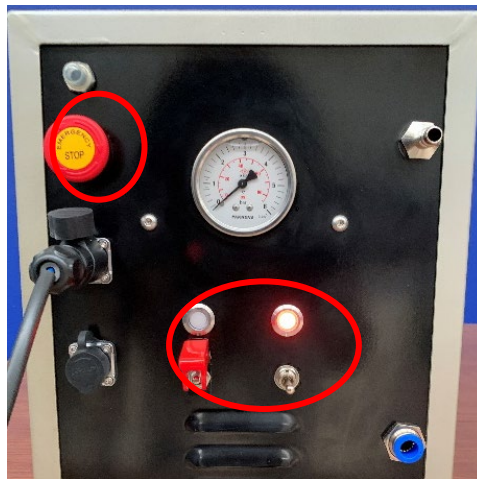


Figure 3-2 Emergency Stop is in Effect

2. Turn the "UP/OFF/DOWN" switch to the "UP" position and the "UP" LED will light blue. The system will start operating and will send air flow to the mast/system. The WB Pneumatic System will stop automatically when the system is filled with air (factory adjustment of the system pressure switch settings are shown in Table 1-1).

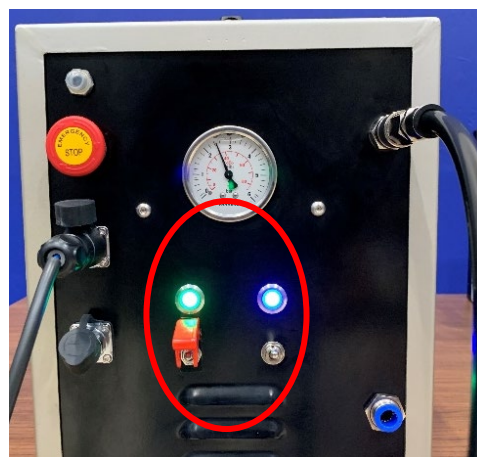


Figure 3-3 System Sends Air Flow to the Mast

3. Follow the mast instructions (manual that shipped with the mast) to operate the system safely.
4. When the operation is complete, turn off the power switch and push the emergency button.

(Non-locking masts) After extending the non-locking mast, the WB Pneumatic System power switch must always be left in the “ON” position and the “UP/OFF/DOWN” Switch must be in the “UP” position. Whenever the pressure is lost inside the mast, the WB Pneumatic System will automatically replace the lost pressure.

3.1.1 Built-In Heater Pneumatic System (Optional)

If the outside temperature is below -5°C , turn on the power switch and the heater system will start to send hot air inside the system (the motor will not work until system cabinet temperature reaches about -5°C). It takes about 60 minutes to go from -35°C to -5°C . When the temperature has reached about -5°C , turn the “UP/OFF/DOWN” Switch to the “UP” position to send the air to the mast.

To shorten the operation duration and keep the system ready, leave the power switch on. This allows the system to continue sending hot air inside the system cabinet.

3.2 Exhaust Air from the Mast

This section describes how to exhaust air from the mast.

⚠ WARNING

Safety Instruction- Before retracting locking Pneumatic Masts, check that there is sufficient air pressure inside the Mast on the WB Pneumatic System gauge (approximately 1.8 Bar).

To send air flow to the mast, proceed as follows:

1. **(Locking masts)** Ensure there is enough air pressure in the mast (approximately 1.8 Bar). If there is not enough air pressure in the mast, inflate the system with air by turning the power switch on and turning the "UP/DOWN" switch to the "UP" position. The "UP/OFF/DOWN" LED will light blue and the system will start to send air flow to the mast. Leave the "UP/DOWN" switch in the "UP" position until the WB Pneumatic System gauge reads 1.8 Bar.



Figure 3-4 Ensure Air Pressure is Approximately 1.8 Bar

2. Push and hold the "UP/DOWN" switch down to lower the mast. The LED will illuminate green and the system will begin to exhaust air from the mast. The mast will return to the nested position.



Figure 3-5 Lower the Mast

Note: During mast retraction, if the air pressure drops to around 1 Bar and there is no mast lowering movement, turn the "UP/DOWN" switch off (medium position) and contact The Will-Burt Company.

3. Follow the mast instructions (manual that shipped with the mast) to retract the mast safely.
4. When the operation is complete, turn off the power switch and push the emergency button.

3.2.1 Built-In Heater Pneumatic System (Optional)

If the outside temperature is below -5°C , turn on the power switch and the heater system will start to send hot air inside the system (the motor will not work until system cabinet temperature reaches about -5°C). It takes about 60 minutes to go from -35°C to -5°C . When the temperature has reached about -5°C , press and hold the "UP/OFF/DOWN" switch down to exhaust air from the mast.

To shorten the operation duration and keep the WB Pneumatic System ready, leave the power switch on. This allows the system to continue sending hot air inside the system cabinet.

3.3 Using Hand-Held Remote Control (HHRC)

If desired, the HHRC can be used to operate WB Pneumatic System.

Note: When the HHRC's cable is connected to the WB Pneumatic System, the "UP/OFF/DOWN" switch on the WB Pneumatic System Panel will not operate.

To power on the HHRC:

1. Ensure the HHRC cable is connected to the system.
2. Turn the system power switch on (HHRC power LED will light red). This shows that the HHRC is powered on (Figure 3-6).



Figure 3-6 HHRC is Powered On

To extend and send air to the mast, push the “UP” button on the HHRC. The HHRC “UP” and “UP/OFF/DOWN” LEDs will light blue (Figure 3-7).



Figure 3-7 Extend the Mast

To retract and exhaust air from the mast, push the “DOWN” button on the HHRC. The HHRC “UP” LED will light green and the system “UP/OFF/DOWN” LED will light green (Figure 3-8).



Figure 3-8 Lower the Mast

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Section 4 Maintenance

This section describes maintenance procedures required to keep the WB Pneumatic System operational. Use care to understand and follow all precautions while performing these procedures. If the system does not perform as required, see Section 5 for troubleshooting.

Disconnect power from the WB Pneumatic System before performing maintenance.

4.1 Pre-Maintenance Check

Before performing maintenance procedures, ensure:

- All operators read and understand the entire maintenance procedure and are properly trained.
- Disconnect power from the WB Pneumatic System.
- The precautions mentioned in the Safety Summary are understood.

4.2 Maintenance Equipment

The recommended equipment for maintenance is listed in Table 4-1.

Table 4-1 Recommended Equipment

Recommended Equipment*		
Personal Protective		
Safety Glasses	Work Gloves	Nitrile or Vinyl Gloves
Hearing Protection	Safety Shoes	
Hand Tools		
Chisel	Drill	File
Sockets	Hammer	Screwdrivers
Wrenches	Measuring Tape	Utility Knife
Torque Wrenches	Hex Wrenches	Level
Expendables		
Acetone, Alcohol, or other solvent	Pipe Thread Sealant or PTFE Tape	
Rags (Clean and Dry)	Non-Abrasive Cleaners (Soap and Water)	
<p>* Note:</p> <ul style="list-style-type: none"> • Depending on the local, regional, and national standards and codes of practice, and the environment, additional personal protective equipment may be necessary. • When disposing of any disposables or components, do so according to any applicable local, regional, and national standards and codes of practice. 		

4.3 Spare Parts

To order spare or replacement parts, always refer to the model number and serial number. The model number, serial number, and additional information is engraved on the system identification plate as shown in Figure 4-1. Throughout this manual, “P/N” followed by a number represents the part and model numbers for that component. To order spare parts or for the part numbers for additional components, contact The Will-Burt Company.

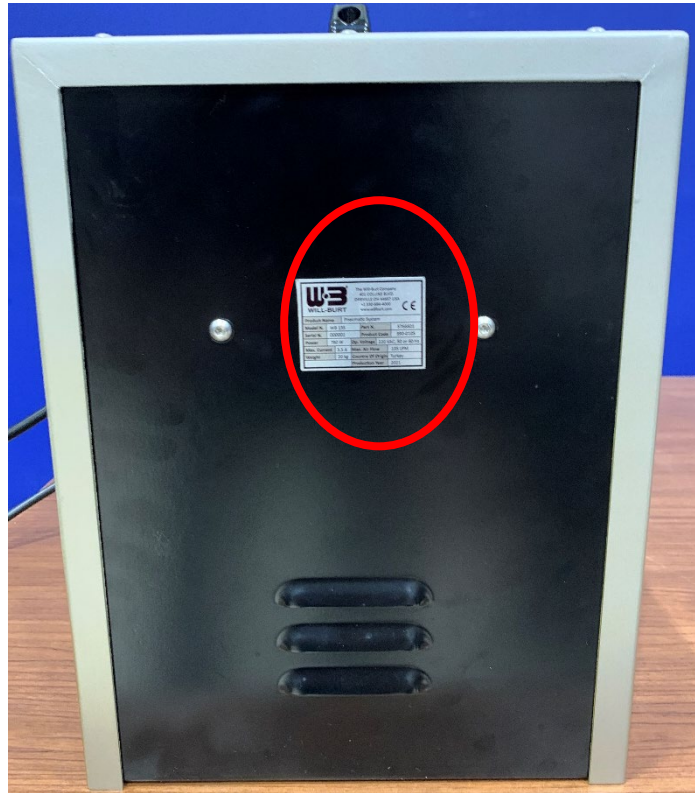


Figure 4-1 WB Pneumatic System Identification Plate

4.4 Periodic Maintenance

This section describes periodic maintenance of the system.

Preventative maintenance checks and service means systematic care, inspection, and servicing of equipment to keep it in good condition and to prevent breakdowns. All procedures must be performed by trained personnel only. For factory or onsite training, contact The Will-Burt Company.

If anything looks wrong and cannot be diagnosed and/or fixed, the WB Pneumatic System should be taken to the next higher-level maintenance facility for inspection.

Note: The customer should create and maintain a maintenance log for each WB Pneumatic System.

4.4.1 Periodic Inspections

Table 4-2 lists inspections to be done periodically.

Table 4-2 Periodic Inspections

Action	Frequency
Inspect for damage. If damage is apparent, do not use the WB Pneumatic System, and have it serviced prior to use.	As needed.
Inspect to ensure the WB Pneumatic System is kept clean and free from foreign material. If necessary, clean the WB Pneumatic System. Use: <ul style="list-style-type: none"> • Isopropyl alcohol on all metal surfaces • Water when cleaning rubber or plastic material • Soap and water when cleaning the mast's exterior surfaces 	As you work and as needed. In saltwater environments, clean the WB Pneumatic System at least once every 3 months.
Visually inspect to ensure all hardware is in place. Look for chipped paint, bare metal, or rust around bolt heads. Ensure no hardware is missing, bent, or broken. If hardware is found loose, retighten.	Monthly
Visually inspect to ensure all cables (if any), hoses, and electrical wires are undamaged and properly terminated. Look for loose or broken connectors. Replace electrical wires if necessary. Tighten loose connectors.	Monthly
Check for obvious looseness of pressurized equipment. Ensure nothing is loose, missing, bent, or broken. Remove loose pressurized equipment, clean threads, seal it with sealant and tighten into place.	Monthly
Check that connections of pressurized equipment are clean, undamaged, and are in good condition. Check for damage to insulation. If pressurized equipment is damaged, do not operate system until the problem is fixed.	Monthly
Check and clean air filter(s) with air. Note: Do not operate the system without the suction filter. This could damage the inside of the compressor.	Every 6 months. Replace filters every year.

Action	Frequency
During operation of the WB Pneumatic System, observe the pressurized equipment for damage, leakage, tears, fraying, accumulation of foreign material and abnormal sound. If pressurized equipment is damaged, do not operate system until fix the problem.	As every use
Visually inspect the condition of the coating. Coating shall be in good condition with no bare metal or composite material exposed.	Monthly
Check for rust and corrosion. If any corrosion exists, remove it with a wire brush. Touchup any bare metal with paint.	As needed
Check all visible surfaces of the WB Pneumatic System for damage, air leakage, chaffing, cracks, etc. If damaged, replace the WB Pneumatic System. Return the WB Pneumatic System for the next higher-level maintenance facility.	Every 5 years

4.5 Corrective Maintenance

This section describes corrective maintenance for the system. Depending on the WB Pneumatic System configuration and the conditions of the mast system, all corrective maintenance procedures may not be required. Follow the appropriate instructions for your mast system.

Prior to performing corrective maintenance, remove the:

- Power from the WB Pneumatic System.
- Air intake and exhaust pressure lines from the WB Pneumatic System.

4.5.1 Component Replacement

To replace a component:

1. Remove power and pneumatic hoses.
2. Remove top cover screws to remove handle and top cover.
3. Find the faulty part and replace it with the new one in accordance to troubleshooting procedures (Section 5).

4.5.2 Pressure Switch Adjustment

The maximum operating pressure switch settings are shown in Table 1-1. If necessary, the pressure switch can be adjusted.

4.5.2.1 To adjust the pressure switch (excluding 1500W WB Pneumatic Systems):

1. Remove the WB Pneumatic System handle and top cover.
2. Connect the mast or 5-liter (approximate) metal compressor tube (test & adjustment unit) to WB Pneumatic System.
3. Turn on the WB Pneumatic System. Mast will start to extend.
4. When it completes extension, the Manometer on the WB Pneumatic System will indicate pressure. The pressure switch can be adjusted to the desired level according to instructions below (if the test and adjustment unit is used when the tube is full with air, the Manometer on the WB Pneumatic System will indicate the pressure):
 - To increase the pressure setting, pull pressure switch locking cover up and turn it in the clockwise direction.
 - To decrease the pressure setting, pull the pressure switch locking cover up and turn it in the counterclockwise direction.
5. After finishing adjustment, operate the WB Pneumatic System together with mast or metal compressor tube at least 3 times to be sure the settings are right and the pressure switch cuts the WB Pneumatic System power at desired level.
6. When all adjustment is completed, push the pressure switch locking cover down. Put the WB Pneumatic System top cover and its handle back. Screw them all in place.

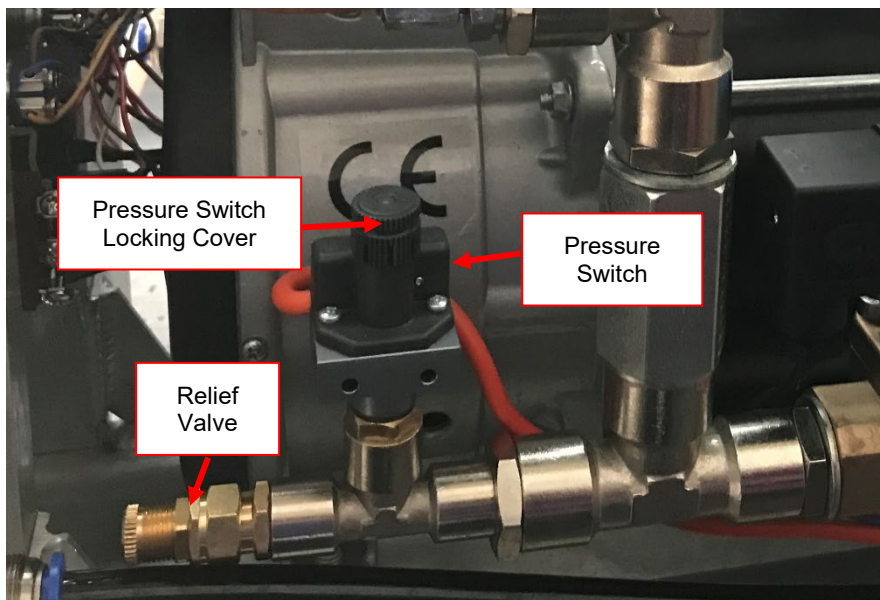


Figure 4-2 Pressure Switch (excluding 1500W WB Pneumatic Systems)

4.5.2.2 To adjust the pressure switch (for 1500W WB Pneumatic Systems):

1. Remove the WB Pneumatic System handle and top cover.
2. Connect the mast or 5-liter (approximate) metal compressor tube (test & adjustment unit) to WB Pneumatic System.
3. Turn on the WB Pneumatic System. Mast will start to extend.
4. When it completes extension, the Manometer on the WB Pneumatic System will indicate pressure. The pressure switch can be adjusted to the desired level according to instructions below (if the test and adjustment unit is used when the tube is full with air, the Manometer on the WB Pneumatic System will indicate the pressure):
 - Remove the pressure switch cover by removing 2 ea lock type screws.
 - Turn the WB Pneumatic System on and leave it running. When the device reaches the stop pressure, turn the adjusting screw (P) at the top counterclockwise (-). Turning the screw clockwise (+) ensures stopping at higher pressure. Turning the screw counterclockwise (-) ensures stopping at lower pressure [factory setting is 2.4 bar (± 0.2)].
 - If the WB Pneumatic System is activated before the desired pressure is reached, the stop-running differential is low. Turning the start adjustment (ΔP) screw clockwise (+) will get a large pressure difference. The actuation screw adjustment only changes the actuation pressure setting [factory setting is 1.8 bar (± 0.2)].
5. After finishing adjustment, operate the WB Pneumatic System together with mast or metal compressor tube at least 3 times to be sure the settings are right and the pressure switch cuts the WB Pneumatic System power at desired level.
6. When all adjustment is completed, put the pressure switch cover back and tighten the screws. Put the WB Pneumatic System top cover and its handle back. Screw them all in place.

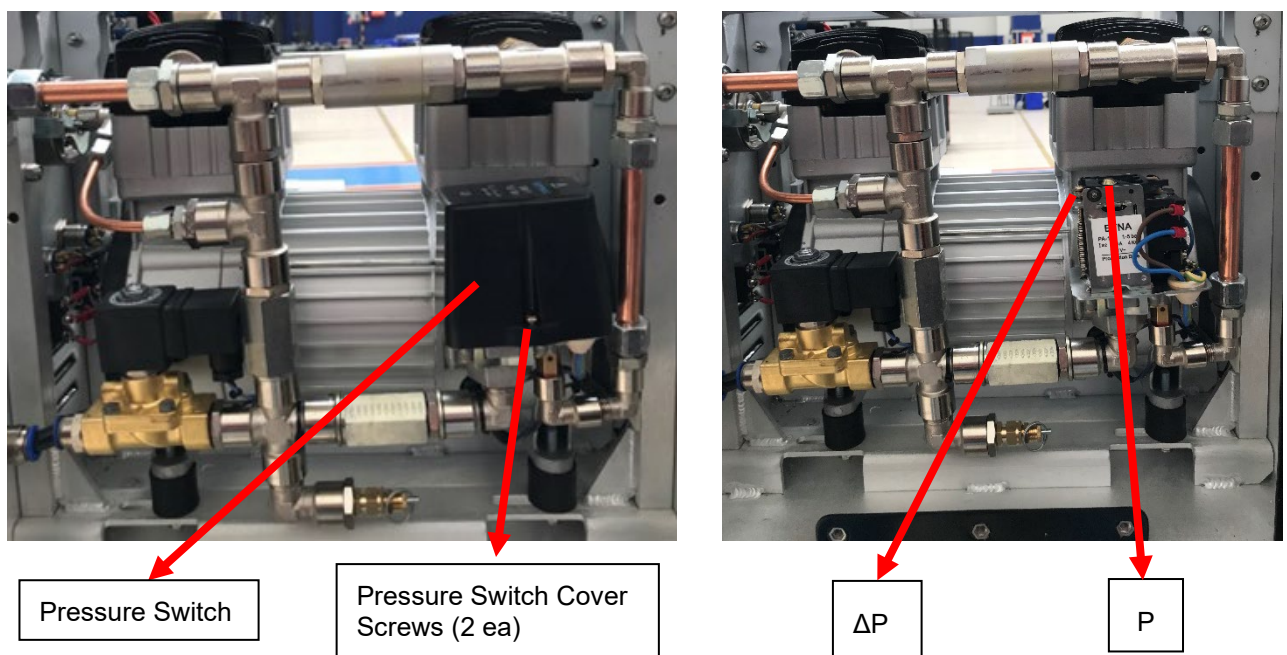


Figure 4-3 Pressure Switch for 1500W WB Pneumatic Systems

4.6 Long-Term Storage

When putting the system into long-term storage, ensure the:

- WB Pneumatic System is fully removed from power source.
- WB Pneumatic System is stored in a clean and dry environment.
- WB Pneumatic System is stored in temperatures above -10°C / 14°F .

4.7 System Disposal

Dispose of the WB Pneumatic System in accordance with the national environmental regulations.

Section 5 Troubleshooting

This section describes the troubleshooting for the WB Pneumatic System. Use care to follow all precautions while performing troubleshooting procedures described in Table 5-1.

Table 5-1 Troubleshooting

Problem	Possible Cause	Possible Solution
WB Pneumatic System is frozen.	All controls cannot be seen and/or controlled.	Wrap warming blankets around WB Pneumatic System until ice melts. Use a heat gun or 500W quartz light. Clear build-up ice on the exterior of WB Pneumatic System.
There is no power even when the power switch is turned on.	Power cable is not connected.	Check power cable connection.
	No main power source.	Check and ensure main power source is functioning properly.
	WB Pneumatic System Circuit Breaker is Pushed out.	Push in WB Pneumatic System circuit breaker. If this does not work, check any short circuit or replace circuit breaker.
	Power switch defective	Replace power switch.
	Emergency Button is in use.	Turn the emergency button clockwise to release the emergency stop function. If this does not work, replace it.
	Power LED is defective.	Replace power LED, power supply, relay or check internal wiring. Replace pressure switch with new one.
There is no operation sound when the "UP/DOWN" switch is in the "UP" position.	There may be no power.	Check main power source, circuit breaker, emergency button and power switch. Turn all of them on.
	"UP/DOWN" switch is defective.	Replace "UP/DOWN" switch. Replace power supply, relay or check internal wiring. Replace pressure switch with new one.

Problem	Possible Cause	Possible Solution
Mast cannot be retracted.	There may be no power.	Check main power source, circuit breaker, emergency button and power switch. Turn all of them on.
	“UP/DOWN” switch defective.	Replace “UP/DOWN” switch.
	Hose unit is not properly connected.	Ensure hose unit is properly connected.
	Lowered solenoid valve.	Check solenoid valve inside WB Pneumatic System. If it is not working, replace it with a new one.
Mast cannot be extended or retracted from Hand-Held Remote Control (HHRC).	There may be no power.	Check main power source, circuit breaker, emergency button and power switch. Turn all of them on.
	HHRC cable is not properly connected.	Ensure HHRC cable is properly connected. If the problem still persists, replace HHRC.
	HHRC power LED does not light red.	Check if HHRC power LED lights red. If not, replace HHRC.
	HHRC “UP/DOWN” LEDs do not light green.	Check if HHRC “UP/DOWN” LEDs light green. If not, replace HHRC.
WB Pneumatic System indicator does not indicate any value during operation.	Pneumatic lines obstructed or loose.	Check the pneumatic lines for obstruction and loose connection. Replace Indicator with new one.
WB Pneumatic System cannot work defined pressure bar.	Pneumatic lines obstructed or loose.	Check the pneumatic lines for obstruction or loose connection.
	WB Pneumatic System pressure indicator is not working.	Adjust Pressure Switch setting value. Replace Pressure Switch with new one.

Problem	Possible Cause	Possible Solution
Air leakage.	Air leakage at pneumatic line.	<p>Check air leakage at pneumatic line connections by mixing water and soap to find the leakage point. If there is a loose connection, apply proper sealant and tighten. If the air leakage still exists, replace the component/hose with the new one.</p> <p>Check solenoid valve inside WB Pneumatic System. If it is not working, replace it with a new one.</p>
There is air leakage at the hose connection.	Foreign material inside air pressure connection socket.	Check for the foreign material. If there is any foreign material remove it by using brush or suitable tool. If the problem persists, replace the air pressure connection socket.

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Section 6 References

This section provides reference information for the system.

6.1 WB Pneumatic System Harness V0.3_220VAC

6.1.1 System Architecture

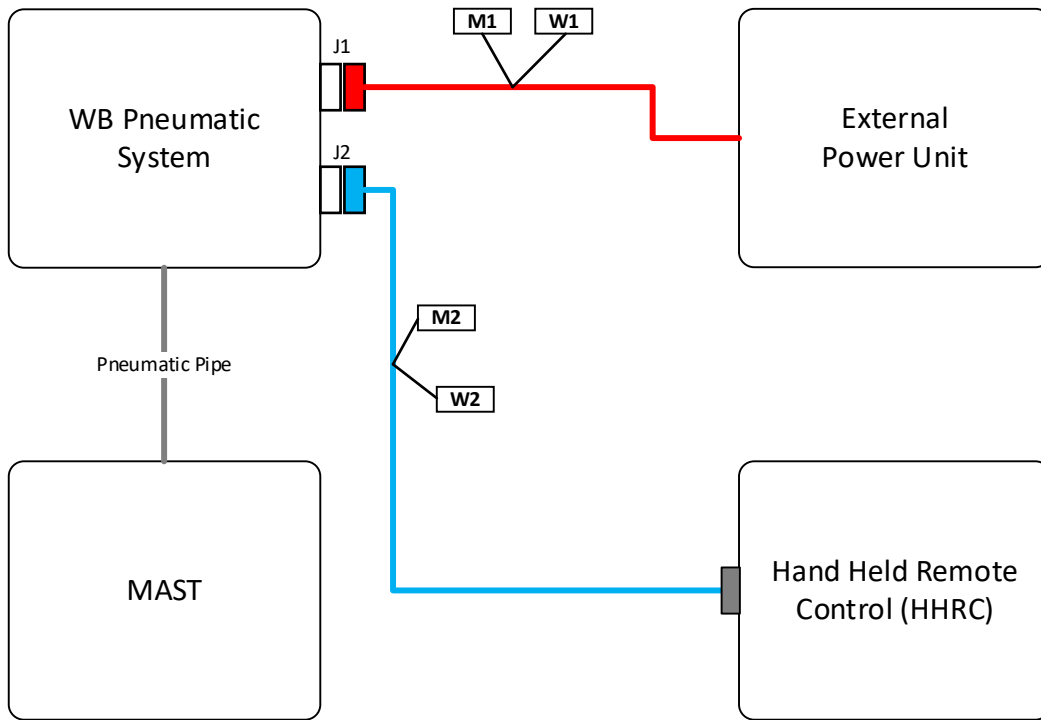


Figure 6-1 System Architecture

6.1.2 M1

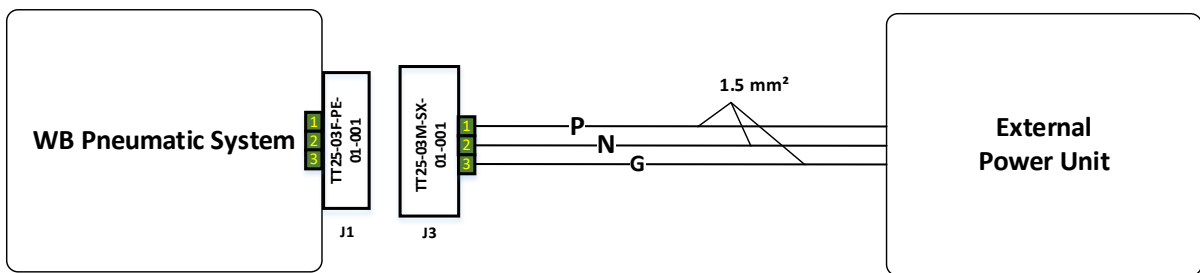


Figure 6-2 M1

6.1.3 W1

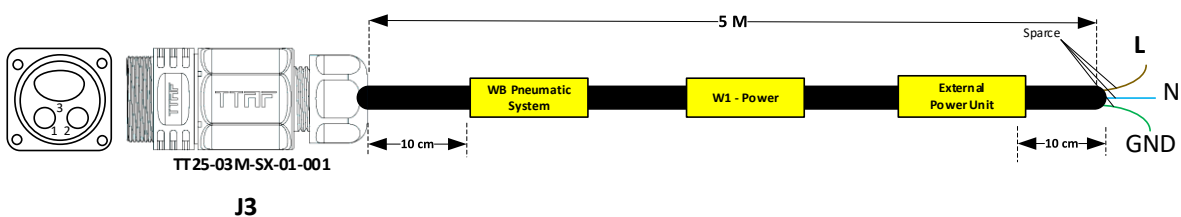


Figure 6-3 W1 Power Cable

6.1.4 M2

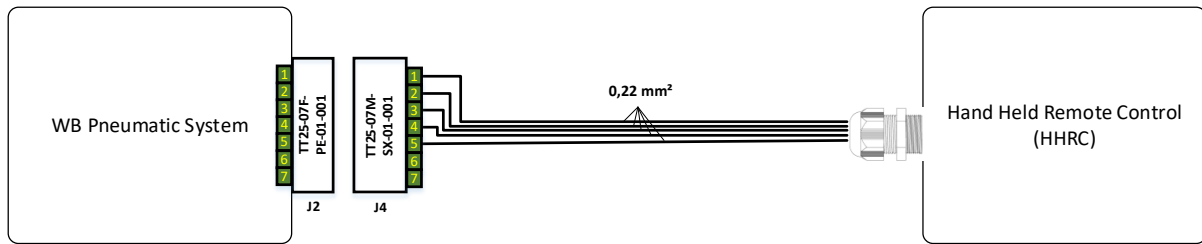


Figure 6-4 M2

6.1.5 W2

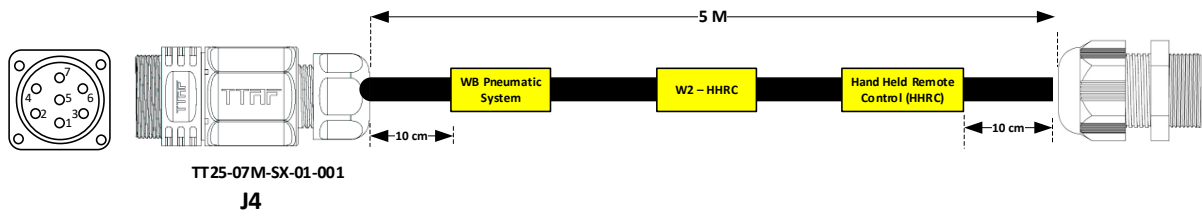


Figure 6-5 W2 HHRC Cable

6.2 WB Pneumatic System Harness V0.3_110VAC

6.2.1 System Architecture

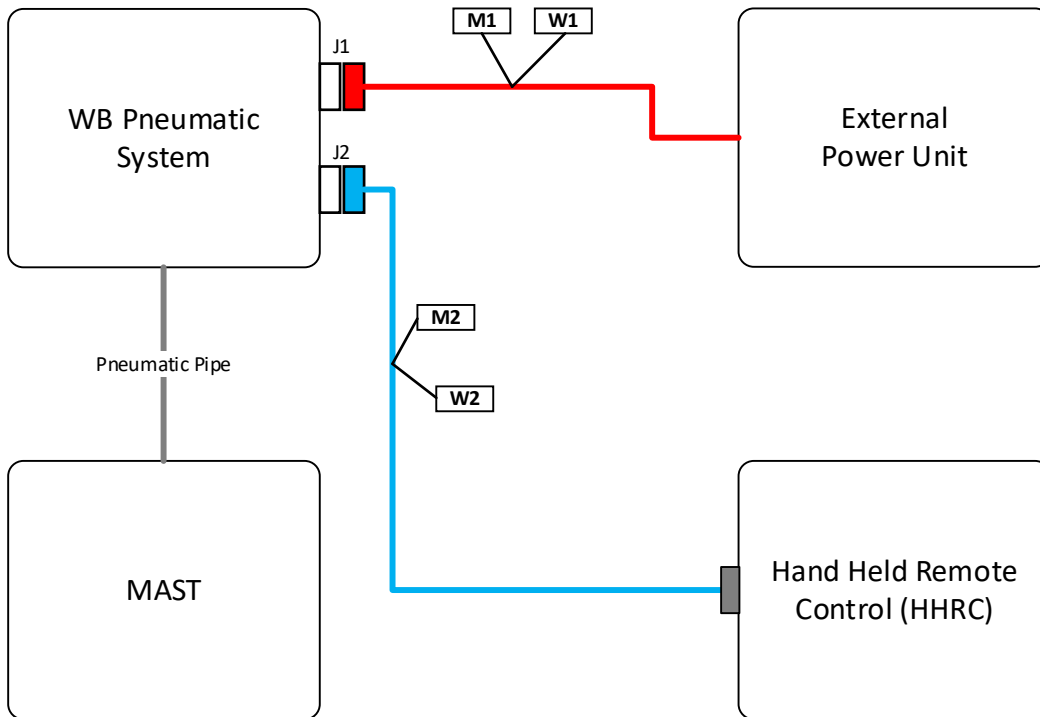


Figure 6-6 System Architecture

6.2.2 M1

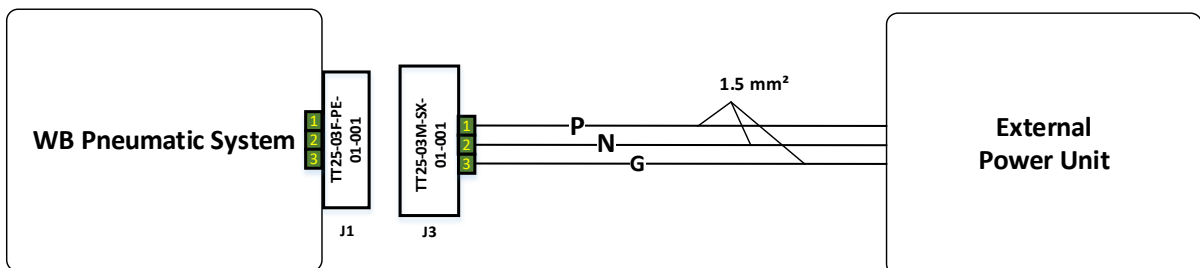


Figure 6-7 M1

6.2.3 W1

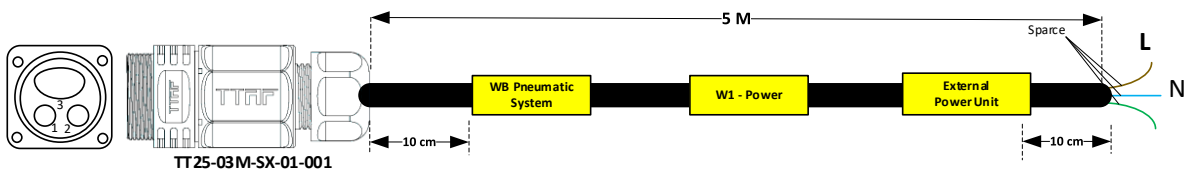


Figure 6-8 W1 Power Cable

6.2.4 M2

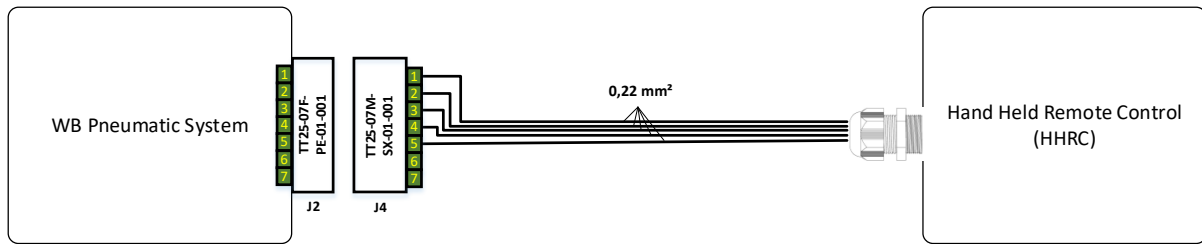


Figure 6-9 M2

6.2.5 W2

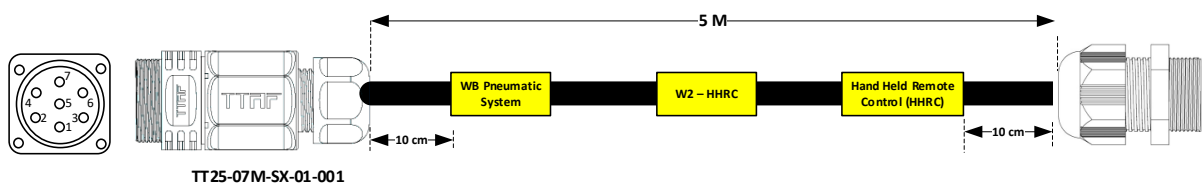


Figure 6-10 W2 HHRC Cable

6.3 WB Pneumatic System Harness V0.3_220VAC_MIL CONN

6.3.1 System Architecture

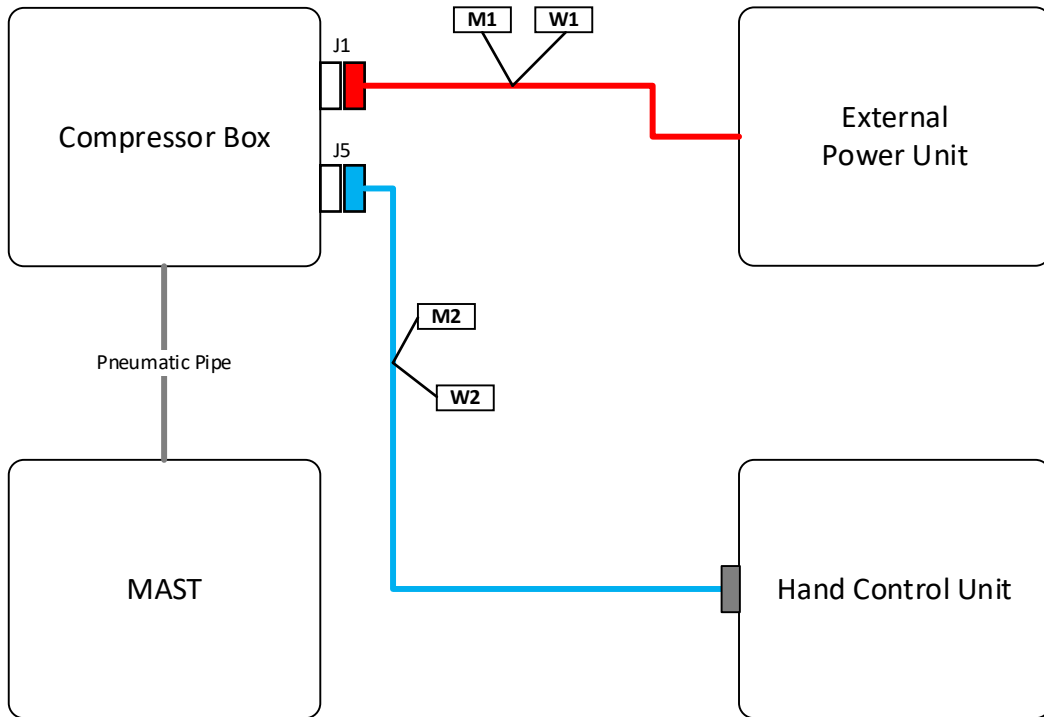


Figure 6-11 System Architecture

6.3.2 M1

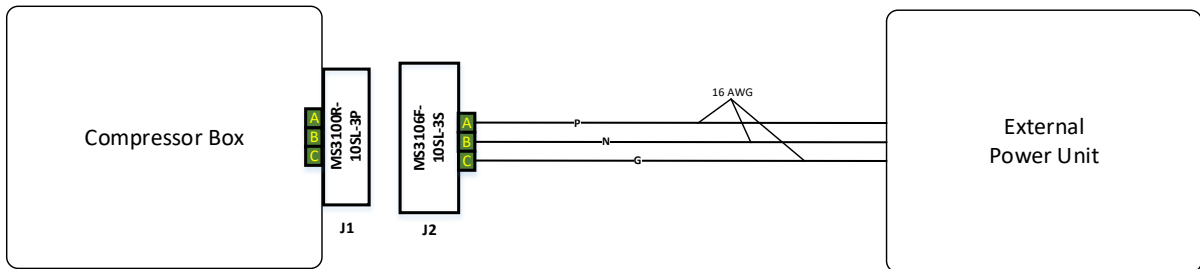


Figure 6-12 M1

6.3.3 W1

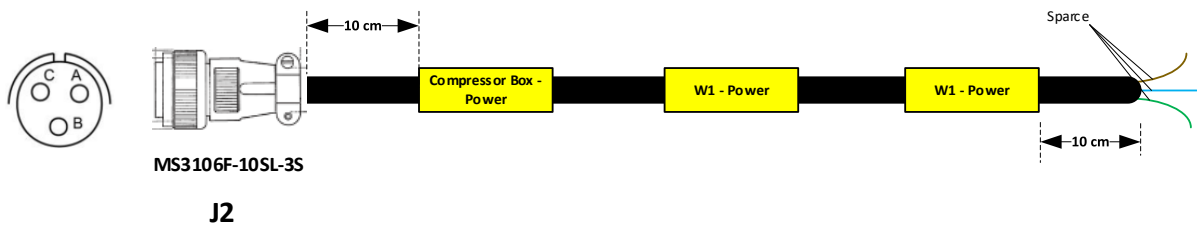


Figure 6-13 W1 Power Cable

6.3.4 M2

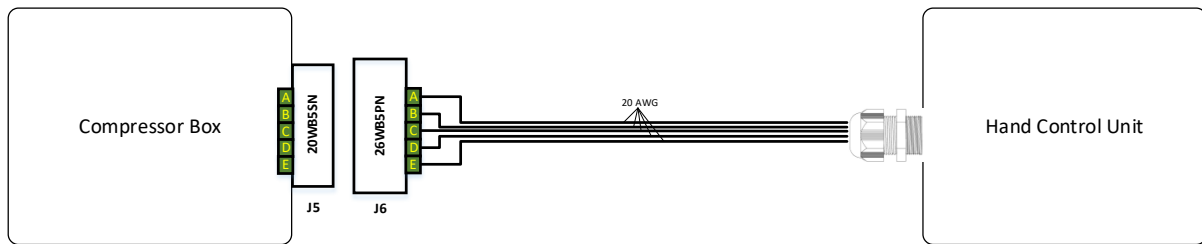


Figure 6-14 M2

6.3.5 W2

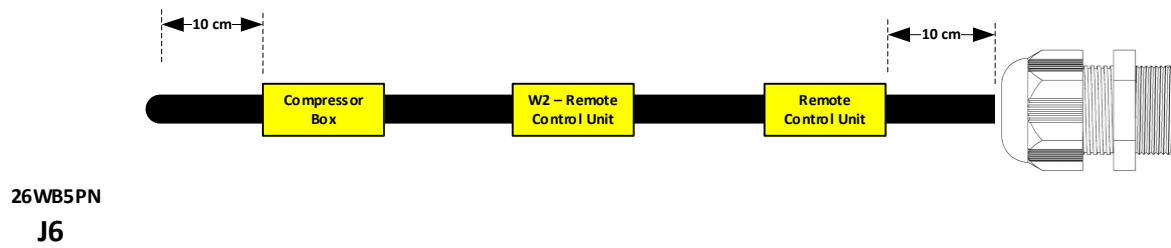


Figure 6-15 W2 HHRC Cable

6.4 WB Pneumatic System Harness V0.3_24VDC

6.4.1 System Architecture

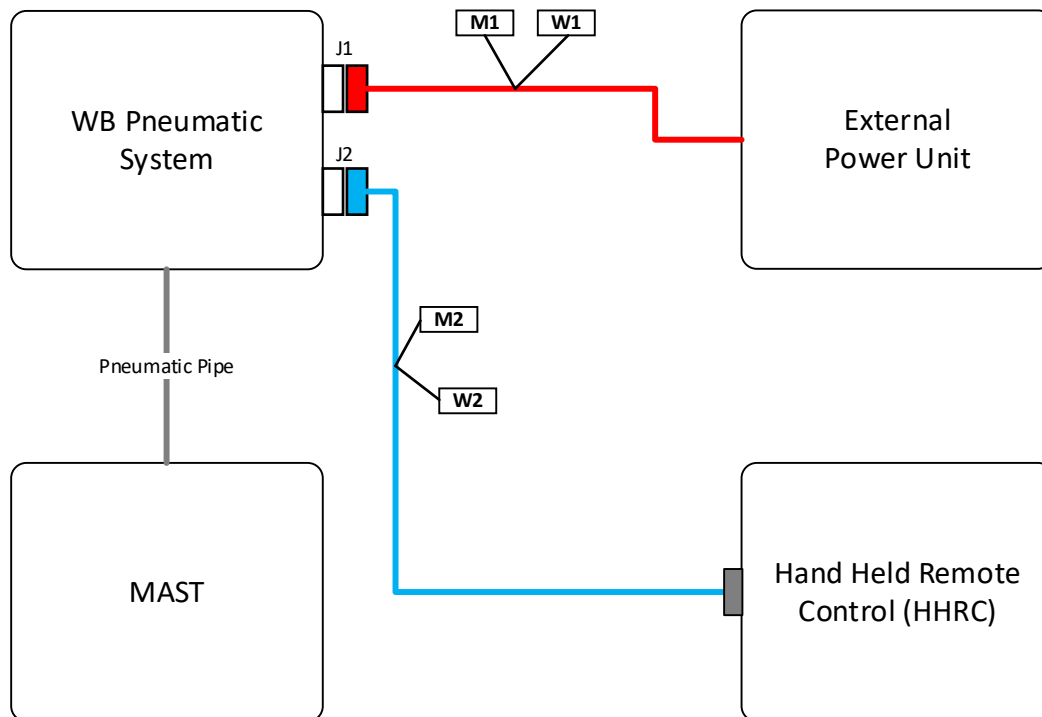


Figure 6-16 System Architecture

6.4.2 M1

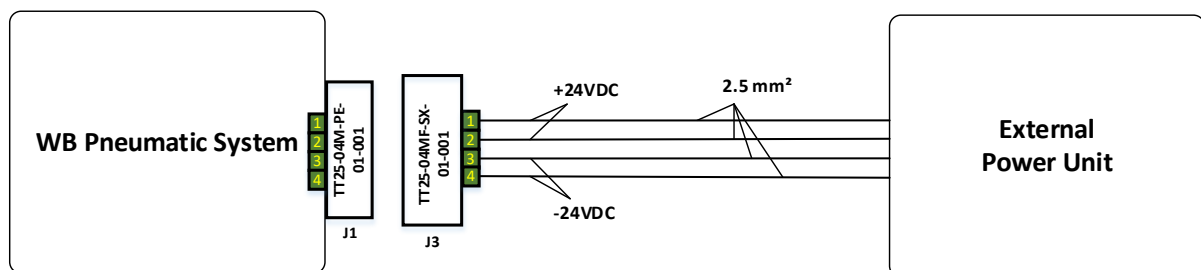


Figure 6-17 M1

- | |
|-----------------------------|
| Pin 1 = Brown wire (+24VDC) |
| Pin 2 = Blue wire (+24VDC) |
| Pin 3 = Black wire (-24VDC) |
| Pin 4 = White wire (-24VDC) |

6.4.3 W1

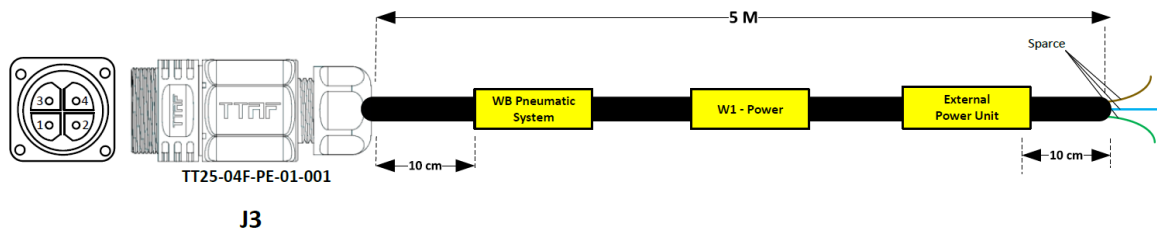


Figure 6-18 W1 Power Cable

6.4.4 M2

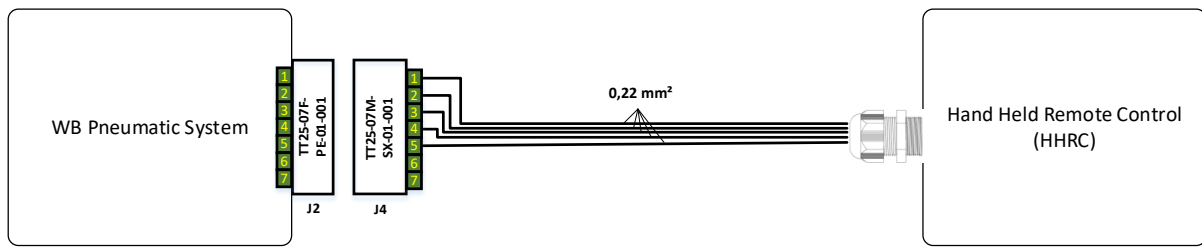


Figure 6-19 M2

6.4.5 W2

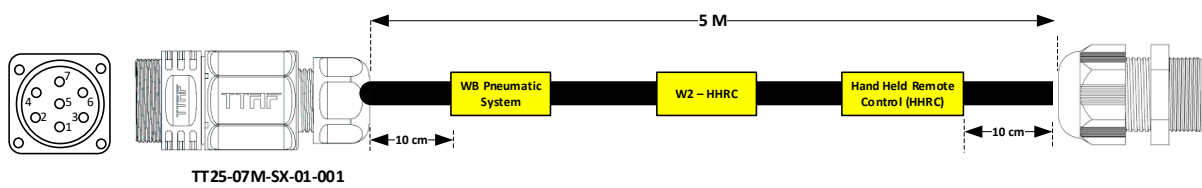


Figure 6-20 W2 HHRC Cable

6.5 WB Pneumatic System Harness V0.3_12VDC

6.5.1 System Architecture

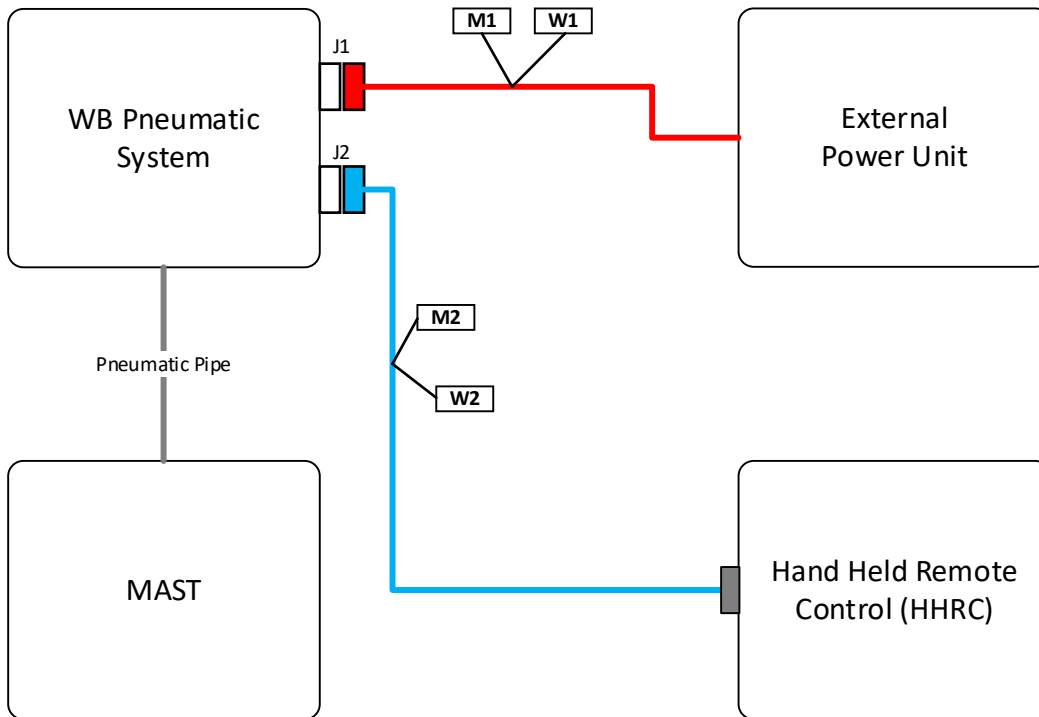


Figure 6-21 System Architecture

6.5.2 M1

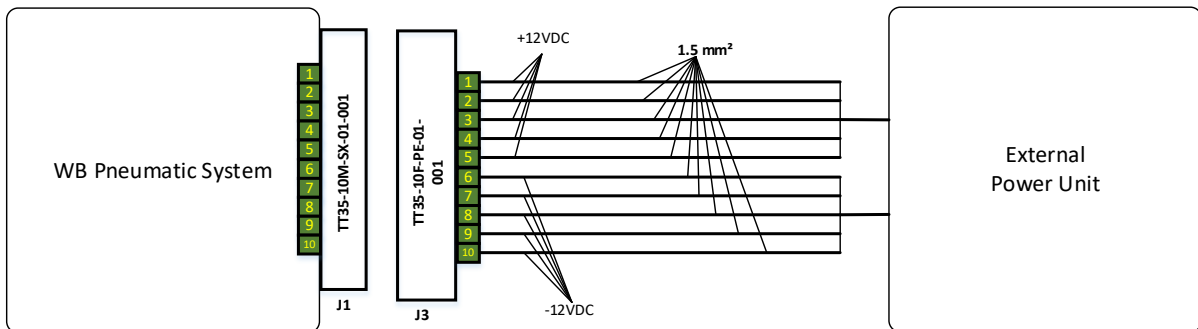


Figure 6-22 M1

6.5.3 W1

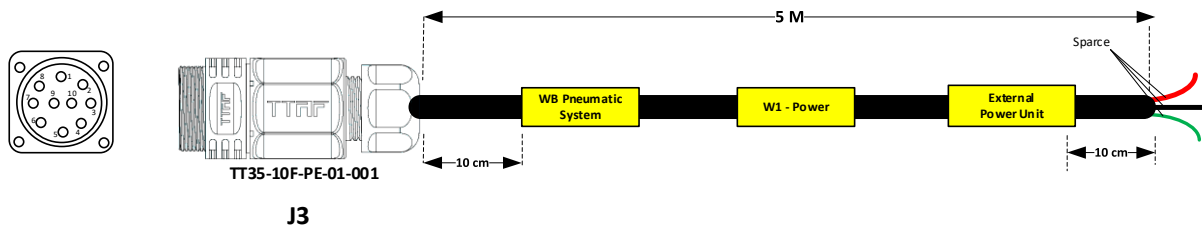


Figure 6-23 W1

6.5.4 M2

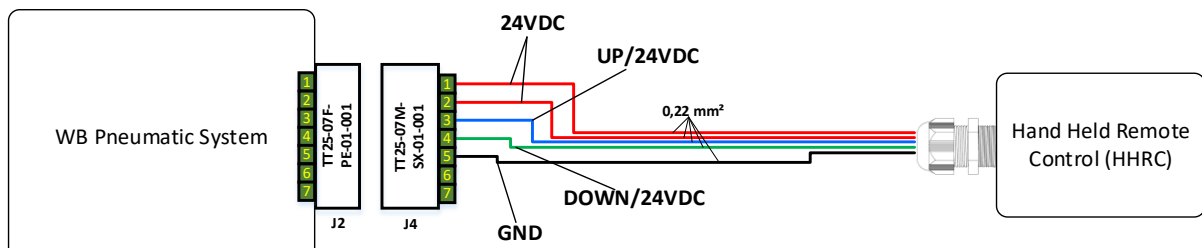


Figure 6-24 M2

6.5.5 W2

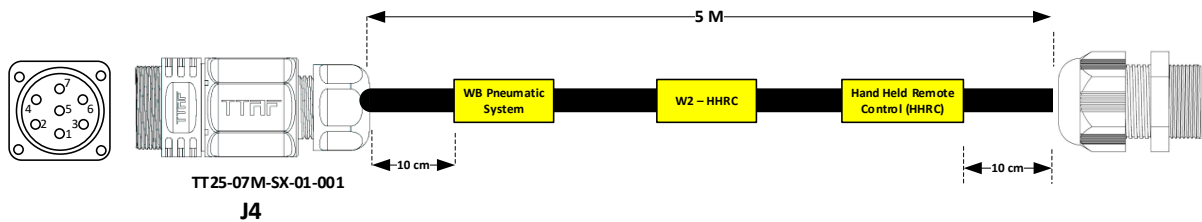


Figure 6-25 W2