



Auxiliary Link Control Panel

Technical Manual

0997961_D

Valley Auxiliary Link Control Panel

Valley Auxiliary Link Control Panel

Table of Contents

ABOUT THIS MANUAL	4
ANCILLARY EQUIPMENT WARRANTY	4
SAFETY	5
Recognize Safety Information	5
Safety Messages.....	5
Information Messages.....	5
Use Of Personal Protective Equipment.....	6
Conductive Materials And Equipment.....	6
Fall Protection	6
Minimum Working Clearance	7
Qualified Person.....	7
Overhead Power Lines.....	8
Minimal Lockout / Tagout Procedure.....	9
Sequence Of Lockout.....	9
Restoring Equipment To Service	9
Operate Safely.....	11
Safety Decal.....	13
OVERVIEW	14
Door Panel - User Controls.....	14
Power Switch: Local-Off-Remote Switch (SW1).....	14
Transmit Test Switch (SW2).....	14
Relay Output: On-Off-Auto Switches (SW3, SW4, SW5)	14
Schematic	15
Terminal strips	15
Component ID.....	15
Modem	15
Component Function.....	16
Programmable Logic Controller (PLC).....	17
Analog Input Module	17
DIN Rail Configuration Switches.....	18
Call-Out	18
Digital Output Restore	18
Relays	19
PLC Status.....	20
Input Type Configuration	21
Input Type Configuration by Auxiliary Link Part Number	21
TROUBLESHOOTING	22
Probable Cause Table.....	23
Auxiliary Link Supply Measurements	24
Auxiliary Link ID Reset Procedure	24
Sensor or Transmitter Wiring.....	25

Valley Auxiliary Link Control Panel

Table of Contents

About This Manual

Information contained in this manual applies to Valley Auxiliary Link Control Panel.

For proper operation of the Auxiliary Link, the Auxiliary Link Control Panel Technical Manual and BaseStation2-SM Owner's Manual must be used together.

The BaseStation2-SM Owner's Manual part number 0997206 (English) includes information on the configuration of Auxiliary Link functions.

All owner's, operators and maintenance personnel **MUST** read and understand the Auxiliary Link Control Panel Technical Manual and BaseStation2-SM Owner's Manual.

Specifications, descriptions and illustrative material contained herein were as accurate as known at the time this publication was approved for printing. Valmont Industries Inc., reserves the right to change specification or design without incurring obligation. Specifications are applicable to machines sold in the United States and may vary outside the United States.

Ancillary Equipment Warranty

The owner is responsible for warranty registration of all ancillary equipment such as engines, pumps and generators with its respective manufacturer.

Recognize Safety Information

This irrigation equipment can be powered by high voltage, which can be extremely dangerous if used improperly. For maximum safety and optimum performance of the machine, all owner/operators and maintenance personnel must read and understand the owner/operator manual(s), all safety messages in this manual and safety signs/decals on the machine before operating this equipment.

Anyone assembling, operating, servicing or maintaining this machine must read and understand all operation, maintenance, troubleshooting, testing, installation, assembly instructions and all safety messages in this manual before operating the machine or beginning any maintenance, troubleshooting, testing, installation or assembly of components.

These instructions alert you to certain things you should do carefully; if you don't, you could hurt yourself or others, hurt the next person who operates the equipment, or damage the equipment.

Safety Messages

Safety messages in this manual are preceded by the hazard symbol and one of three words: DANGER, WARNING or CAUTION. These messages alert you to potential hazards that could hurt you or others and or cause property damage.



This HAZARD SYMBOL is used to alert you to information about unsafe actions or situations, and may be followed by the word DANGER, WARNING or CAUTION.

DANGER

The HAZARD SYMBOL used with the word DANGER describes immediate hazards that can result in severe personal injury or death.

WARNING

The HAZARD SYMBOL used with the word WARNING describes unsafe actions or situations that can result in severe injury, death and/or major equipment or property damage.

CAUTION

The HAZARD SYMBOL used with the word CAUTION describes unsafe actions or situations that can result in injury, and/or minor equipment or property damage.

Information Messages

Important information messages in this manual are preceded by the word NOTE.

NOTE

The word NOTE is used to alert you to information that describes procedures or tips to help you install, operate or maintain your equipment properly.

Safety

Use Of Personal Protective Equipment

- People working in areas where there are potential electrical hazards must use, personal protective equipment that is appropriate for the specific parts of the body to be protected and for the work to be performed. Refer to U.S. Occupational Safety & Health Administration (OSHA) Regulations (Standards - 29 CFR) Safeguards for personnel protection. - 1910.335, or applicable national, state or local regulations, for additional information.
- Personal protective equipment must be maintained in a safe, reliable condition and periodically inspected or tested.
- Protective shields, protective barriers, or insulating materials must be used to protect each person from shock, burns, or other electrically-related injuries while that person is working near exposed energized parts which might be accidentally contacted or where dangerous electric heating or arcing might occur. When normally enclosed live parts are exposed for maintenance or repair, they must be guarded to protect unqualified persons from contact with the live parts.
- Safety signs and tags. Safety signs, safety symbols, or accident prevention tags must be used where necessary to warn people about electrical hazards which may endanger them.

Conductive Materials And Equipment

Materials and equipment that can conduct electricity must be handled in a way that will prevent them from contacting energized power lines, exposed conductors or circuit parts.

- When handling long conductive objects (such as but not limited to truss rods, pipes, angles and ladders) in areas with energized power lines, exposed conductors or circuit parts, work practices (such as the use of insulation, guarding, and material handling techniques) must be used to minimize the hazard.
- Portable ladders must have non-conductive side rails.
- Do not wear conductive articles of jewelry and clothing (such as but not limited to watch bands, bracelets, rings, key chains, necklaces, metalized aprons, cloth with conductive thread, or metal headgear) that could come in contact with energized power lines, exposed conductors or circuit parts.

Fall Protection

Identify potential fall hazards and determine if fall protection equipment is appropriate for the task, before beginning the work. Pay attention to hazards associated with routine and non-routine tasks. Inspect fall protection equipment (harnesses, lanyards) and devices (guardrails, tie-off points) before each use. Use fall protection equipment if required for the job. Be sure the fall protection equipment is right for the task, fits properly, and is in good condition. Refer to U.S. Occupational Safety & Health Administration (OSHA) Regulations Standards - 29 CFR 1926.500, 1926.501 and 1926.502, or applicable national, state or local regulations for more information.

- When using scaffolds, make sure there is proper access, full planking, stable footing, and guard railing.
- When using a boom lift, keep feet firmly on the platform of a boom lift, use fall protection equipment tied-off at all times to the guardrail or tie-off point.
- When using a ladder, make sure the ladder is non-conductive and the correct size for the task. Read the ladder user instructions and be sure the ladder is in good condition. Make sure ladder is set on stable footing and at the correct angle.

Minimum Working Clearance

To reduce the risk of injury, all persons require adequate working clearance around the electrical panel or other electrical equipment. The table below identifies the minimum working clearance needed. Refer to U.S. Occupational Safety & Health Administration (OSHA) Regulations (Standards - 29 CFR) Safeguards for personnel protection. -1910.303(g)(1)(i), or any other applicable national, state or local regulations, for additional information.

MINIMUM WORKING CLEARANCE 0-600 VOLTS				
WIDTH OF WORKING CLEARANCE AREA	HEIGHT OF WORKING CLEARANCE AREA	★MINIMUM WORKING CLEARANCE IN FRONT OF ELECTRICAL PANEL/EQUIPMENT		
		EXPOSED LIVE PARTS ON ONE SIDE OF WORK SPACE AND NO LIVE GROUNDED PARTS ON THE OTHER SIDE.	EXPOSED LIVE PARTS ON ONE SIDE OF WORK SPACE AND LIVE GROUNDED PARTS ON THE OTHER SIDE.	EXPOSED LIVE PARTS ON ONE SIDE OF WORK SPACE AND EXPOSED LIVE PARTS ON THE OTHER SIDE.
30in.(760mm) MINIMUM OR WIDTH OF ENCLOSURE, WHICH EVER IS GREATER	78in.(1980mm) MINIMUM OR HEIGHT OF ENCLOSURE, WHICH EVER IS GREATER	36in.(915mm) MINIMUM	42in.(1065mm) MINIMUM	48in.(1220mm) MINIMUM

★Concrete, brick or tile walls shall be considered as grounded.

Qualified Person

A Qualified Person is one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his/her ability to solve or resolve problems related to the subject matter, the work, or the project.

Only qualified persons may work on electric circuit parts or equipment that have not been de-energized.

Refer to U.S. Occupational Safety & Health Administration (OSHA) Regulations Standards - 29 CFR 1926.32(m) and 1910.333, or applicable national, state or local regulations for additional information.

Safety

Overhead Power Lines

Assembling, towing or transporting irrigation machine components such as but not limited to the pivot point, linear cart, span/drive unit assemblies, overhangs and/or corner assemblies underneath or near power lines is extremely dangerous because of the risk of electrocution.

Operating equipment that elevates irrigation machine components, such as but not limited to an aerial lift or crane, near power lines is extremely dangerous because of the risk of electrocution. Only qualified personnel should operate this type of equipment. Before operating the equipment, qualified personnel must read the equipment manufacturers' operating and safety instructions.

Refer to U.S. Occupational Safety & Health Administration (OSHA) Regulations (Standards - 29 CFR) Cranes and derricks. - 1926.550, or any other applicable national, state or local regulations for additional information.

- Always presume that any overhead power line is an energized line unless and until the person(s) owning the line and/or the electrical utility authorities indicate that it is not an energized line and it has been visibly grounded.
- Before operating any equipment near any power line make sure the line has been de-energized and visibly grounded at the point of work.
- Electrocution can occur without touching an electrical power line. Electricity, depending on the magnitude, can jump or become induced into equipment or conductive materials that come in close proximity to, but do not touch a power line. High wind, lightning, wet ground and other environmental conditions will increase the possibility of electrocution and require additional consideration.
- Transmitter towers can induce the equipment or materials being handled with an electrical charge. Before working or operating equipment near transmitter towers, make sure the transmitter is de-energized.
- Select the location where the span/drive unit will be assembled to ensure that neither the irrigation machine, or the equipment used during the assembly process, will violate the minimum clearance guidelines.
- Never operate equipment or allow the load, ropes or tag lines within 10 ft (3.05 m) of any power line rated 50 kV or lower whether it is energized or not. For lines rated over 50 kV, the minimum clearance shall be 10 ft (3.05 m) plus 0.4 inch (1.1 cm) for each kV over 50 kVs.
- Never assemble, tow, transport or allow irrigation machine components underneath or within 10 ft (3.05 m) of any power line rated 50 kV or lower whether it is energized or not. For lines rated over 50 kV, the minimum clearance shall be 10 ft (3.05 m) plus 0.4 inch (1.1 cm) for each kV over 50 kVs. Overhang support angles, cables and spinner drive components regularly extend 10 ft to 12 ft (3.1 m to 3.7 m) above the irrigation pipeline (span).
- Use barricades to identify areas where interference with overhead power lines could occur. Keep the assembly, towing or transporting of irrigation machine components and the operation of equipment including load, ropes or tag lines away from any power line, in the distances described above, whether the line is energized or not.
- Always designate a person to observe clearance between the power line and all equipment being operated or moved in order to give timely warning for all operations to STOP if the minimum clearance is violated.

Minimal Lockout / Tagout Procedure

The following procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It is used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before personnel perform any servicing or maintenance where the unexpectedly energized or start-up of the machine or equipment or release of stored energy could cause injury. All personnel, upon observing a machine or piece of equipment which is locked out to perform servicing or maintenance shall not attempt to start, energize, or use that machine or equipment.

When the energy isolating devices are not lockable, tagout should be used and affected personnel must wear full personal protection.

Refer to U.S. Occupational Safety & Health Administration (OSHA) Regulations (Standards - 29 CFR) Typical minimal lockout procedures - 1910.147 App A, or applicable national, state or local regulations, for additional information.

Sequence Of Lockout

1. Notify all affected personnel that servicing or maintenance is required on a machine or equipment and that the machine or equipment must be shut down and locked out to perform the servicing or maintenance.
2. The authorized personnel shall identify the type and magnitude of the energy that the machine or equipment utilizes, shall understand the hazards of the energy, and shall know the methods to control the energy.
3. If the machine or equipment is operating, shut it down by the normal stopping procedure (depress the stop button, open switch, close valve, etc.).
4. De-activate the energy isolating device(s) so that the machine or equipment is isolated from the energy source(s).
5. Lock out the energy isolating device(s) with assigned individual lock(s).
6. Stored or residual energy (such as that in capacitors, springs, elevated machine members, rotating fly-wheels, hydraulic systems, and air, gas, steam, or water pressure, etc.) must be dissipated or restrained by methods such as grounding, repositioning, blocking, bleeding down, etc.
7. Ensure that the equipment is disconnected from the energy source(s) by first checking that no personnel are exposed, then verify the isolation of the equipment by operating the push button or other normal operating control(s) or by testing to make certain the equipment will not operate. CAUTION: Return operating control(s) to neutral or "off" position after verifying the isolation of the equipment.
8. The machine or equipment is now locked out.

DANGER

•WHEN PERSONNEL WILL BE EXPOSED TO CIRCUIT ELEMENTS AND ELECTRICAL PARTS, A QUALIFIED PERSON MUST USE TEST EQUIPMENT TO VERIFY THAT THE CIRCUIT ELEMENTS AND EQUIPMENT PARTS OF THE EQUIPMENT ARE DE-ENERGIZED.

Restoring Equipment To Service

When the servicing or maintenance is completed and the machine or equipment is ready to return to normal operating condition, the following steps shall be taken:

1. Check the machine or equipment and the immediate area around the machine to ensure that non-essential items are removed and that the machine or equipment components are operationally intact.
2. Check the work area to ensure that all personnel are safely positioned or removed from the area.
3. Verify that the controls are in neutral.
4. Remove the lockout devices and re-energize the machine or equipment.
5. Notify affected personnel that the servicing or maintenance is completed and the machine or equipment is ready to be used.

Safety

Operate Safely

Following is a list of safety operating tips which you and all other persons servicing or operating the machine must read and understand:

CAUTION

- DO NOT operate this machine without first reading the Owner's Manuals for the machine.
- Read all safety messages in this manual and safety signs on the machine.
- DO NOT let anyone operate this machine without proper instructions.
- Unauthorized modifications may impair the function and/or safety of the machine.
- If you do not understand any part of this manual, contact your Valley dealer.

EMPLOYEE INSTRUCTION ON SAFETY

It is very important to instruct your employees on the safe use of this equipment at the time of their initial assignment to operate it. DO NOT let anyone operate this equipment without proper instructions.

Safety training should be presented annually and the service manager should ensure employees fully understand the safety messages and what to do in case of emergencies.

DANGER

DISCONNECT ALL POWER WHEN SERVICING

ALWAYS disconnect electrical power before servicing or performing maintenance to the machine.

Before performing service or maintenance on any part of the machine, follow the MINIMAL LOCKOUT/TAGOUT PROCEDURE located in the SAFETY section of this manual and do the following:

1. SHUT OFF and LOCK the public power service disconnect to the irrigation machine. See figure 11-1.

FILL OUT the blue (OSHA safety color code) tag and attach to the disconnect after locking. See figure 11-1.

The tag should reveal the name of a person to contact before restoring power to the machine. See Figure 11-2.

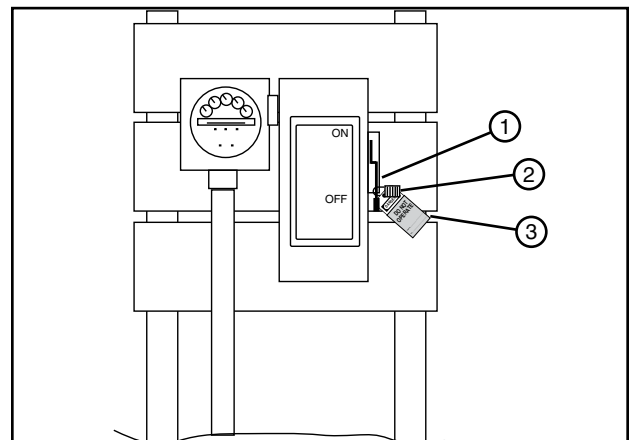


Figure 11-1 1. Public Power Service Disconnect
2. Lock
3. Blue OSHA Tag



Figure 11-2

Valley Auxiliary Link Control Panel

Safety

Operate Safely

CAUTION

QUALIFIED SERVICE PERSONNEL

If you do not understand electricity or other parts of the machine, have qualified service personnel perform any hazardous repairs or maintenance.

CAUTION

GUARD ALL POWER TAKE-OFF DRIVES

This includes all belt and power line drives.

Replace any guards and shields removed for maintenance.

WARNING

SUSPECTED SHORT CIRCUITS

DO NOT touch the machine if you suspect a short-circuit situation. Call a qualified electrician or an authorized Valley dealer immediately.

Circumstances which may cause you to suspect hazardous voltage situations may include:

- Physical damage to the machine or span cable.
- Recent electrical storms (lightning).
- Unusual operating characteristics of the machine.

If you suspect a short circuit due to feeling a rippling tingle when touching the machine, **DO NOT** touch the machine again. Call a qualified electrician or an authorized Valley dealer immediately.

WARNING

LIGHTNING AND THE MACHINE

Stay away from the machine during an electrical storm. An irrigation machine makes a good path to earth. It is also probably the tallest object in the field, which makes it a good lightning receptor!

CAUTION

DO NOT OVERSIZE FUSES

Fuses are sized for the protection of a specific machine.

Be certain you have the proper fuse sizes in place before initial startup and when replacing fuses.

CAUTION

PLUG - IN CONNECTORS

Disconnect power before connecting or disconnecting any plug-in connectors.

DANGER

DRIVE SHAFTS START WITHOUT WARNING

An electric motor on each tower of the center pivot powers two drive shafts connected to wheel gear drives. These drive shafts start and stop without warning.

- DO NOT touch rotating drive shaft or shield, clothing or limbs may become entangled, resulting in severe injury.
- DO NOT service the machine until the main disconnect is locked in the OFF position.
- ALWAYS replace drive shaft shields after servicing.
- DRIVE SHAFT SHIELDS MUST ALWAYS BE IN PLACE WHEN OPERATING THE MACHINE. Operate Safely (Continued)

CAUTION

CHECK WHEEL TRACKS BEFORE STARTING

Make sure all objects, livestock, or persons are clear of the machine before starting. Drive trains are powerful and can climb over vehicles, equipment, etc.

CAUTION

KEEP CHILDREN AWAY

Irrigation machines are NOT playground equipment.

Prevent children from playing or climbing around on the machine. This can be extremely dangerous, especially if the machine is operating.

Valley Auxiliary Link Control Panel

Safety

Safety Decal

You MUST familiarize yourself and other operator's with safety decals. For replacement of any decal, contact your local Valley dealer.

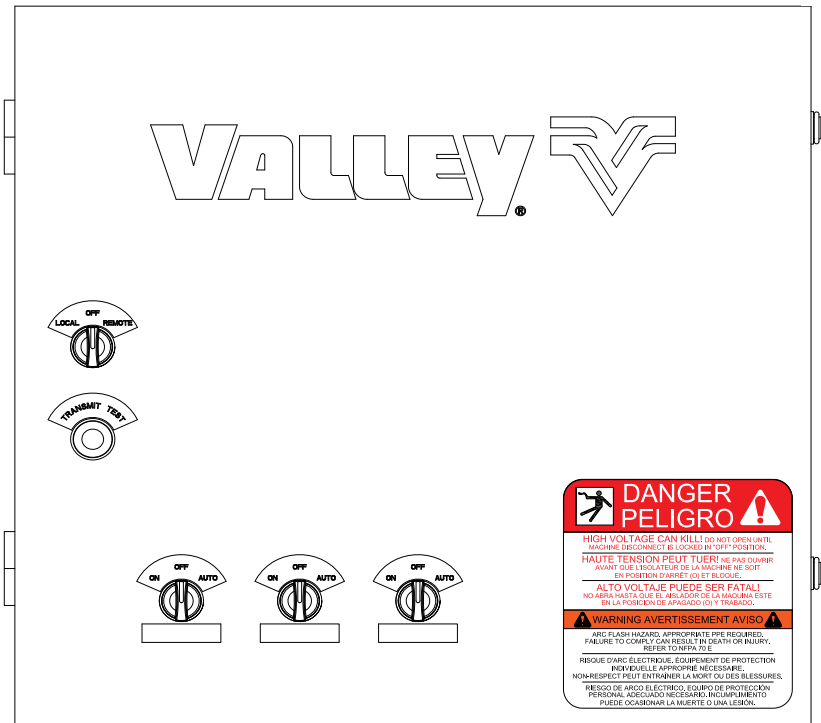


Figure 13-1



Valley Auxiliary Link Control Panel

Overview

Door Panel - User Controls

Power Switch: Local-Off-Remote Switch (SW1)

The Local-Off-Remote Switch provides user selection of Auxiliary Link operation. See Figure 14-1.

LOCAL - Power is switched ON and remote operation of the Auxiliary Link by the BaseStation is DISABLED.

OFF - Power is switched OFF.

REMOTE - Power is switched ON and remote operation of the Auxiliary Link by the BaseStation is ENABLED.

Transmit Test Switch (SW2)

The Transmit Test Switch provides user ability to test operation of modem or radio. Pressing the Transmit Test switch will cause the Auxiliary Link to transmit a status message to the BaseStation. See Figure 14-1.

Relay Output: On-Off-Auto Switches (SW3, SW4, SW5)

The On-Off-Auto Switches provide user selection of output relay operation. The switches are sequentially associated with the Digital Outputs, 0, 1, and 2 from left to right as viewed from the outside of the enclosure. See Figure 14-1 on this page and 16-1 on the next page.

ON – The switch disconnects the wire from the PLC digital output and connects it to 120 VAC, energizing the corresponding relay coil, closing the Normally Open contacts.

OFF – The switch disconnects the wire from the PLC digital output, de-energizing the corresponding relay coil, opening the Normally Open contacts.

AUTO – The switch connects the wire from the PLC digital output to the corresponding relay, allowing BaseStation to control the PLC digital output to control the relay.

NOTE
Switch position is not monitored by the Auxiliary Link PLC.

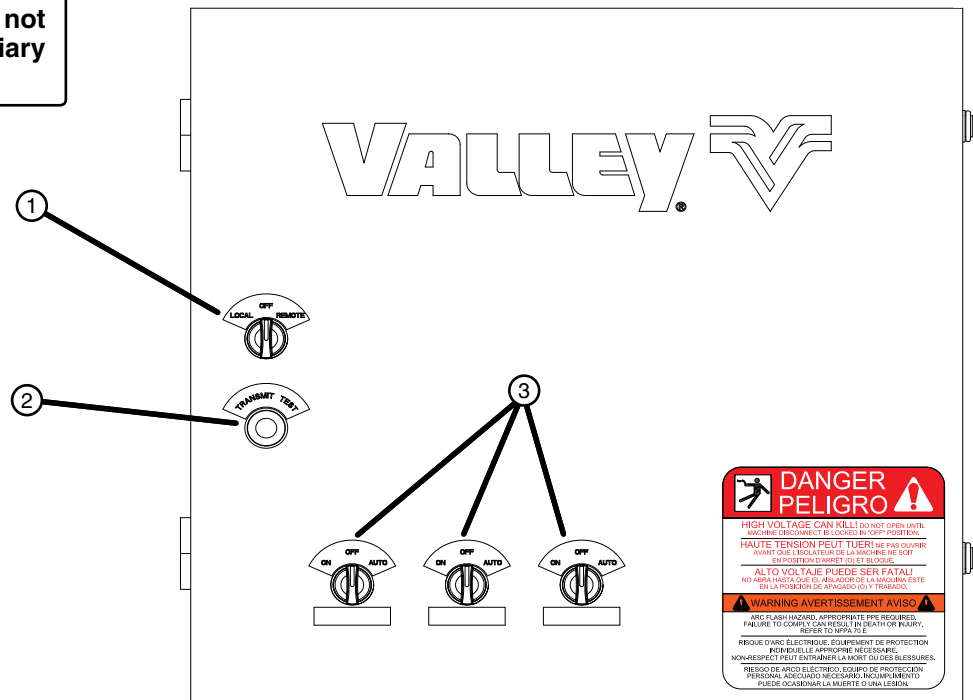


Figure 14-1

1. Local-Off-Remote Switch
2. Transmit Test Switch
3. Manual Control Switch ON, OFF AUTO

Valley Auxiliary Link Control Panel

Overview

Component ID

Schematic

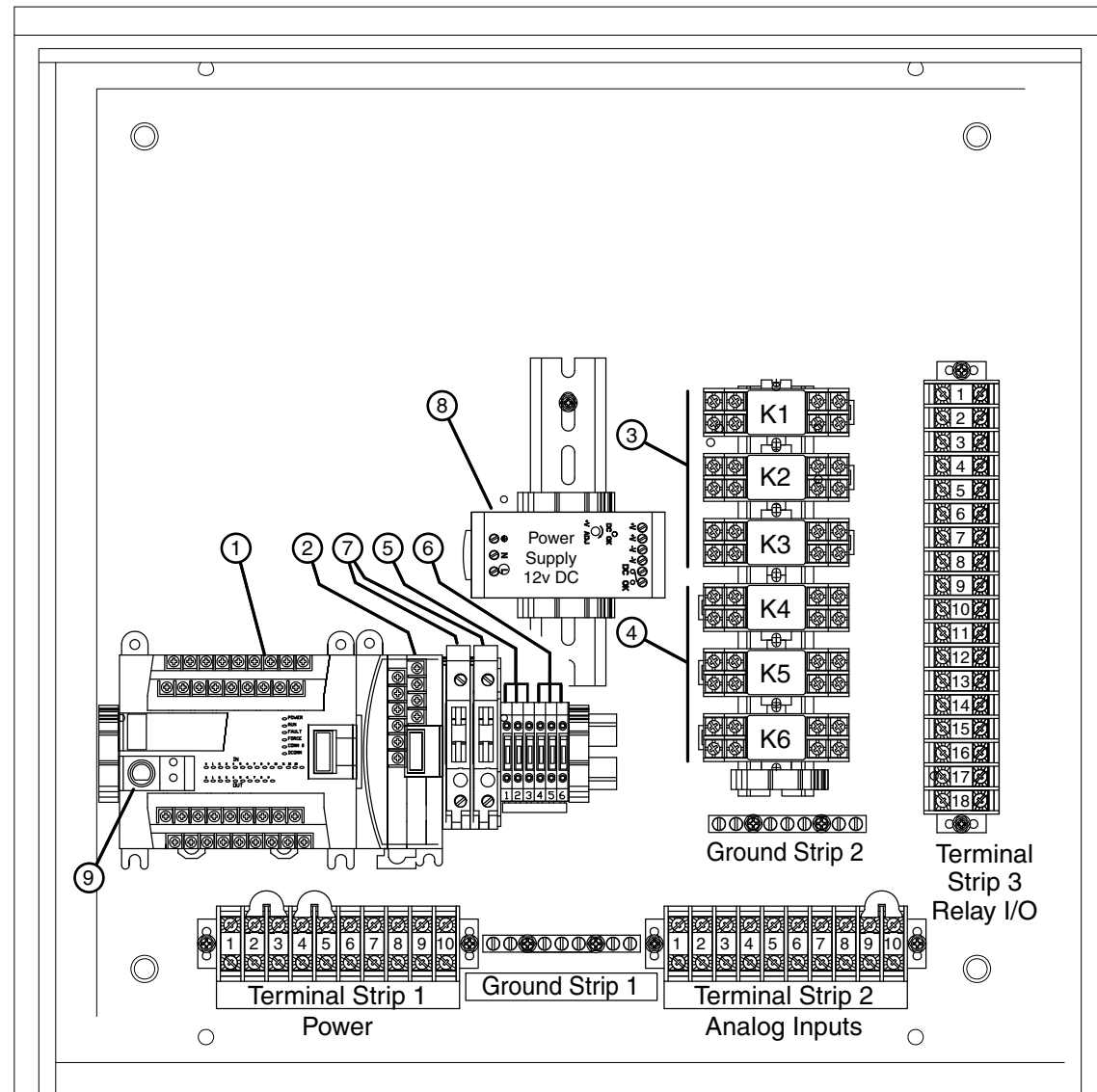


Figure 15-1 1. Programmable Logic Controller (PLC) 2. Analog Input Module 3. Input Relays 4. Output Relays 5. Input Terminal Block Disconnect Switches 6. Output Terminal Block Disconnect Switches 7. Fuse Block (3.0amp, 250Volt Fast Acting) 8. Power Supply, 15VDC 9. Serial Communications Cable

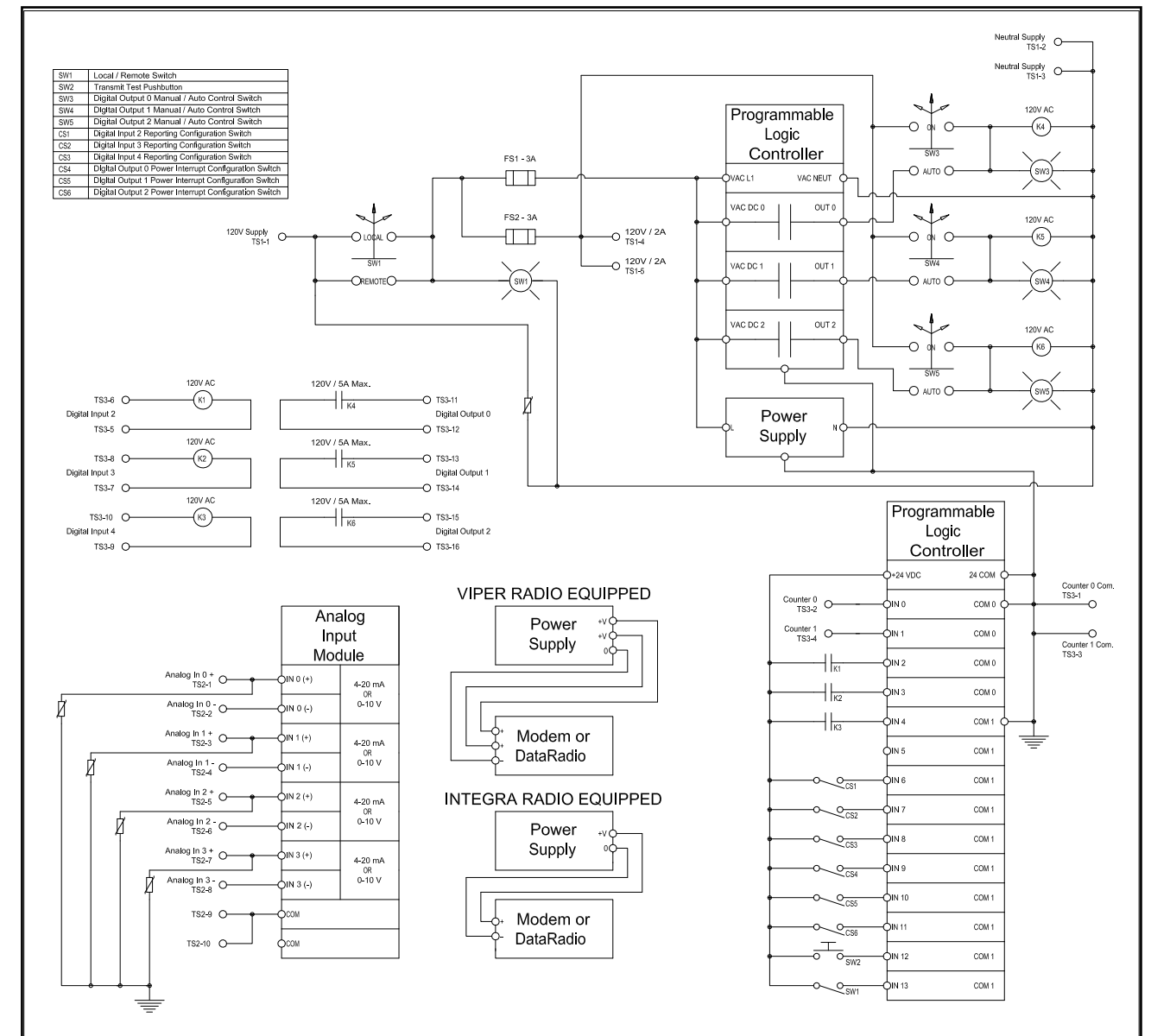


Figure 15-2

Modem

The factory-supplied modem is a user specified option. Each modem type has a unique Valmont part number identifying the modem option installed from the factory, the serial communications baud rate and the analog module configuration.

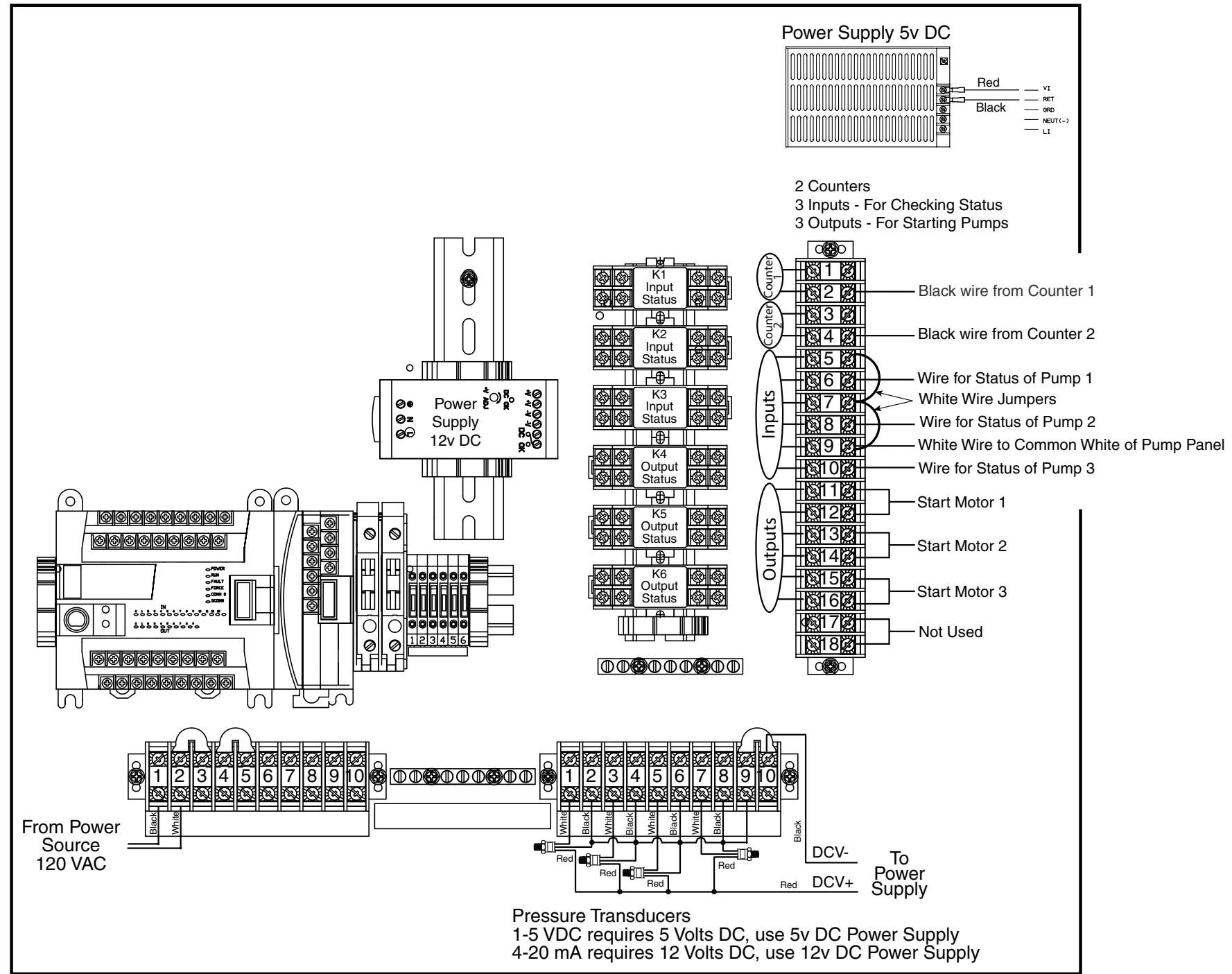
Terminal strips

Terminal strips are pre-wired as shown in the schematic decal on the inside of the panel door. Each terminal strip is labeled with a designator label and numbered according to the diagram on the decal. See Figure 15-1.

Valley Auxiliary Link Control Panel

Overview

Component Function



TERMINAL NUMBER	TERMINAL NAME	ELECTRICAL REQUIREMENTS	DESCRIPTION
T81-1	POWER SUPPLY	120V AC	
T81-2	NEUTRAL SUPPLY	120V NEUTRAL	
T81-3	AUXILIARY POWER	3A FUSED	
T81-4			
T81-5			
T81-6			
T81-7			
T81-8			
T81-9			
T81-10			
T82-1	ANALOG INPUT 0	+ 4-20mA CURRENT LOOP - OR 0-10V DC	
T82-2			
T82-3	ANALOG INPUT 1	+ 4-20mA CURRENT LOOP - OR 0-10V DC	
T82-4			
T82-5	ANALOG INPUT 2	+ 4-20mA CURRENT LOOP - OR 0-10V DC	
T82-6			
T82-7	ANALOG INPUT 3	+ 4-20mA CURRENT LOOP - OR 0-10V DC	
T82-8			
T82-9			
T82-10	ANALOG COMMON		
T83-1	COUNTER 0	COMMON *14-24V DC	
T83-2			
T83-3	COUNTER 1	COMMON *14-24V DC	
T83-4			
T83-5	DIGITAL INPUT 2	RELAY COIL COMMON RELAY COIL VOLTAGE (120V AC)	
T83-6			
T83-7	DIGITAL INPUT 3	RELAY COIL COMMON RELAY COIL VOLTAGE (120V AC)	
T83-8			
T83-9	DIGITAL INPUT 4	RELAY COIL COMMON RELAY COIL VOLTAGE (120V AC)	
T83-10			
T83-11	DIGITAL OUTPUT 0	DRY CONTACT, 120V/5A MAX.	
T83-12			
T83-13	DIGITAL OUTPUT 1	DRY CONTACT, 120V/5A MAX.	
T83-14			
T83-15	DIGITAL OUTPUT 2	DRY CONTACT, 120V/5A MAX.	
T83-16			
T83-17			
T83-18			

Figure 16-1

Valley Auxiliary Link Control Panel

Overview

Programmable Logic Controller (PLC)

- 10 digital outputs, 120 VAC

Output Number	Function
0, 1, 2	bistable output (corresponding with panel switches)
3, 4, 5, 6, 7, 8, 9	not used

- 13 digital inputs, 24 VDC

NOTE 24 VDC is used for digital input monitoring circuits only

Input Number	Function
0, 1	high speed counter
	logic low < 2 VDC
	logic high > 14 VDC
2, 3, 4	bistable inputs
5	(not used)
6, 7, 8	call-out configuration for state change of inputs 2, 3, 4, monitoring DIN rail switched 4, 5 and 6.
9, 10,11	output restore configuration, monitoring DIN rail switches 1, 2 and 3
12	Transmit Test switch monitor
13	Local/Remote switch position monitor

- One RS232 serial communications port, used for communications (8-pin circular connector.) Valmont options include 300, 1200, and 9600 baud with 8 data bits, 1 stop bit, no parity, and CTS/RTS flow control. The baud rate is a fixed firmware value and requires a unique Valmont part number. (Note that the part number is also determined by the analog module configuration.)
- Optional memory module (0-pin dual row header), not used except for firmware upload for PLC configuration.

Analog Input Module

- Four analog inputs, individually configurable for 0 to 10 VDC or 4 to 20 mA inputs. Configuration switches inside the module case are accessible on the side of the module, selecting the input type. **Firmware in the PLC must match the Analog Input module switch settings for Input Type. Each combination has a unique Valmont part number identifying the PLC firmware installed from the factory and the serial communications rate that is fixed in firmware.**
- Input types are configurable in the Base Station, limited to grouping by sensor type with the first group (starting with input 0) being 4-20 mA inputs; followed by the second group (starting with the next available input) being voltage inputs. Each Auxiliary Link is individually configured.

Selection combinations	
4 - 20 mA	0 to 10 VDC
0, 1, 2, 3	(none)
0, 1, 2	3
0, 1	2, 3
0	1, 2, 3
(none)	0,1 ,2, 3

NOTE

Electrical range for analog inputs:
-21 to +21 mA
-10.5 to +10.5 VDC

Analog sensors require an external power supply, not installed at the factory.

Valley Auxiliary Link Control Panel

Overview

DIN Rail Disconnect Switches

Call-Out

The first three disconnect switches, closest to the 120 VAC fuse blocks, are used to enable the Auxiliary Link call-out function for the associated digital input. There is a switch for each of the three bistable digital inputs connected to the PLC (inputs 2, 3, and 4.) Each time that the corresponding digital input changes state, and the DIN rail switch is closed, the PLC will send a status message out the serial port. See Figure 18-1.

Din rail switch	Digital Input
1st (CS1)	2
2nd (CS2)	3
3rd (CS3)	4

CLOSED – Call-out is enabled

OPEN – Call-out is disabled

- The Auxiliary Link is not able to dial out on a phone modem, so a call-out is not available with telephone communications.
- The Auxiliary Link will not wait for the radio channel to become available if it is busy. The Auxiliary Link will only try once to send out the message. If the Clear To Send line (CTS) is busy, the message is lost.
- The Auxiliary Link does not listen for an acknowledgement from the Base Station that the message was received; and it will not re-send the message if an acknowledge is not received.

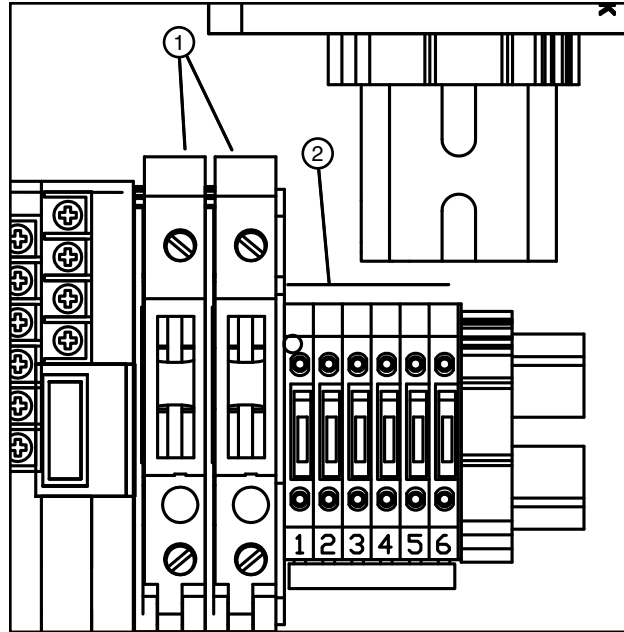


Figure 18-1

1. Fuse Block
2. I/O Disconnects

Digital Output Restore

The fourth, fifth, and sixth switches, farthest to the right of the 120 VAC fuse blocks, are used to select the way that the digital outputs are set after the PLC computer is reset. The PLC computer resets when the 120 VAC supply power reaches its safe operating level and the PLC program is running. This can occur after a complete loss of power is restored; or, after the supply voltage comes back up after a brown-out period. See Figure 18-1.

Din rail switch	Digital Output
4th (CS4)	0
5th (CS5)	1
6th (CS6)	2

Sequence of Events:

- Power OFF
- Power ON
- PLC resets and resumes operation according to Din Rail switch setting.

OPEN – Enables the Output to be restored to the prior state. The last known state of the corresponding digital output is restored after a PLC reset.

CLOSED – Does not enable the Output to be restored to the prior state. The PLC Output will be Off until it receives a BaseStation command to turn it On. The digital output is set to the OFF state after a PLC reset.

Valley Auxiliary Link Control Panel

Overview

Relays

The relays isolate the PLC from the device(s) that the Auxiliary Link is electrically connected to, providing protection for the PLC and allowing for connection to machines using other voltage sources and voltage levels. All six relays, factory installed have 120 VAC coils. See Figure 19-1.

Relay Number	Function
K1	Digital Input
K2	Digital Input
K3	Digital Input
K4	Digital Output
K5	Digital Output
K6	Digital Output

The Digital Input relay contacts are used to switch 24 VDC to the PLC inputs, monitoring a 120 VAC signal connected to the coil of the relay. See Figure 19-1.

The Digital Output relays act as a switch to a pair of terminal connections using the pair of Normally Open contacts of the relay. The relay logic can be inverted by moving the wire connected to the terminal strip from the Normally Open contact of the relay to the Normally Closed contact. See Figure 19-1.

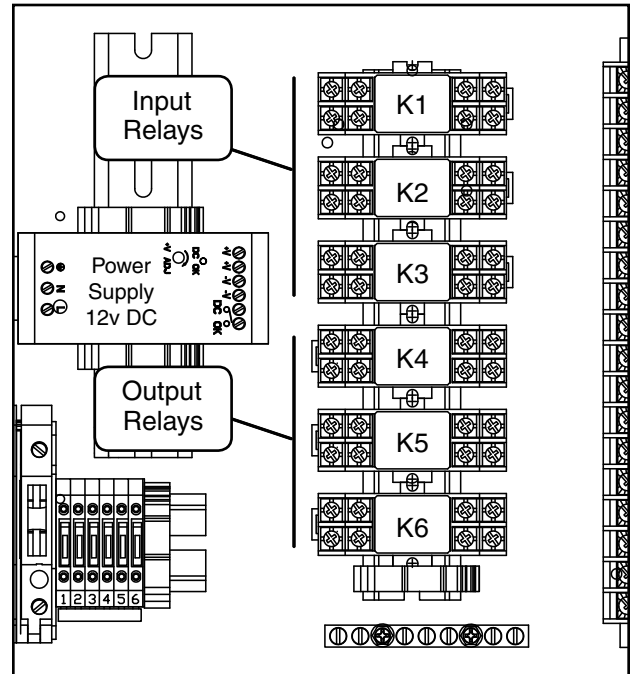


Figure 19-1

Isolation Relays Shown

Valley Auxiliary Link Control Panel

Overview

PLC Status

The status of the PLC is indicated through group of LEDs located on the front of the PLC. See Figure 20-1.

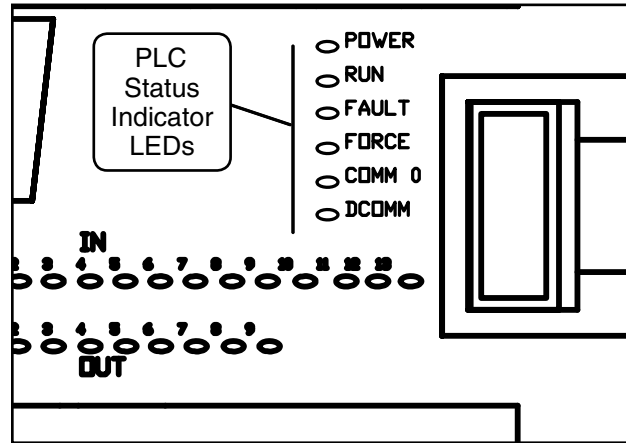


Figure 20-1 Front of PLC Shown

The table below lists the PLC LEDs and the indicated status. See Figure 20-2.

PLC LED	Status	Indication
POWER	On	Power on
	Off	Power off
RUN	On	Execution of the user program in Run mode
	Off	User program is not running
FAULT	On	Fault detected - PLC must be replaced
	Off	No fault detected
FORCE	On	Output is forced ON
	Off	No Forces installed
COMM 0	On (flashing)	PLC transmitting message via RS-232 port
	Off	Not transmitting via RS-232 port
DCOMM	On	Communications (ASCII) not configured, hold down the Communications Toggle Push Button until LED goes Off. See Figure 20-3.
	Off	Configured communications (ASCII)

Figure 20-2

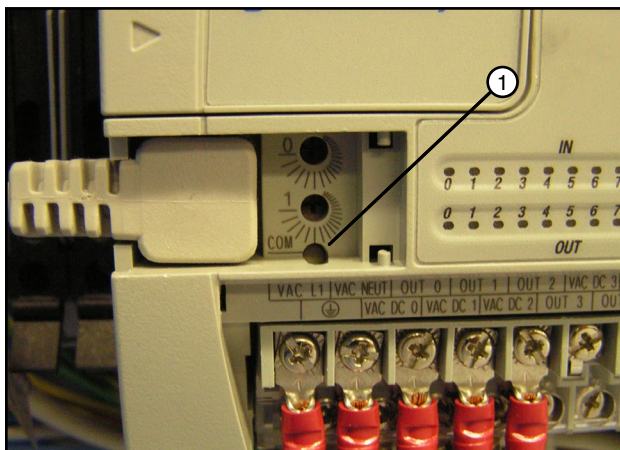


Figure 20-3 1. Communications Toggle Push Button

Valley Auxiliary Link Control Panel

Overview

Input Type Configuration

The Analog Input Module input type switches are configured at the factory. The switches are accessed through the ventilation slots on top of the module. See Figure 21-1.

There are five different analog Input module configurations C0V4, C1V3, C2V2, C3V1 and C4V0.

- "C" followed by a number indicates switches set to the Current or ON position. See Figure 21-1.
- "V" followed by a number indicates switches set to the Voltage or OFF position. See Figure 21-1.

The table below lists the Auxiliary Link part numbers and their associated input type configurations and switch positions. See Figure 21-2.

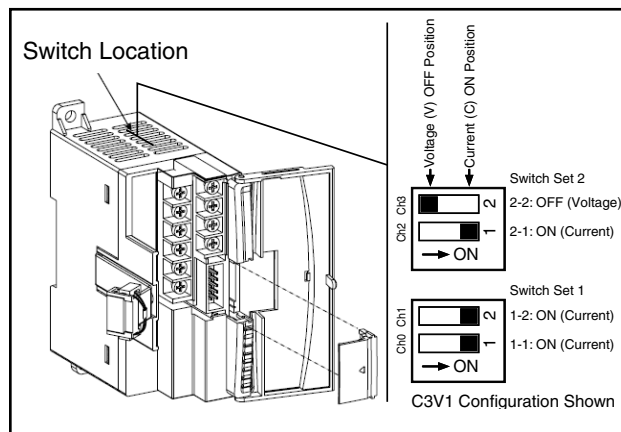


Figure 21-1

Input Type Configuration by Auxiliary Link Part Number

Aux Link Part Number	Communications	Switch Positions
9311089	300 Baud Modem	Auxiliary Link with C0V4 Configuration 1-1: OFF (Voltage) 1-2: OFF (Voltage) 2-1: OFF (Voltage) 2-2: OFF (Voltage)
9311093	1200 Baud Modem	
9311097	Phone Modem	
9311101	1200 Baud Modem/No Pwr Supply	
9311105 (Discontinued)	12.5 VHF Data Radio	
9311179	No Radio	
9311198	6.25/12.5 VHF Data Radio	
9311242 (Discontinued)	12.5 UHF Data Radio	
9311252	6.25/12.5 UHF Data Radio	
9311513 (Discontinued)	12.5 UHF Data Radio	
9311797	6.25/12.5 UHF Data Radio	Auxiliary Link with C1V3 Configuration 1-1: ON (Current) 1-2: OFF (Voltage) 2-1: OFF (Voltage) 2-2: OFF (Voltage)
9311803 (Discontinued)	12.5 UHF Data Radio	
9312791	Viper 136-174 MHz	
9312803	Viper 406.1-470 MHz	
9311090	300 Baud Modem	
9311094	1200 Baud Modem	
9311098	Phone Modem	
9311102	1200 Baud Modem/No Pwr Supply	
9311106 (Discontinued)	12.5 VHF Data Radio	
9311178	No Radio	
9311199	6.25/12.5 VHF Data Radio	Auxiliary Link with C2V2 Configuration 1-1: ON (Current) 1-2: ON (Current) 2-1: OFF (Voltage) 2-2: OFF (Voltage)
9311243 (Discontinued)	12.5 UHF Data Radio	
9311253	6.25/12.5 UHF Data Radio	
9311788 (Discontinued)	12.5 UHF Data Radio	
9311798	6.25/12.5 UHF Data Radio	
9311804 (Discontinued)	12.5 UHF Data Radio	
9312792	Viper 136-174 MHz	
9312804	Viper 406.1-470 MHz	
9311107 (Discontinued)	12.5 VHF Data Radio	
9311140	300 Baud Modem	
9311141	1200 Baud Modem	Auxiliary Link with C3V1 Configuration 1-1: ON (Current) 1-2: ON (Current) 2-1: ON (Current) 2-2: ON (Current)
9311142	Phone Modem	
9311143	1200 Baud Modem/No Pwr Supply	
9311177	No Radio	
9311200	6.25/12.5 VHF Data Radio	
9311244 (Discontinued)	12.5 UHF Data Radio	

Aux Link Part Number	Communications	Switch Positions
9311254	6.25/12.5 UHF Data Radio	Auxiliary Link with C2V2 Configuration (continued) 1-1: ON (Current) 1-2: ON (Current) 2-1: OFF (Voltage) 2-2: OFF (Voltage)
9311789 (Discontinued)	12.5 UHF Data Radio	
9311799	6.25/12.5 UHF Data Radio	
9311805 (Discontinued)	12.5 UHF Data Radio	
9312793	Viper 136-174 MHz	
9312805	Viper 406.1-470 MHz	
9311091	300 Baud Modem	Auxiliary Link with C3V1 Configuration 1-1: ON (Current) 1-2: ON (Current) 2-1: ON (Current) 2-2: OFF (Voltage)
9311095	1200 Baud Modem	
9311099	Phone Modem	
9311103	1200 Baud Modem/No Pwr Supply	
9311108 (Discontinued)	12.5 VHF Data Radio	
9311176	No Radio	
9311201	6.25/12.5 VHF Data Radio	
9311245 (Discontinued)	12.5 UHF Data Radio	
9311255	6.25/12.5 UHF Data Radio	
9311790 (Discontinued)	12.5 UHF Data Radio	
9311800	6.25/12.5 UHF Data Radio	Auxiliary Link with C4V0 Configuration 1-1: ON (Current) 1-2: ON (Current) 2-1: ON (Current) 2-2: ON (Current)
9311806 (Discontinued)	12.5 UHF Data Radio	
9312794	Viper 136-174 MHz	
9312806	Viper 406.1-470 MHz	
9311092	300 Baud Modem	
9311096	1200 Baud Modem	
9311100	Phone Modem	
9311104	1200 Baud Modem/No Pwr Supply	
9311109 (Discontinued)	12.5 VHF Data Radio	
9311175	No Radio	
9311202	6.25/12.5 VHF Data Radio	Auxiliary Link with C4V0 Configuration (continued) 1-1: ON (Current) 1-2: ON (Current) 2-1: ON (Current) 2-2: ON (Current)
9311246 (Discontinued)	12.5 UHF Data Radio	
9311256	6.25/12.5 UHF Data Radio	
9311791 (Discontinued)	12.5 UHF Data Radio	
9311801	6.25/12.5 UHF Data Radio	
9311807 (Discontinued)	12.5 UHF Data Radio	
9312795	Viper 136-174 MHz	
9312807	Viper 406.1-470 MHz	

Figure 21-2

Valley Auxiliary Link Control Panel

Troubleshooting

Use this Troubleshooting section to diagnose and troubleshoot problems with the Auxiliary Link control panel.

Always perform service or maintenance safely, use personal protection equipment when required, maintain a minimum working clearance around the control panel and other equipment, use fall protection when required, always use at least the minimal lockout/tagout procedure when maintaining or servicing the machine. For more information see the Safety section.



WARNING

TO REDUCE THE POSSIBILITY OF SEVERE INJURY OR DEATH:

- TROUBLESHOOTING OR REPAIRING ELECTRICAL PROBLEMS SHOULD ONLY BE PERFORMED BY A QUALIFIED VALLEY DEALER.
- ALWAYS CONTACT YOUR LOCAL VALLEY DEALER TO TROUBLESHOOT OR CORRECT ANY ELECTRICAL PROBLEMS ON OR ASSOCIATED WITH THE CONTROL PANEL OR MACHINE. NEVER ATTEMPT TO TROUBLESHOOT OR CORRECT ELECTRICAL PROBLEMS ON YOUR OWN.
- USE PERSONAL PROTECTION EQUIPMENT WHEN REQUIRED.
- MAINTAIN A MINIMUM WORKING DISTANCE AROUND THE CONTROL PANEL AND OTHER EQUIPMENT.
- USE FALL PROTECTION WHEN REQUIRED.
- BEFORE SERVICING OR PERFORMING MAINTENANCE ON THE MACHINE, ALWAYS SHUT OFF ALL ELECTRICAL POWER TO THE CONTROL PANEL AND MACHINE, THEN USE THE MINIMAL LOCKOUT/TAGOUT PROCEDURE ON THE SERVICE DISCONNECT AND CONTROL PANEL.

Disconnect All Power

Before performing service or maintenance on any part of the machine, follow the MINIMAL LOCKOUT/TAGOUT PROCEDURE located in the SAFETY section of this manual and do the following:

1. SHUT OFF and LOCK the public power service disconnect to the irrigation machine. See figure 22-1.

FILL OUT the blue (OSHA safety color code) tag and attach to the disconnect after locking. See figure 22-1.

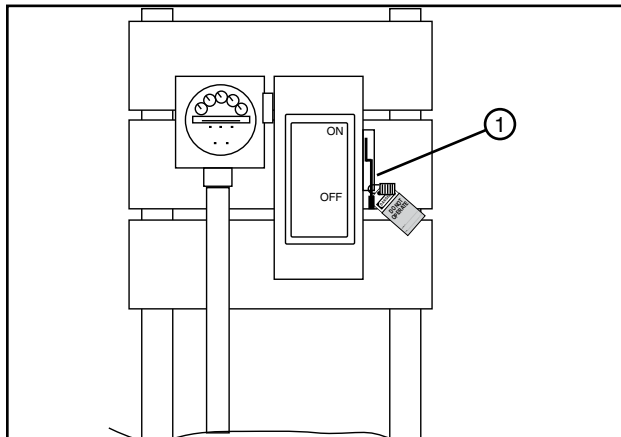


Figure 22-1

1. Public Power Service Disconnect
2. Lock
3. Blue OSHA Tag

Valley Auxiliary Link Control Panel

Troubleshooting

Probable Cause Table

Device	Status	Probable Cause	Recommended Action
Power Supply	Power LED Off	No Line Power	Verify incoming power. Check fuse. Check power wiring to power supply.
	Power LED On	Output Shorted	Check output wiring. Replace power supply.
PLC	Power LED Off	No Line Power	Verify incoming power. Check fuse. Check power wiring to PLC.
		Internal Power Supply Overloaded	PLC 24V power supply shorted.
	Power LED On, Run LED Off	Processor Fault	Cycle power.
		Unrecoverable Processor Error	Replace PLC.
	Power LED On, Fault LED On	Processor Hardware Error	Cycle power.
		Loose Wiring	Check wiring connections on PLC.
		Unrecoverable Processor Error	Replace PLC.
	Power LED On, Fault LED Flashing	Hardware/Software Major Fault Detected	Cycle power. Update software - if available. Replace PLC.
Run, Force, and Fault LEDs Flashing	Missing or Corrupt Operating System	Replace PLC.	
I/O Module	Power LED Off, PLC Power LED On	No Module Power	Check module to PLC cable.
		Module Fault	Cycle power. Replace module.

Valley Auxiliary Link Control Panel

Troubleshooting

Auxiliary Link Supply Measurements

Using 03E2075 power supply, 15V, 3.4A
Dataradio set for maximum transmit power (255)
[x.xx A] is measurement without radio installed

AC source measurements:

- Power On Surge
= 0.55 A AC [0.49 A]
- 0 Digital Output Relays energized, 0 Digital Input Relays energized, radio in RX
= 0.19 A AC [0.16 A]
- 0 Digital Output Relays energized, 0 Digital Input Relays energized, radio in TX
= 0.41 A AC [na]
- Each Digital Output or Digital Input Relay energized adds
0.01 A AC
- 3 Digital Output Relays energized, 3 Digital Input Relays energized, radio in RX
= 0.25 A AC [0.22 A]
- 3 Digital Output Relays energized, 3 Digital Input Relays energized, radio in TX
= 0.46 A AC [na]

Auxiliary Link ID Reset Procedure

The Auxiliary Link ID Reset Procedure is used to reset the Auxiliary Link Local and Base IDs back to the factory defaults (Local ID = *** and the Base ID = 999.) The reset procedure also turns Off all outputs.

To reset the Auxiliary Link Local and Base IDs back to the factory defaults do the following:

1. Prepare to sequence the Local-Off-Remote switch from the local to the remote position, for 2-3 seconds in each position without pausing at the off position. The whole sequence cannot take more than 10 seconds.
2. Put the Local-Off-Remote switch in the Local position.
3. Rotate the switch to the REMOTE position for 2-3 seconds.
4. Rotate the switch to the LOCAL position for 2-3 seconds.
5. Rotate the switch to the REMOTE position.

The IDs should have been reset to the factory defaults and all outputs should be off.

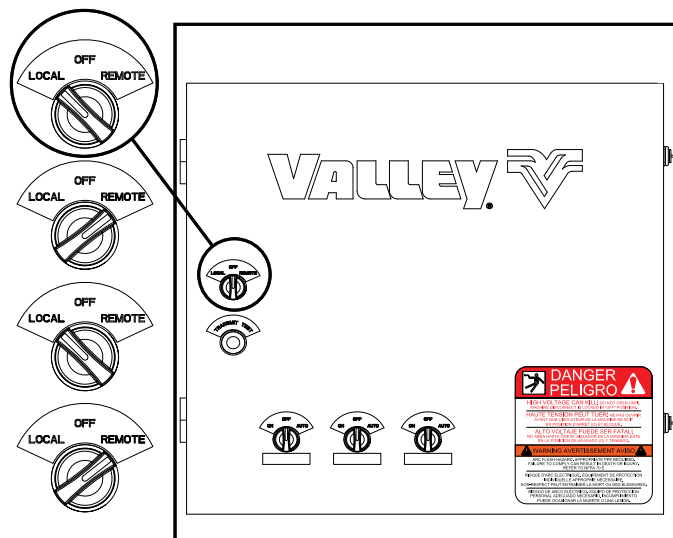
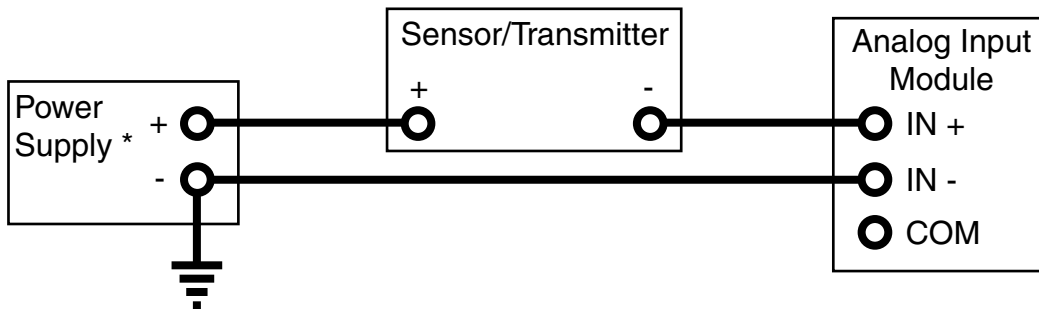


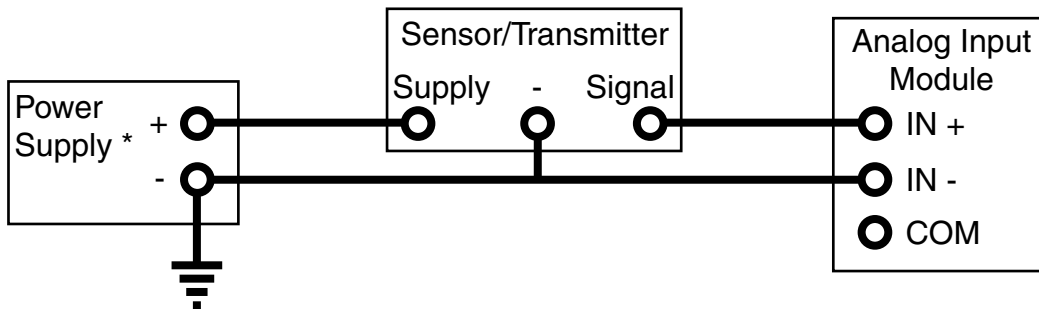
Figure 24-1

Sensor or Transmitter Wiring

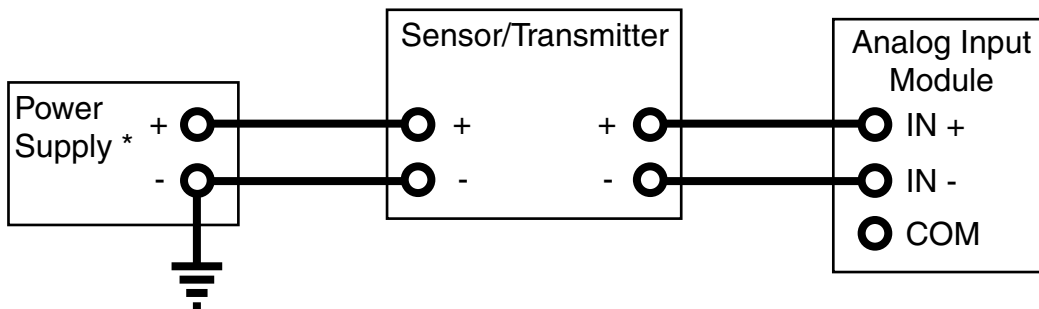
2-Wire Sensor/Transmitter Wiring



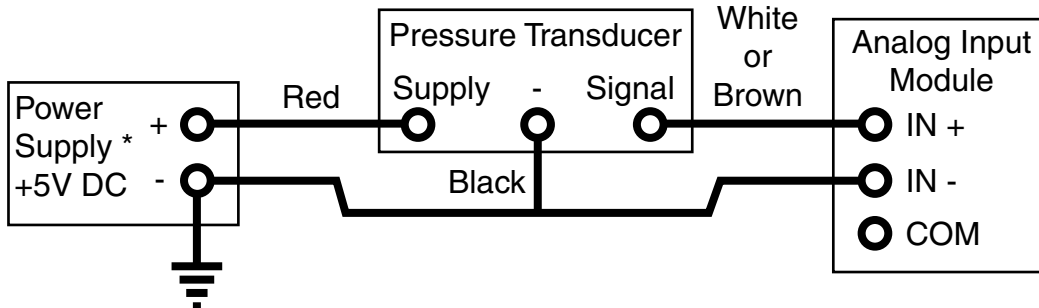
3-Wire Sensor/Transmitter Wiring



4-Wire Sensor/Transmitter Wiring



Valley Pressure Transducer Wiring



* All power supplies rated N.E.C. Class 2