

Installation and Operation Instructions

Compass Plus Wash Control Center

7750-9015-006
10-2003

Contents

1	General Information	3
1.1	Introduction	3
1.2	Safety Information	5
2	Safety	6
2.1	Terminology	6
2.2	General Information	8
2.3	Installation	9
2.4	Operation	10
2.5	Maintenance and Troubleshooting	11
2.6	Product Specification Information	12
3	Installation Parameters	13
3.1	Specifications	13
3.2	Requirements	13
3.3	Electrical Requirements	14
4	Pre-Installation	15
4.1	Checklist of Installation Components	15
4.2	Additional Required WestfaliaSurge Components	15
4.3	Additional Materials Required for Installation (Obtained Locally)	15
4.4	Optional WestfaliaSurge Equipment	15
5	Installation Instructions	16
5.1	Compass Plus Electrical Connections	17
5.2	Connecting the Outputs	17
5.3	Connecting Power Inputs	27
5.4	Installing Compass Plus PCB as Replacement for Navigator PCB	30
5.5	Installation Instructions for Optional Wash Water Temperature Sensor	32
5.6	Installation Instructions for Compass Plus with Parlor Control	35
6	Compass Plus Programming	39
6.1	General Instructions on How to Program the Compass Plus	39
6.2	General Programming Information	40
6.3	Quick Load “Default” Program	56
7	Owner’s Manual and Operation Instructions	57
7.1	Automatic Operation	57
7.2	Manual Operation	57
7.3	Operation Instructions — Compass Plus with Parlor Control	58

8	Maintenance	61
9	Troubleshooting	62
9.1	Troubleshooting Chart	62
9.2	Self Diagnostic Routine	65
10	Spare Parts	67
11	Appendix	68
11.1	Variable Definitions	68
11.1.1	AI / AVC Variables	68
11.1.2	Additional Required Variables	72
11.1.3	Optional Variables	73

1 General Information

1.1 Introduction

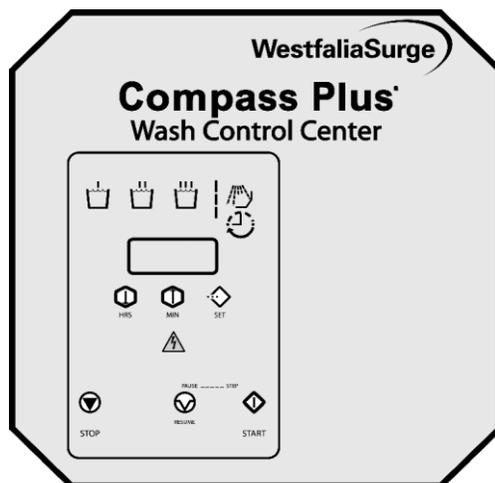
A Message For the Purchaser

Thank you for purchasing the Compass Plus. The Compass Plus programmable wash controller module can easily be installed to control existing or new pipeline washing systems.

The Compass Plus consists of an enclosure with a pre-mounted membrane switch and circuit board. The circuit board is electrically separated into two distinct circuits, a digital timer circuit and a separate switch circuit. The digital timer circuit consists of a programmable computer chip that allows almost unlimited sequencing of a pipeline wash cycle. The timer sends its signal to a series of solid state switches. The power input to the digital timer and the input to the switch circuit can be separated to allow the use of low voltage solenoids, relays or other equipment. Separated power inputs allow for a constant clock display and maintain a full charge on the back-up battery. Throughout these instructions, the control module will be referred to as the Compass Plus.

Important Information

- Some covers and guards have been removed for illustrative/photographic purposes only in this documentation.
- For information about ordering replacement parts, refer to *Parts Breakout* in this documentation.
- You are urged to study this documentation and follow the instructions carefully. Failure to read and understand the contents of this documentation could result in personal injury or malfunctioning equipment. If you do not understand the instructions in this documentation contact either your local WestfaliaSurge™ dealer or the Technical Services Department at WestfaliaSurge, Inc.
- The information in this documentation supercedes all previously published information.
- All dimensions in [] are in millimeters unless otherwise specified.



Abbreviation List

The following is a list of abbreviations which may be used in this document and the words which they represent.

AC	Alternating Current
DC	Direct Current
AWG	American Wire Gauge
ppm	Parts per Million
LED	Light Emitting Diode
PVC	Polyvinyl Chloride
in.	Inch/Inches
ft.	Foot/Feet
Hz	Hertz
°F	Degrees Fahrenheit
°C	Degrees Centigrade
SS	Stainless Steel
ID	Inside Diameter
OD	Outside Diameter

1.2 Safety Information

THIS INTERNATIONALLY APPROVED AND RECOGNIZED WARNING ICON INDICATES IMPORTANT MESSAGES CONCERNING YOUR PERSONAL SAFETY. WHEN YOU SEE THIS SYMBOL, BE ALERT TO THE POSSIBILITY OF PERSONAL INJURY AND CAREFULLY READ THE MESSAGES THAT FOLLOW.



THERE ARE INHERENT HAZARDS ASSOCIATED WITH THE OPERATION AND SERVICE OF DAIRY FARM EQUIPMENT. FOR YOUR PERSONAL SAFETY... READ: SECTION 2 — SAFETY AND OBSERVE THE FOLLOWING SAFETY PRACTICES.

- The product must be installed and serviced only by a trained, qualified service technician.
- All persons who will operate, service, inspect or otherwise handle this product must read and understand the safe operating practices, safety precautions and warning messages in this documentation.
- Disconnect and lock out the main electrical service before installing, adjusting or servicing the product.
- Electrical installation should be done by a qualified electrician and must meet all applicable national, state and local electrical codes.
- Ensure that all electrical components are grounded to a central ground.
- Do not operate this product unless all covers, shields and guards are in place.
- Keep hands and fingers away from moving parts such as fans, air cylinders and detachers. These mechanisms may start operating without warning.
- Keep children away from operating products.
- Become familiar with all controls.
- Safety signs, panels and labels that are normally affixed to the product must be replaced immediately if illegible or missing.
- New or replacement equipment components that are installed during repair or maintenance must include all safety signs, panels and labels as specified by the manufacturer. These must be affixed to the new or replacement equipment as specified by the manufacturer.
- Contact your local WestfaliaSurge™ dealer to obtain replacement safety signs, panels and labels.

FAILURE TO OBSERVE THESE SAFETY PRACTICES CAN RESULT IN PERSONAL INJURY OR DEATH.

2 Safety

2.1 Terminology

This terminology is consistent with all supplied documentation and the nomenclature and warnings on the products themselves.

Installation Instructions

Installation Instructions include the installation and initial setup of the product by the qualified installer.

Operation Instructions

Operation Instructions include the preparation for use and controls used by the operator.

Maintenance

Maintenance includes testing, preventive maintenance (inspection and overhauls) and routine maintenance.

Troubleshooting

Troubleshooting includes corrective maintenance (troubleshooting and repair).

Warning Notices



The signal word DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. Notes in this category convey warnings of deadly potential hazards (electrical, mechanical, chemical and so forth) which will cause death or serious personal injury. Their purpose is to warn people of deadly situations. Use of this class of warning notice is limited to the most extreme situations, typically for hazards that, for functional reasons, cannot be guarded.



The signal word WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. Notes in this category convey warnings of serious potential hazards (electrical, mechanical, chemical and so forth) which could cause death or serious personal injury. Their purpose is to warn people of dangerous situations.



The signal word CAUTION indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. Notes in this category are used as a general reminder of good safety practices or to direct attention to unsafe practices. Their purpose is to emphasize customer safety awareness.

The word **IMPORTANT!** means that particular attention is directed to the interaction of technical processes and procedures that may not be obvious even to qualified personnel. Notes in this category are used to emphasize important items such as regulatory requirements, special requirements or facts regarding related equipment or devices, pitfalls to avoid and procedures which are particularly important. Their purpose is to avoid situations where equipment would be installed incorrectly or would function incorrectly.

All persons must comply with transport, assembly, operating and maintenance notes and technical data in the owner's manuals, the product documentation or on the product itself. This is necessary in order to avoid problems that might cause serious injury or damage to property.

Qualified Personnel

Qualified personnel are persons who have training and experience as well as a knowledge of pertinent standards, specifications, accident prevention regulations and operating conditions. They have been authorized by the party responsible for the safety of the system to carry out the required activities and are capable of recognizing and avoiding possible inherent dangers in doing so.

General Note

In the interest of clarity and because of the extensive amount of information, this documentation does not detail every bit of information and cannot discuss every possible operational or servicing-related situation. If you wish additional information, you can request it directly through your local WestfaliaSurge™ dealer.

2.2 General Information

Basic Information about Safety

Due to their electrical and mechanical properties, some products can cause extremely serious damage to health and property if they are not operated and serviced as intended. It is assumed that planning and installation of all mechanical and electrical facilities, and transport, installation, operation and servicing of the product will be performed and supervised by responsible, qualified personnel.

When electrical products are running, some of their components are conducting dangerous electricity and/or are subjected to mechanical stress. Persons working on or using the product must be appropriately qualified. They must be thoroughly acquainted with the contents of all documentation provided with the product.

Correct, safe use of this product requires proper transport, proper installation, operation as intended by the manufacturer, proper maintenance and careful servicing. All persons working on or around the product must comply with all notes and information on the product.

Applications, Design, Operating Mode

The products for which this documentation is supplied are component parts or major subassemblies of equipment designed for the restraint of dairy cattle during milking and the harvesting of raw milk. The equipment has been constructed in accordance with information specified in their rating plates, catalogs and other documents. The documentation provided contains only safety information which must be observed when the equipment is used as intended by the manufacturer. Persons working on or using the product must adhere to any pertinent applicable national or local regulations.

Some of these products may be used for purposes in other than dairy farm applications. If the safety precautions provided are not adequate for these applications, the operator or installer must provide additional safety precautions as necessary for safe operation.

Transport and Storage

Certain products must be picked up only at the main lifting fittings provided for this purpose. Use hoisting tackle appropriate in terms of product weight. Use suitable cable guides or spreading devices if the product in the delivery state has attachments installed which could interfere with the hoisting tackle. Eyebolts provided in electric motors are suitable for lifting only the motor and are not to be used for lifting the motor plus additional weight.

2.3 Installation

General Safety Notes

Operation and servicing of the product must be performed properly by qualified personnel who observe the warnings in all documentation provided with the product and the notes on the product. General standards for installation and safety are to be followed for work on power installations. Good practices for the proper use of lifting tackle and equipment must be followed. The use of personal protective equipment such as safety goggles and protective footwear must be considered.

Environment

Where products which require cooling by ambient air are involved, there must be unrestricted passage of the cooling air to and from the products. The re-intake of heated exhausted air is not permitted. Batteries or any dangerous materials must be recycled or disposed of according to local regulations. Dangerous materials are materials that are hazardous to health or the environment.

Electrical Connections

If electrical connections are included as part of the installation, they must be made in compliance with the documentation provided. Connection cables must be selected according to the type of use and the voltages and current levels specified. Connect the equipment in accordance with the circuit diagram supplied in the terminal box or in the documentation. Cables in the terminal box must be professionally connected and the following must be observed:

- The inside of the terminal box is clean and contains no cable remains.
- All terminal lugs are tight.
- Adherence to minimum clearances is observed (beware of protruding wire ends).
- Unused openings are sealed and the cover elements are screwed on tight.
- All sealing surfaces of the terminal box are in a proper state to maintain the required type of protection.

Liquid, Gas and Vapor Connections

If any pumps or compressors are included as part of this installation, they must be connected in compliance with data in the documentation provided. Exhaust air from vacuum pumps in which the compression chamber is lubricated with oil must be discharged outside of any confined space occupied by humans or livestock.

Initial Start-up Adjustments

Before initial start-up of a product the following minimum conditions must be observed:

- The product is assembled and operated in accordance with the data on the nameplate and in the documentation supplied (voltage, current, frequency, connection, model, type of protection, cooling method).
- When frequency converters are used, operating speeds may not exceed, nor be less than, those permitted according to nameplate data.
- The product is properly assembled, aligned and connected to piping or hoses as intended by the manufacturer.
- The elevation above sea level of the installation location is considered when adjusting any regulating valves.
- Any drive elements (belt tension and alignment or coupling alignment) are adjusted correctly.
- All fastening screws, bolts, fasteners and electrical connections are tightened as specified in the documentation.
- The grounding and equipotential bonding connections have been made properly.
- Any supplementary equipment is properly connected and operative.
- All measures have been taken to protect against contact with moving or energized parts. It is not possible for this listing to be exhaustive. Additional tests in accordance with other manuals, local regulations or system-specific conditions may be required.

2.4 Operation

Safety Notes

Covers

Guards and covers which prevent contact with electrically energized or moving parts or are required to direct the flow of air for effective cooling must not be removed or left open during operation.

Sound Pressure Levels

Sound pressure levels in excess of 84 decibels may cause damage to health. Where applicable suitable protective measures, such as wearing ear plugs, must be taken.

2.5 Maintenance and Troubleshooting

General Safety Precautions

Before any work is performed on the product, especially when covers over energized or moving parts are removed, the product or system is to be properly disconnected from the electrical power source. In addition to the main electrical circuits, particular attention must be paid to any supplementary or auxiliary electrical circuits. If the product contains pressurized gases or fluids, the product or system must be properly disconnected from the pressure source. If the product contains moving parts, wait until these parts have stopped moving.

- Disconnect the product from the electrical and/or pressure source.
- Secure it against reconnection.
- Confirm disconnection.
- Cover or provide barriers for adjacent electrically active components.

The above measures are not to be reversed until the product has been completely reassembled and the servicing concluded. The operational reliability of the product can only be maintained if original parts or authorized replacement parts are used during every corrective maintenance and consistent adherence to the documentation is maintained.

Dismantling

Sectional diagrams and representations in the documentation which is provided contain information regarding the technical design of normal products and assemblies to aid in dismantling the product or assembly. Special models and versions may deviate in technical details. If any uncertainty exists, we strongly recommend that you contact WestfaliaSurge, Inc. for additional information, stating the product type and serial number.

Assembly

Joints that are sealed due to stringent protection requirements must be resealed during assembly with a suitable non-hardening sealant. If gaskets and sealing elements are installed to ensure the required degree of protection, they must be examined and replaced if they are no longer effective.

2.6 Product Specification Information

Installation and Operation



ELECTRICAL SHOCK HAZARDS Ensure that all power sources to the product are disconnected before proceeding with any wiring or electrical connections.



ELECTRICAL SHOCK HAZARDS During this test procedure portions of the Compass Plus board have high voltage on exposed connectors. Extreme caution must be exercised to avoid electrical shock.



HAZARDOUS CHEMICALS This product is used with potentially hazardous chemicals that can cause severe injury or death. Always read and follow instructions provided by the chemical manufacturer for proper handling procedures. Keep children away from chemicals at all times. Follow the chemicals at all times. Follow the chemical manufacturer's instructions for proper first-aid procedures.



DO NOT wire the switch circuits to a constant power source. Power to the switch circuits must be switched off when in the MILK mode. Inadvertently starting the wash cycle while in the MILK mode may cause a mixing of milk and wash chemicals.

3 Installation Parameters

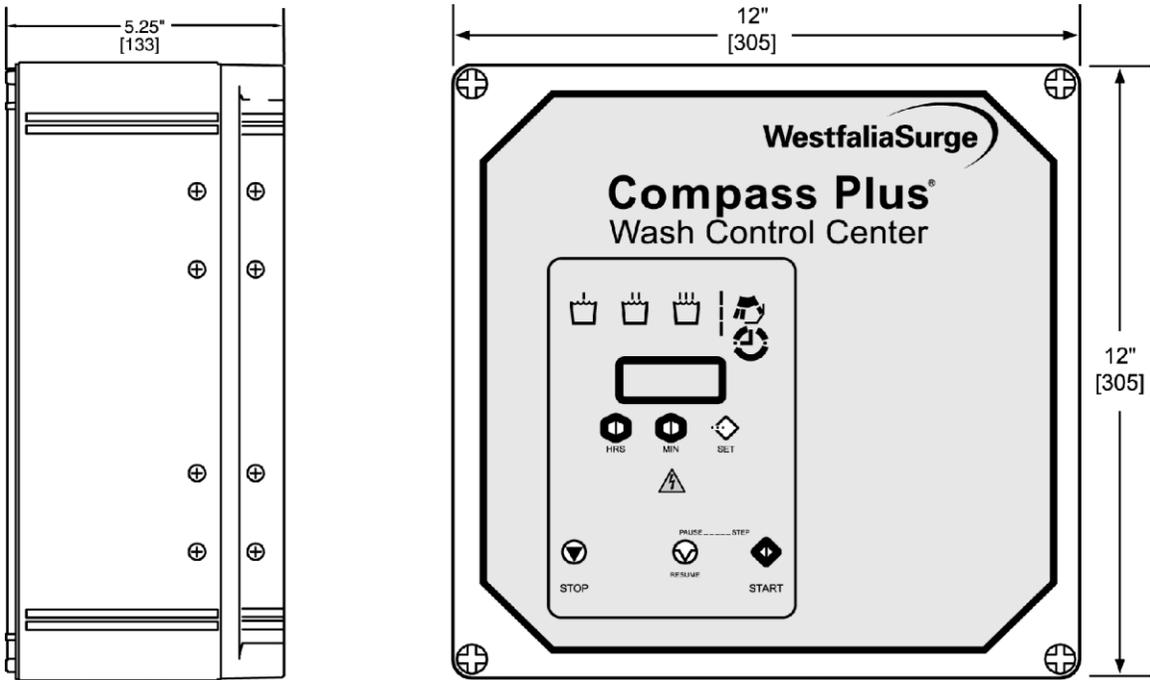
3.1 Specifications

Dimensions



Note!

All dimensions in [] are in millimeters unless otherwise specified.



3.2 Requirements

Environment

- Check the entire system to be controlled for proper installation. Do not mount the unit directly over the wash vat. The unit must be mounted in a clean, dry location. Do not mount on an outside, uninsulated wall in a cold environment; condensation and/or freezing temperatures can be a problem.

3.3 Electrical Requirements

Power

- Input Voltage: 90-230 volts AC at 50 or 60 Hz.
- The power to the switch inputs can be the same as the digital timer circuit input or a separate input between 12-250 volts AC at 50 or 60 Hz. See **Figures 1, 6 and 7** for a diagram of the TB-2 power input locations.
- The voltage input to the switch portion of the circuit board can be separate from the digital timer portion. All switched output components must require the same voltage as the input voltage or must be switched by an isolation relay.
- If the combined current requirement through the switch circuits exceeds 3 amps, a relay(s) needs to be installed to isolate the high current from the switch circuits.
- If an AVC is to be controlled by the Compass Plus, the milk pump electrode circuit should be changed to run the milk pump on the long electrode for wash and milk.

Shielding and Grounding

Like other computer equipment, the Compass Plus programmable circuitry can be susceptible to certain electronic noise from other equipment on the dairy. The Compass Plus circuitry has been designed to avoid most interference.

An additional line filter (Number 7750-0036-733) and/or shielded cable (Number 7750-0233-585) may be necessary to avoid erratic operation caused by external sources. Major causes of electronic noise are variable speed fans, variable speed pumps, fluorescent lights and electric fences.

4 Pre-Installation

4.1 Checklist of Installation Components

The Compass Plus is available in three configurations:

- 7750-0108-229 - Compass Plus Module only — Used to control the pipeline wash system functions including: hot and cold water valves, Air Injector AVC, Drain, Diverter, Vacuum Pump, Milk Pump, Chemical Dispensing and Monitor wash water temperature.
- 7750-0103-245 - Compass Plus with Parlor Control, 110 V — Used to control the pipeline washing functions and also contains a **MILK/OFF/WASH** switch to allow the milk and wash functions to be switched at the Compass Plus and two toggle switches and 110 V relays used to manually operate two milk pumps and two air blow valves.
- 7750-0108-230 - Compass Plus with Parlor Control, 220 V — Used to control the pipeline washing functions and also contains a **MILK/OFF/WASH** switch to allow the milk and wash functions to be switched at the Compass Plus and two toggle switches and 220 V relays used to manually operate two milk pumps and two air blow valves.

4.2 Additional Required WestfaliaSurge™ Components

- 7750-0233-585 - Shielded Cable
- Tri-Scan™ Analyzer

4.3 Additional Material Required for Installation (Obtained Locally)

- Metric Socket or Wrench Set
- Conduit and Connectors

4.4 Optional WestfaliaSurge Equipment

- Air Injectors
- Diverters
- Milk/Wash Control
- 7750-0109-683 - Kit Temperature Sensor
- 7750-0110-619 - P600 Dispenser with 3 - 20 oz (600 ml) Pumps
- 7750-0110-620 - P1200 Dispenser with 3 - 40 oz (1200 ml) Pumps
- 7750-0110-685 - Kit Water Valve 115 Volt AC
- 7750-0110-776 - Kit Water Valve 230 Volt AC
- 7750-0221-400 - Hose 3/8 in. OD x 1/4 in. ID Poly (100 feet)

5 Installation Instructions (Compass Plus)



ELECTRICAL SHOCK HAZARD Ensure that all power sources to the product are disconnected before proceeding with any wiring or electrical connections.



Note!

All dimensions are typical.

- Turn OFF power to the milking system.
- Mount the control in a clean, dry area where it is convenient to operate. Secure it with four screws through the holes in the enclosure.

5.1 Compass Plus Electrical Connections

The Compass Plus circuit board is electrically separated into two circuits, the digital timer circuit and the switch circuit. The power input to the digital timer circuit needs to be between 90-230 volts AC at 50-60 Hz. The power to the switch inputs can be the same as the digital timer circuit input or a separate input between 12-250 volts AC at 50-60 Hz. Refer to **Figure 1** and **Table 1** for a diagram of the Compass Plus input and output locations.



Note!

L1 and L2 are internally connected to the same point on the board. N1 and N2 are also internally connected on the board.

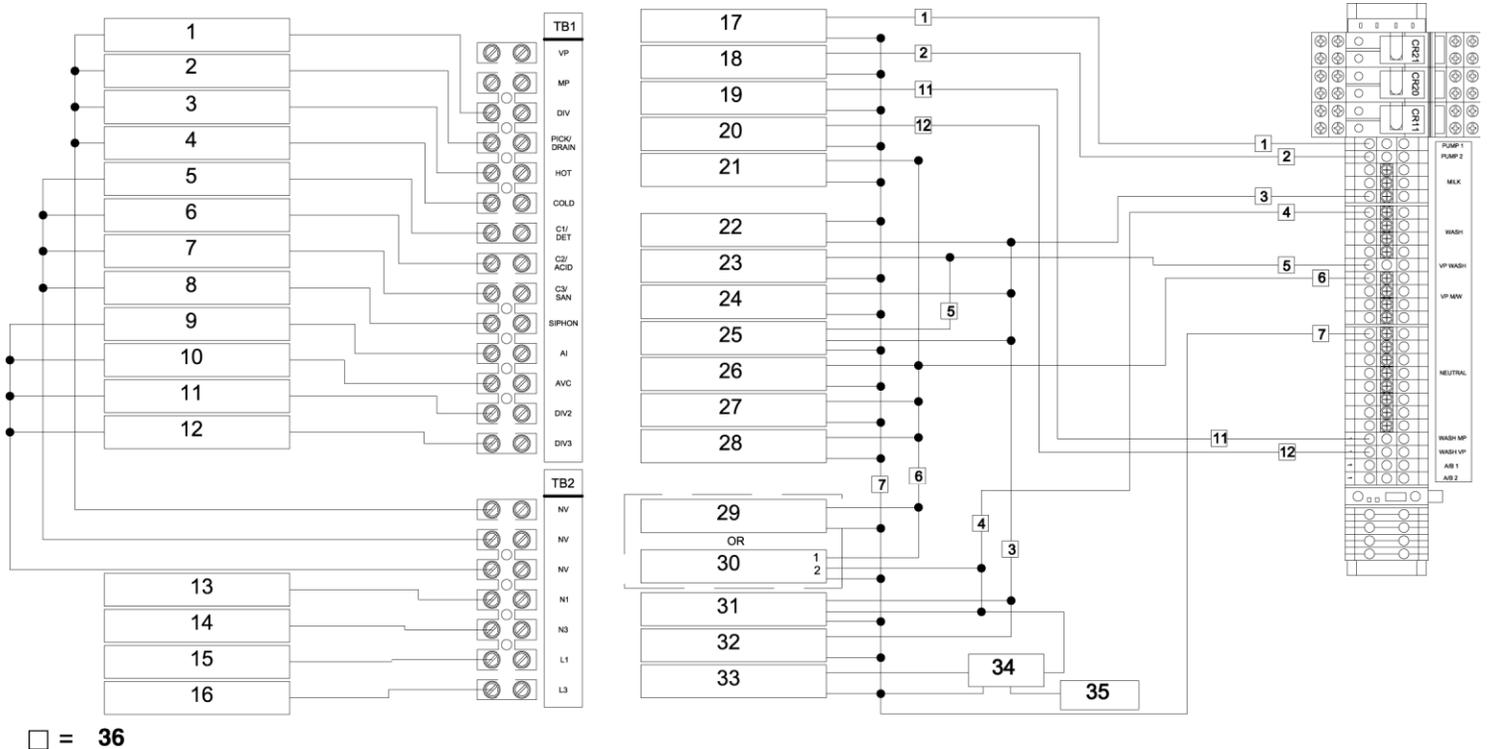
5.2 Connecting the Outputs

Connect all wires to the terminal strips provided in the enclosure. Refer to **Figures 2 and 3**. Route the output control wires out of the bottom of the Compass Plus enclosure. This routing will help to keep the switched output wiring away from the PCB power wiring and help to minimize electrical noise.



Note!

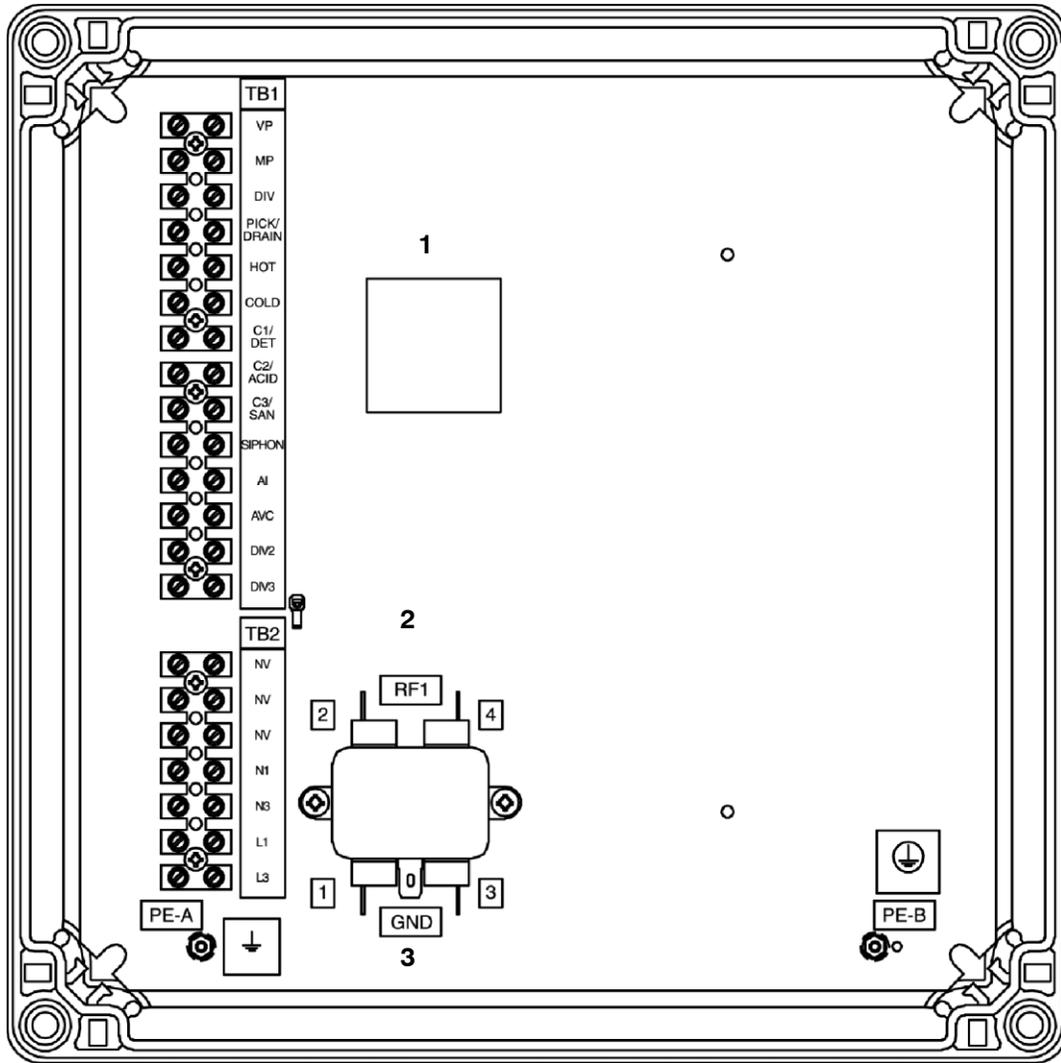
All conduit connections should enter the bottom of the enclosure. No holes should be made in the top of the Compass Plus enclosure.



Legend:

- | | | | |
|-----------|----------------------|-----------|---------------------------|
| 1 | Diverter | 19 | Air Blow Valve 1 |
| 2 | Drain | 20 | Air Blow Valve 2 |
| 3 | Hot Water | 21 | Hour Meter |
| 4 | Cold Water | 22 | Milk Chiller |
| 5 | C1/Detergent | 23 | Milk/Wash Valve |
| 6 | C2/Acid | 24 | Plate Cooler Valve |
| 7 | C3/Sanitizer | 25 | AirDip Milk Signal |
| 8 | Siphon | 26 | Pulsation Central Control |
| 9 | Air Injector | 27 | Detacher Power Supply |
| 10 | Air Vent Coil | 28 | Constant Cool Milk Signal |
| 11 | Diverter 2 | 29 | Vacuum Pump |
| 12 | Diverter 3 | 30 | Vacuum on Demand |
| 13 | Neutral Line 1 | 31 | Rotary Parlor Control |
| 14 | Neutral Line 3 | 32 | BackFlush |
| 15 | Line 1 | 33 | Secondary Drains |
| 16 | Line 3 | 34 | Relay |
| 17 | Receiver Milk Pump 1 | 35 | Drain Valves |
| 18 | Receiver Milk Pump 2 | 36 | Wire Number |

FIGURE 5.2 Block Diagram Field Connections



Legend:

- 1** Current Not to Exceed 500 mA Per Output.
- 2** Load
- 3** Line

FIGURE 1 Compass Plus Inputs and Outputs

Table I Field Electrical Connections 7750-0108-229 Compass Plus Only

From	To
TB 1 – Field Installed Equipment Outputs	
VP	Vacuum Pump Contactor
MP	Milk Pump Contactor
DIV	Diverter Valve
Pickup/Drain	Pickup/Drain Valve
HOT	Hot Water Solenoid Valve
COLD	Cold Water Solenoid Valve
C1	Chemical Dispense Detergent
C2	Chemical Dispense Acid
C3	Chemical Dispense Sanitizer
Siphon	Vacuum Siphon Valve
AI	Air Injector Valve
AVC	AVC Valve
DIV2	Diverter Valve 2 (Optional)
DIV3	Diverter Valve 3 (Optional)
TB 2 – Field Installed Voltage Inputs	
NV	Neutral – Field Installed Equipment
NV	Connected from TB1
NV	
N1	Neutral – Line 1 Constant Power
N3	Neutral – Line 3 Power, Wash only
L1	Line 1 Power Constant
L3	Line 3 Power, Wash Only

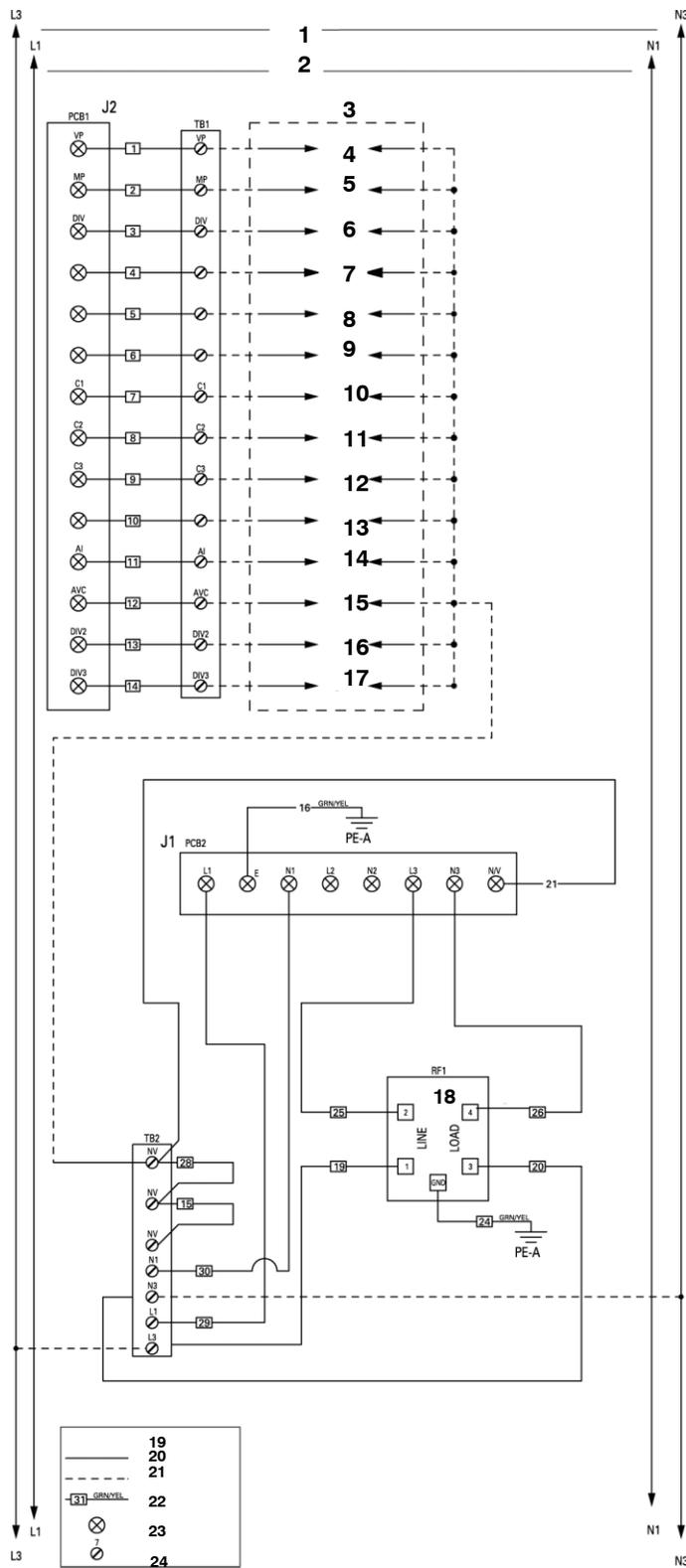


FIGURE 2 Control Ladder Diagram for the Compass Plus

Legend:

- 1** L3 Power Supplied in Wash Mode Only 115 or 230VAC
- 2** L1 Constant Power 115 or 230VAC
- 3** Field Installed Equipment
- 4** Vacuum Pump Contactor
- 5** Milk Pump Contactor
- 6** Diverter 1
- 7** Pick-up/Drain Valve
- 8** Hot Water Valve
- 9** Cold Water Valve
- 10** C1 Dispense Detergent
- 11** C2 Dispense Acid
- 12** C3 Dispense Sanitizer
- 13** Siphon Valve
- 14** Air Injection Valve
- 15** AVC Valve
- 16** Diverter 2 (Optional)
- 17** Diverter 3 (Optional)
- 18** RF Line Filter
- 19** Legend
- 20** Factory Wiring
- 21** Field Wiring
- 22** Wire Number
- 23** PCB Terminal
- 24** Terminal Block Connector

Notes:

- 1** All installed components to be the same as input voltage.
- 2** All wires to be 16AWG.600V.
- 3** All devices to be protective earth, (PE), grounded, as shown to PE-A.
- 4** All external power sources must be of same phase.

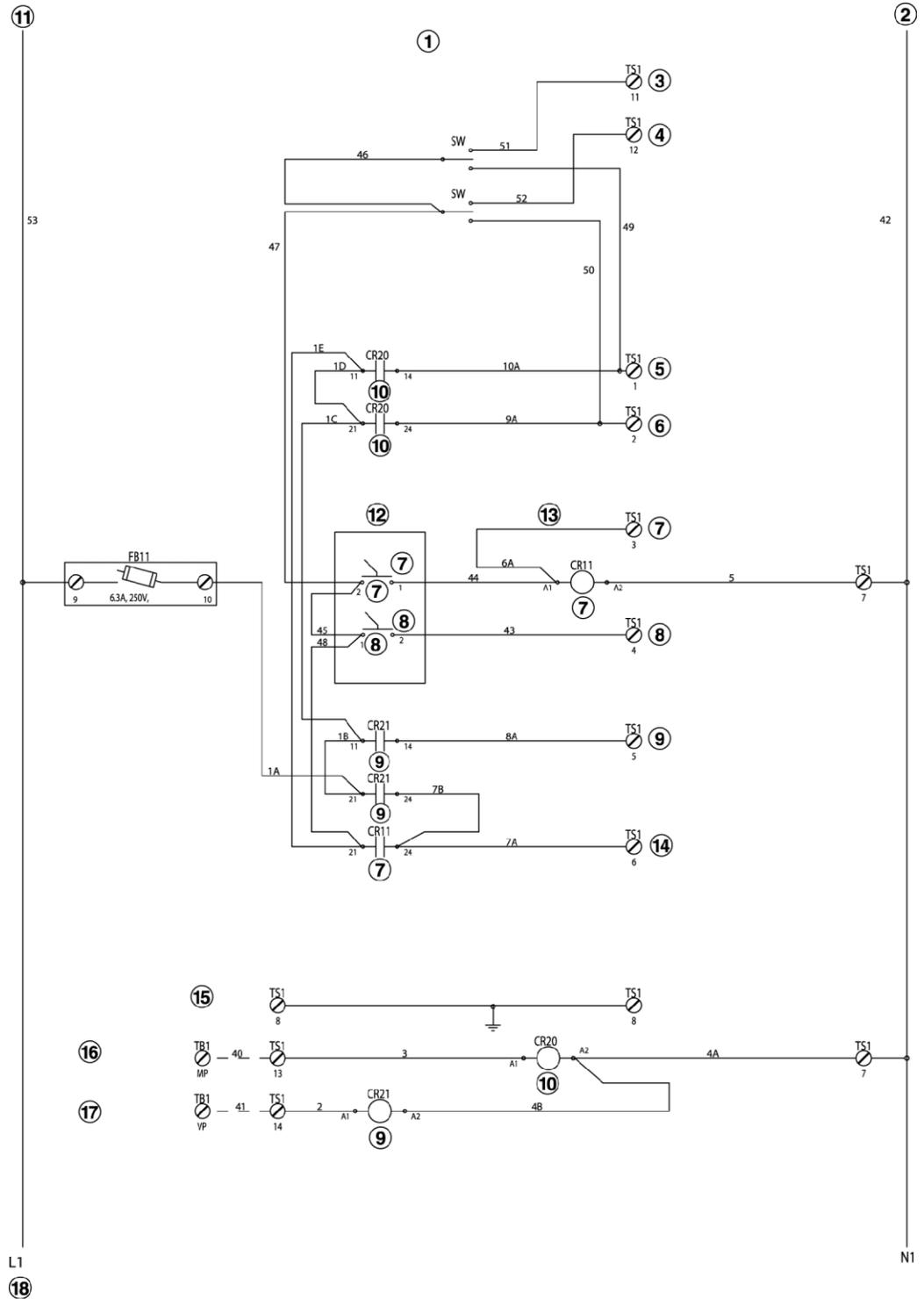


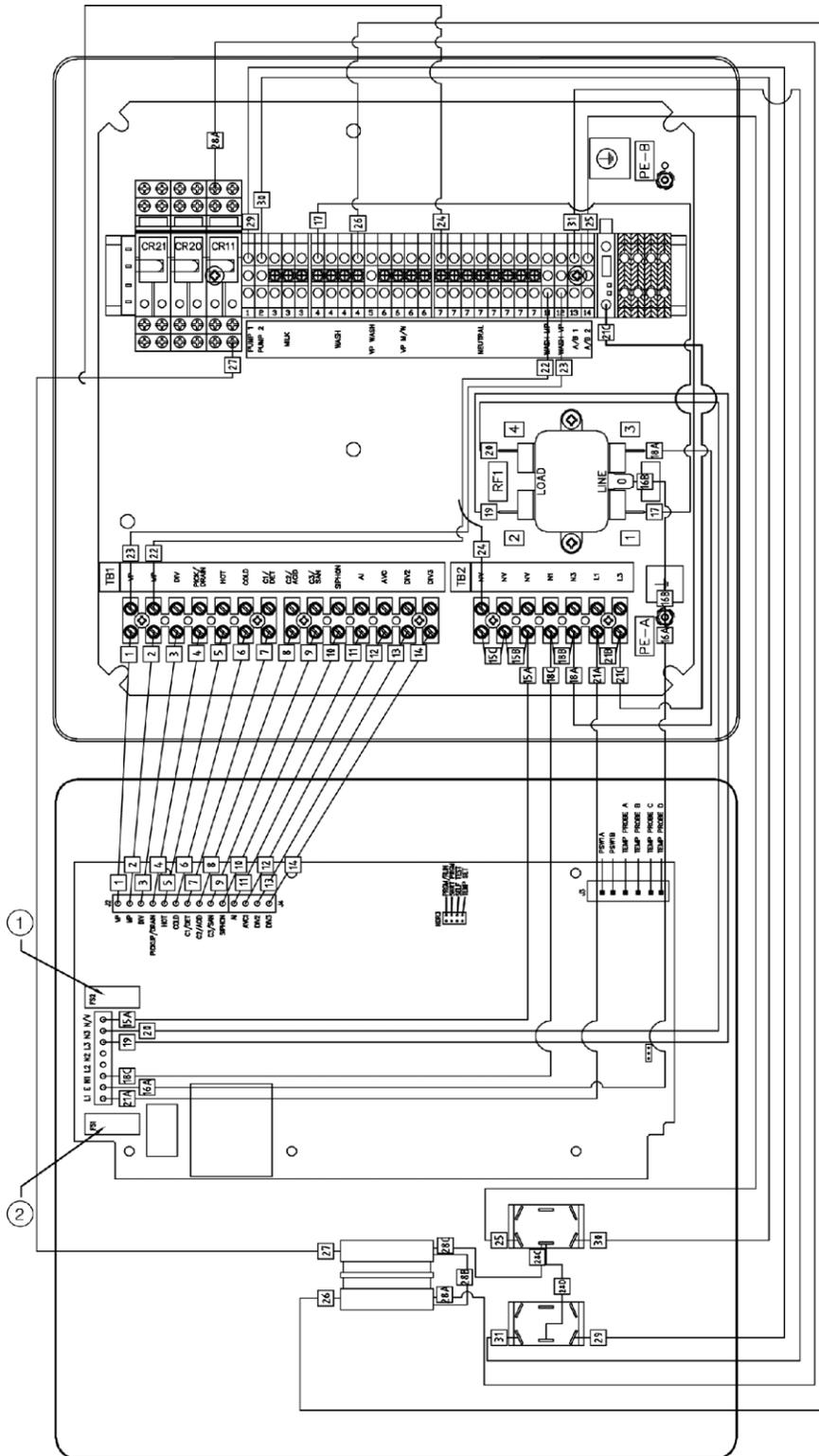
FIGURE 3 Parlor Control for the Compass Plus

Legend

- 1** SPDT Center Off (Spring Return to Center), Momentary Switches; One Way Is Milk Pump Purge, the Other Is Air Blow for Same Receiver System
- 2** To Compass Plus TB2-N3
- 3** Air Blow Coil 1
- 4** Air Blow Coil 2
- 5** Milk Pump Coil 1
- 6** Milk Pump Coil 2
- 7** Milk
- 8** Wash
- 9** VP Wash
- 10** MP Wash
- 11** 115V–7750-0103-245. 230 V7750-0108-230. 115 VAC or 230 VAC, Depending upon relays to Compass Plus TB-L3
- 12** Rotary SW.3 Place Milk-Off-Wash. Latch in all 3 places
- 13** Synonymous with VP Milk
- 14** Accessories used when VP running
- 15** Earth Ground
- 16** From MP Tab on Compass Plus PCB
- 17** From VP Tab on Compass Plus PCB
- 18** 115 VAC or 230 VAC, Depending upon relays

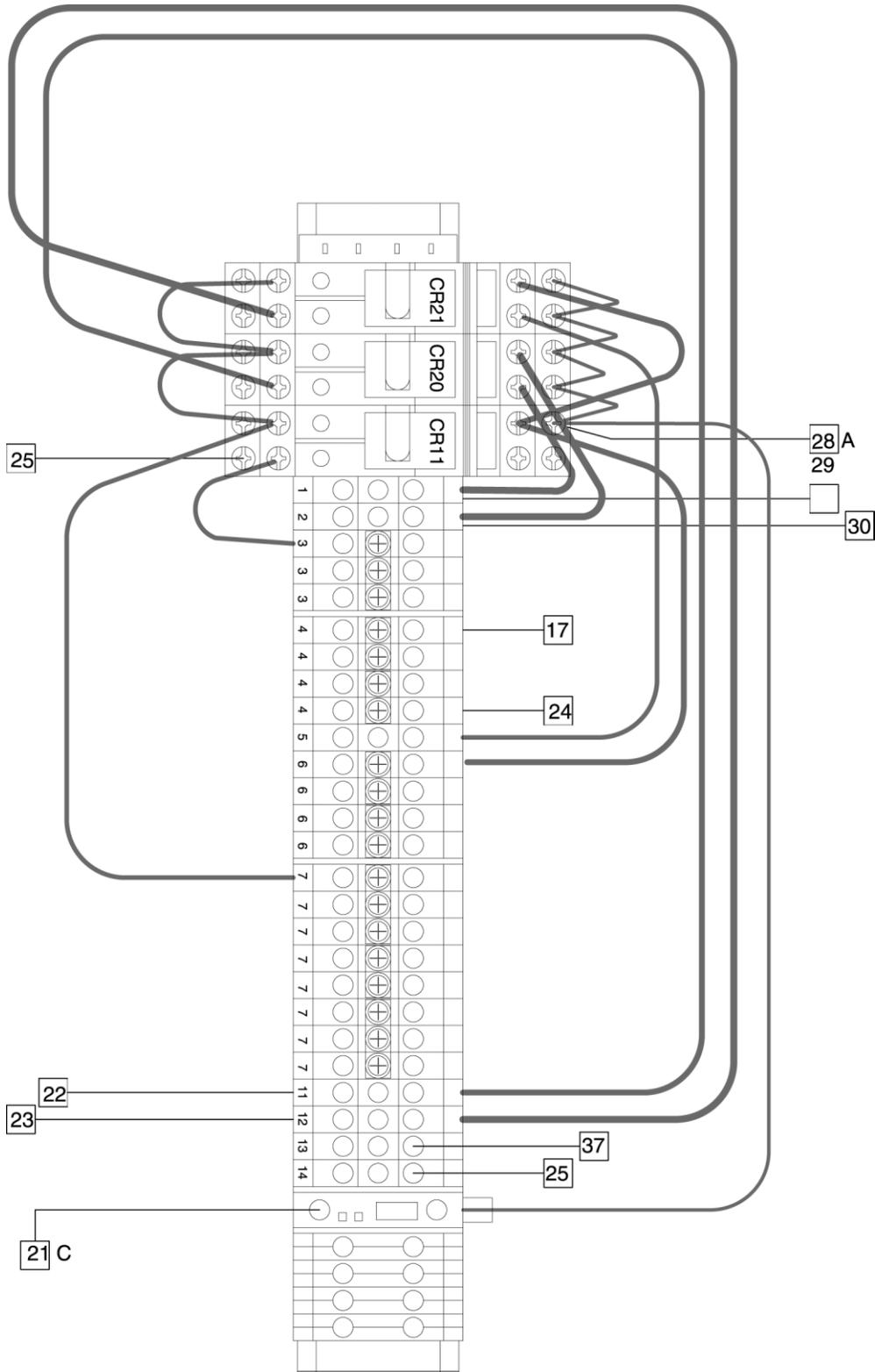
Table II Field Electrical Connections
 7750-0108-229 Compass Plus with Parlor Control - 115V
 7750-0108-230 Compass Plus with Parlor Control - 230V

Terminal	Description	Connect To
1	Pump 1	Receiver Milk Pumping Contactor 1
2	Pump 2	Receiver Milk Pumping Contactor 2
3	Milk	Energized in milk position only: Used to control Chiller, Plate Cooler Valve, Rotary Parlor Controls, Backflush
4	Wash	Energized in wash position only: Supplies L3 to Compass Plus Board outputs To AirDip Control, Rotary Parlor Controls, Secondary Drain Relay
5	VP Wash	To Automatic Milk/Wash Valve Control
6	VP M/W	Used to energize the Vacuum Pump Contactor. Also can provide signal for Hour Meter, Air Dip Control, Pulsation Control, Detacher Power Supply, VOD Control, Konstant Kool Control
7	Neutral	Neutral to all field-connected controls
11	Wash MP	Compass Plus MP Tab connection (factory connection)
12	Wash VP	Compass Plus VP Tab connection (factory connection)
13	A/B 1	To Air Blow Valve 1
14	A/B 2	To Air Blow Valve 2



- Legend:**
- 1 3.5 Amp Fuse
 - 2 1 Amp Fuse

FIGURE 4 Internal Electrical Connections Compass Plus with Parlor Control



□ = Wire Number. Refer to **Figure 4**.

FIGURE 5 Detail TS1 Factory Wiring

Shielded cable or shielded conduit is required for all installations when frequency drives and variable speed motors may be in use. This shielding is required for all wires to or from the Compass Plus. Shielded cable or shielded conduit is recommended for all installations.



Note!

Output devices that use a common wire must be isolated to prevent backfeed. An example would be the vacuum pump contractor, which may be powered by the receiver panel during milking and could provide backfeed power to the devices through the VP tab if the Compass Plus is operated.

All equipment must be controlled using the same AC output voltage as provided to inputs L3 and N3. Relays will be necessary to control loads of varying voltage or DC voltage loads.

A load analysis must be performed to ensure that the operated load at any time does not exceed 3 amps. Any loads which may add up to more than 3 amps should be removed from the Compass Plus by using relays.

Electrical backfeed can be a problem when a device is controlled by the Compass Plus during washing and is also controlled by another system component during milking. Backfeed isolation can be accomplished by using a rotary switch to disconnect input power to L3 and any other outputs which may be energized during milking.

5.3 Connecting Power Inputs

Preferred Method

The recommended method for wiring the Compass Plus is to use two power inputs. Refer to **Figure 6**.

Input 1 is a constant supply connected to TB 2 terminals L1 and N1. This supply powers the Compass Plus PCB.

Input 2 is used to supply power to the switched outputs from the Compass Plus. Power from input 2 is supplied to the Compass Plus only when the milking system is in the Wash mode.

Input 2 is connected TB 2 terminals L3 and N3. This input powers the Compass Plus outputs. The preferred method allows power to be applied to the Compass Plus PCB timer circuit at all times to keep the battery backup on the PCB fully charged and the clock at the proper time. The switched outputs are powered only in the wash mode to keep wash system components from operating in the Milk mode.

Alternate Wiring Method

The alternate method for wiring the Compass Plus is to use the same power source for the digital timer circuit and the switch circuits. Connect the input voltage (from a source with voltage applied only when the system is in the wash mode) to L1 and N1 located on terminal block 2. This will provide power to the Compass Plus PCB.

Place a jumper L1 to L3 and from N1 to N3 to provide power to the switch circuit. The timer circuit and the switch circuit are now powered by the same voltage source. Refer to **Figure 7**.



Note!

The Alternate Wiring Method will supply power to the Compass Plus PCB in Wash Mode Only.



Note!

The Timer circuit needs to be powered at least 5 hours per day to maintain the charge on the backup battery. All dimensions in [] are in millimeters unless otherwise specified.

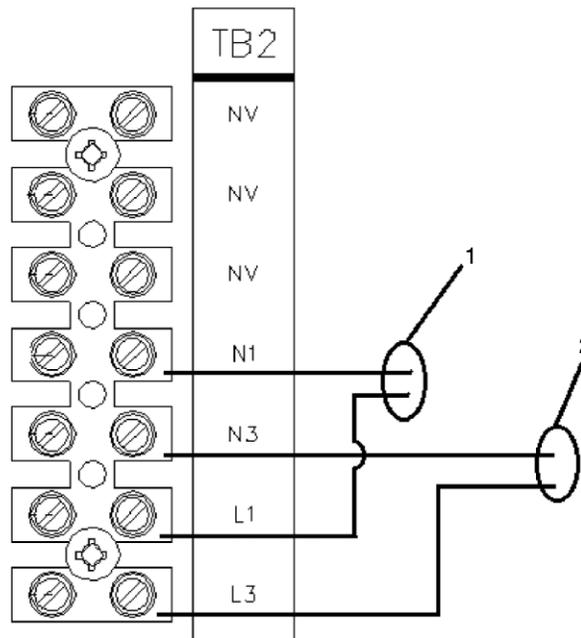


DO NOT wire the switch circuits to a constant power source. Power to the switch circuits must be switched off when in the MILK mode. Inadvertently starting the wash cycle while in the MILK mode may cause a mixing of milk and wash chemicals. The signal word CAUTION indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. Notes in this category are used as a general reminder of good safety practices or to direct attention to unsafe practices. Their purpose is to emphasize customer safety awareness.



Note!

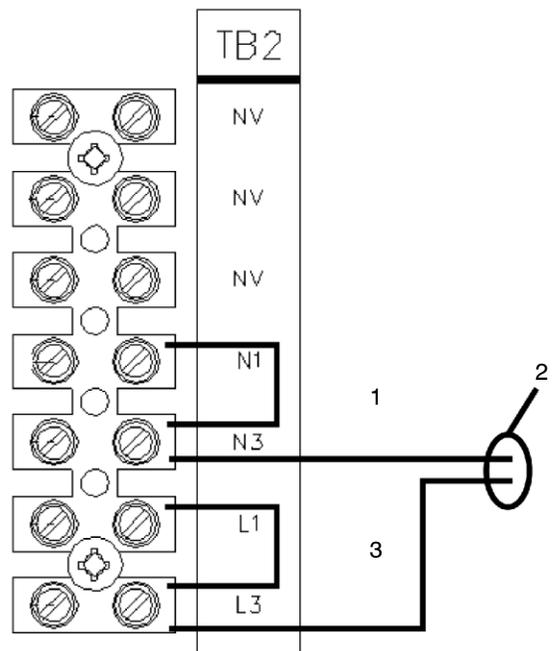
Electrically isolate all system components that may also become energized during milking to prevent backfeeding power into the Compass Plus.



Legend:

- 1 Constant Power Supply to Timer Circuit L1 and N1
- 2 Power Supplied in Wash Mode Only L3 and N3

FIGURE 6 Preferred Power Input Wiring Method



Legend:

- 1 Jumper N1 and N3
- 2 Power Supplied In Wash Mode Only L3 and N3
- 3 Jumper L1 and L3

FIGURE 7 Alternate Power Input Wiring Method

5.4 Installing Compass Plus PCB as Replacement for Navigator PCB

The Compass Plus Printed Circuit Board can be used as the replacement for all Navigator Wash Control Centers now installed in the field.

The Compass Plus PCB is a direct field replacement for all previous models of the Navigator and will provide all the functions available with the original Navigator plus the ability to upgrade the system by adding any or all the additional features available with the Compass Plus PCB.

The changeover from the original Navigator PCB to the Compass Plus PCB will require the wire connection ends to be changed. The original Navigator board used 1/4 inch push-on connectors to attach to the inputs and outputs to the wire harness. The Compass Plus PCB uses a multiple plug-in connector. In order to make the changeover, the original individual 1/4 inch push-on connectors will be cut off, the wire insulation stripped 5/16 inch [8 mm] and a wire ferrule attached. The wires are attached to the plug. The plug is then connected into the appropriate socket on the Compass Plus PCB. All connections are labeled the same and activate the same functions, but their locations on the PCB are different. Refer to **Figure 8**.

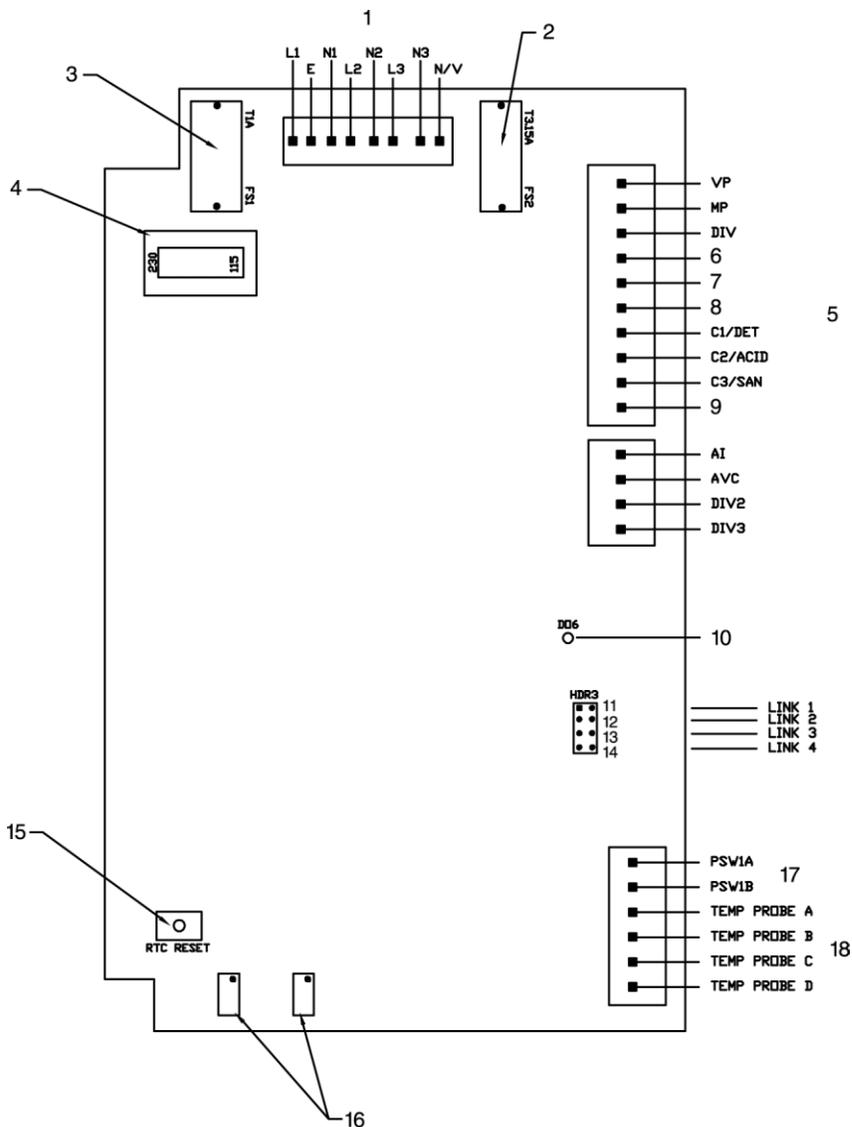


FIGURE 8 Control Card

Legend: Figure 8

- 1 Inputs
- 2 3.5 Ampere Fuse
- 3 1 Ampere Fuse
- 4 Input Voltage Selector Switch
- 5 Outputs
- 6 Pick/Drain
- 7 Hot
- 8 Cold
- 9 Siphon
- 10 Pressure Switch Indicator
- 11 Program Run
- 12 Short Program
- 13 Self Test
- 14 Temp Set
- 15 Real Time Clock Reset Button
- 16 Temperature Calibration Potentiometers
- 17 Pressure Switch Connections
- 18 Temperature Probe Connections



Note!

A change has been made in the digital readout on the Compass Plus PCB. All settings adjustable to the tenth of a second use the center LED as the decimal point. A reading of **—3-0—** is equal to 3 seconds. This is a change from the original Navigator PCB. With the Navigator PCB a reading of **—30** will equal 3 seconds.

5.5 Installation Instructions for Optional Wash Water Temperature Sensor

The Compass Plus has the capability of monitoring the temperature of the discharge wash water from the receiver with the use of the optional temperature probe kit (part number 7750-0109-683).

Attach the Temperature sensor to the discharge piping in a convenient location between the milk pump discharge and the wash vat. If a pre-cooler is used, attach sensor after the pre-cooler.

- Clean the attachment area with alcohol.
- Remove tape from sensor strip.
- Attach to discharge pipe.
- Insulate sensor with insulation provided with kit.

Connect temperature sensor wires to the Compass Plus PCB J 3 pins 3, 4, 5 and 6. The sensor will have two sets of two wires typically two white wires and two red wires. Connect one pair of like colored wires to terminals 3 and 4 and the other set of like colors to terminals 5 and 6.

If a two-wire temperature sensor is used, place a jumper between terminals 3 and 4, connect one sensor wire to terminal 4. Place a jumper between terminals 5 and 6; connect the other wire to terminal 5. A 2-wire sensor will not be as accurate as a 4-wire sensor.

Calibration Instructions for Wash Water Temperature Sensor

The temperature sensor on the Compass Plus PCB is factory calibrated. To verify the proper operation of the temperature sensor or the sensing circuit on the Compass Plus PCB, use the following procedure:

1. Set Compass Plus to display temperature Continuously.
2. Remove temperature sensor plug from J 3.
3. Remove temperature sensor wires from terminals 3, 4, 5 and 6.
4. Place jumper wires between terminals 3, 4, and 4, 6.
5. Connect the Part Number 0005-1199-000 Variable Resistance Ohm Tool to the 3, 4, 5, 6 terminals.
6. Set the dial on the Variable Resistance Ohm tool to 104 Ohms.
7. Reinstall sensor plug in to J 3.
8. Verify digital readout to be 50 degrees F + or – 2 degrees F or 10 degrees C + or – 1 degree C.
9. Adjust gain potentiometer RV2 if necessary to proper reading.
10. Set the dial on the Variable Resistance Ohm tool to 134 Ohms.
11. Verify digital readout to be 190 degrees F + or –2 degrees F or –88 degrees C + or – 1 degree C.
12. Adjust zero potentiometer RV1 if necessary to proper reading.
13. Repeat steps 6 through 8 to verify settings.
14. Reinstall temperature sensors leads to plug and reinstall to J 3.
15. Set the Compass Plus display to the desired setting.



Note!

The Temperature to Ohms to Temperature chart can be used to verify any reading from 0 degrees C (32 degrees F) to 100 degrees C (212 Degrees F) with the use of the 0005-1199-000 Variable Resistance Ohm Tool. If the Ohms setting is set below 100 Ohms (0 degrees C or 32 degrees F), the display will alternate between "Err" and "tMP".

Temperature Sensor to Ohms to Temperature Chart

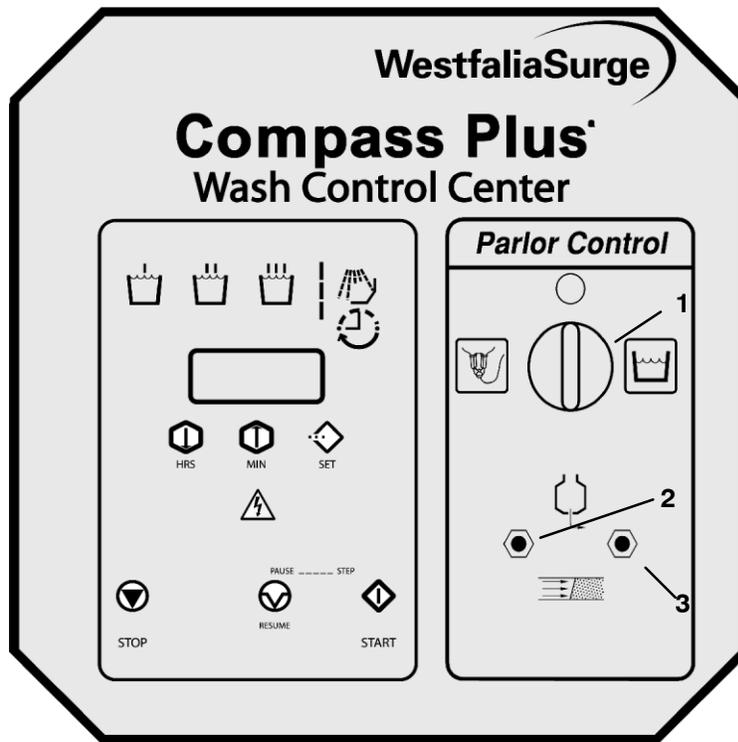
Ohms	Degrees C	Degrees F	Ohms	Degrees C	Degrees F
			100	0	32
100	0	32	101	2.59	36.67
103.85	10	50	102	5.18	41.34
107.7	20	68	103	7.77	46.01
111.55	30	86	104	10.36	50.68
115.4	40	104	105	12.95	55.35
119.25	50	122	106	15.54	59.72
123.1	60	140	107	18.13	64.39
126.95	70	158	108	20.72	69.06
130.8	80	176	109	23.31	73.73
134.65	90	194	110	25.9	78.4
138.5	100	212	112	31.08	87.74
			113	33.67	92.41
			114	36.26	97.08
			115	38.85	101.75
			116	41.44	106.42
			117	44.03	11.09
			118	46.62	115.76
			119	49.21	120.43
			120	51.8	125.1
			121	54.39	129.77
			122	56.98	133.44
			123	59.57	139.11
			124	62.16	143.78
			125	64.75	148.45
			126	67.34	153.12
			127	69.93	157.79
			128	72.52	162.46
			129	75.11	167.13
			130	77.7	171.8
			131	80.29	176.47
			132	82.88	181.14
			133	85.47	185.81
			134	88.06	190.48
			135	90.65	195.15
			136	93.24	199.82
			137	95.83	204.49
			138	98.42	209.16
			139	101.01	213.83
			140	103.6	218.5

Note: 1 OHM = 2.59 Degrees C, 4.67 Degrees F

5.6 Installation Instructions for Compass Plus with Parlor Control

The Compass Plus with Parlor Control is equipped with the switches and terminals required to operate the pipeline milking system in both the Milk and Wash modes. The Parlor Control portion of the control has a three-position selector switch allowing the selection of MILK, OFF or WASH. Two toggle switches provide manual operation of two Milk Pumps and the operation of two Air Blow Valves. All functions and connections of the Compass Plus remain the same. An additional terminal strip, switches, relays and factory wiring are provided to add the functions required to switch the system from MILK to WASH and control the additional equipment required in the MILK/WASH switchover.

The Compass Plus with Parlor Control is available in two models, 115 Volts AC input and 230 Volts AC. The difference between the two models is the coil used in the relays and the position of the voltage switch on the Compass Plus PCB. The devices used on the outputs must be of the same voltage as the input voltage.



Legend:

- 1 Milk/Off/Wash Switch
- 2 Up (Milk Pump 1 Manual On)
Down (Receiver 1 Air Blow)
- 3 Up (Milk Pump 2 Manual On)
Down (Receiver 2 Air Blow)

FIGURE 9 Compass Plus with Parlor Control

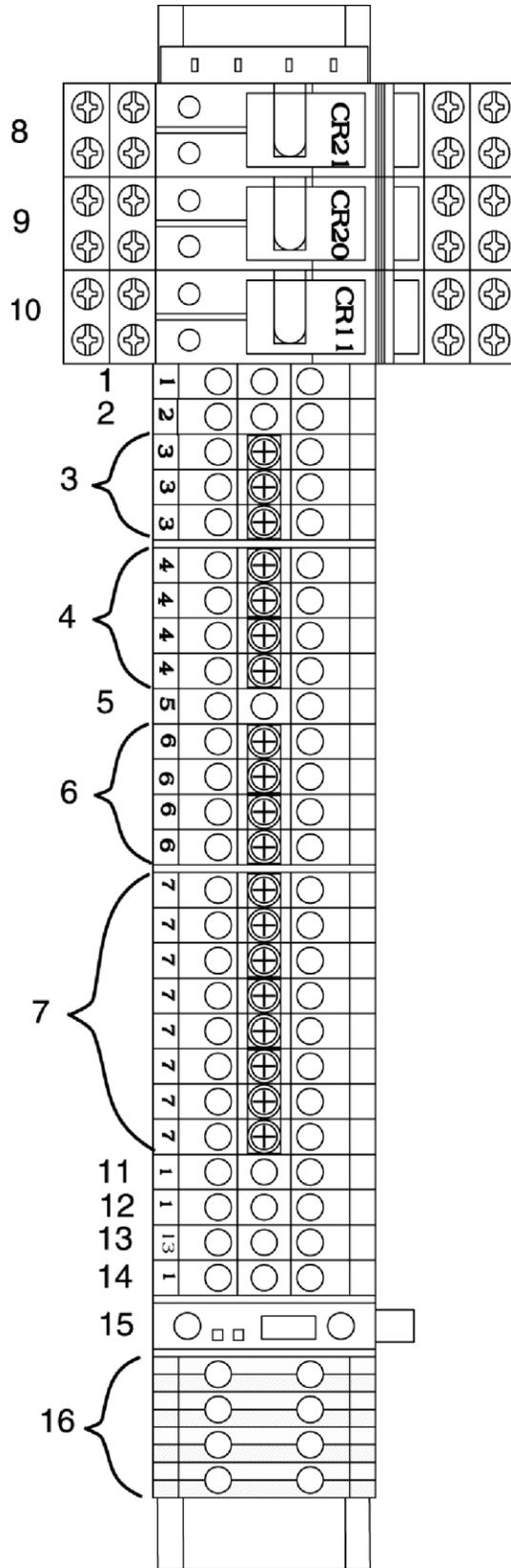


FIGURE 10 Field Connections to Compass Plus with Parlor Control TS 1

Legend: Figure 10 Field Connections to Compass Plus with Parlor TS1

- 1** Milk pump number 1 contactor coil (manual pump out from switch)
- 2** Milk pump number 2 contactor coil (manual pump out from switch)
- 3** Terminals energized in milk mode only
Typical device connections: Milk signal to Chiller, Plate cooler water valve
AirDip milk signal, Rotary Parlor Control, Back flush milk signal.
- 4** Terminals energized in wash mode only
Typical device connections: Wash signal to Vacuum on demand, Rotary
Parlor Control, Secondary Drain through a relay (open drain with
power applied).
- 5** To vacuum pump contactor wash mode from Compass Plus PCB
Typical device connections: Milk/Wash valve control.
- 6** Vacuum pump milk and wash modes
Typical device connections: Hour Meter, Pulsation control, Detacher Power
supply, Receiver Control, Vacuum on demand control.
- 7** Neutral to all field connected components
- 8** Relay vacuum pump wash mode (factory wired)
- 9** Relay milk pump wash mode (factory wired)
- 10** Relay vacuum pump milk mode (factory wired)
- 11** Wash milk pump signal from Compass Plus PCB to milk pump contactor.
- 12** Wash vacuum pump signal from Compass Plus PCB to Vacuum
pump contactor.
- 13** Air Blow valve coil Number 1
- 14** Air Blow valve coil Number 2
- 15** Fuse 6.3 Amp Slow Blow
- 16** Ground terminals

Table III Compass Plus with Parlor Control – Field Connections

Terminal Number	Description	Connect To
1	Pump 1	Receiver Milk Pump Contactor 1
2	Pump 2	Receiver Milk Pump Contactor 2
3	Milk	Energized in Milk position only: Use to control Chiller, Plate Cooler Valve, Rotary Parlor Controls, Backflush
4	Wash	Energized in Wash position only: Supplies L3 to Compass Plus Board outputs To AirDip control, Rotary Parlor Controls, Secondary Drain Relay, VOD wash signal
5	VP Wash	To Automatic Milk/Wash valve control
6	VP M/W	Used to energize when Vacuum Pump Contactor. Also can provide signal for Hour Meter, AirDip Control, Pulsation Control, Detacher Power supply, VOD control, Konstant Kool Control, Vacuum Pump Contactor. Stand By Module
7	Neutral	Neutral to all field connected Controls
11	Wash MP	From TB 1 MP Tab (factory installed)
12	Wash VP	From TB 1 VP Tab (factory installed)
13	A/B 1	To Air Blow Valve 1
14	A/B 2	To Air Blow Valve 2

Wires can be connected to both sides of terminal strip.



Note!

The combined load for output devices on the Parlor Control must not exceed 6.5 Amp.

6 Compass Plus Programming

6.1 General Instructions on How to Program the Compass Plus

The Compass Plus circuit board has a program/run jumper in the control box that will disable important programming functions so that changes cannot be accidentally made to the washing program. Refer to **Figure 8**. When the jumper is not linked, only the pre-sanitation times, clock time and date can be changed. When the Jumper is linked to the PRGM position, all parameters of the wash program can be changed.



Note!

When the program jumper has been in the PRGM position for 30 seconds, the clock display will begin to flash. This is to remind the installer or service person that the unit is in a programmable mode and should be switched back to RUN mode to prevent program changes.

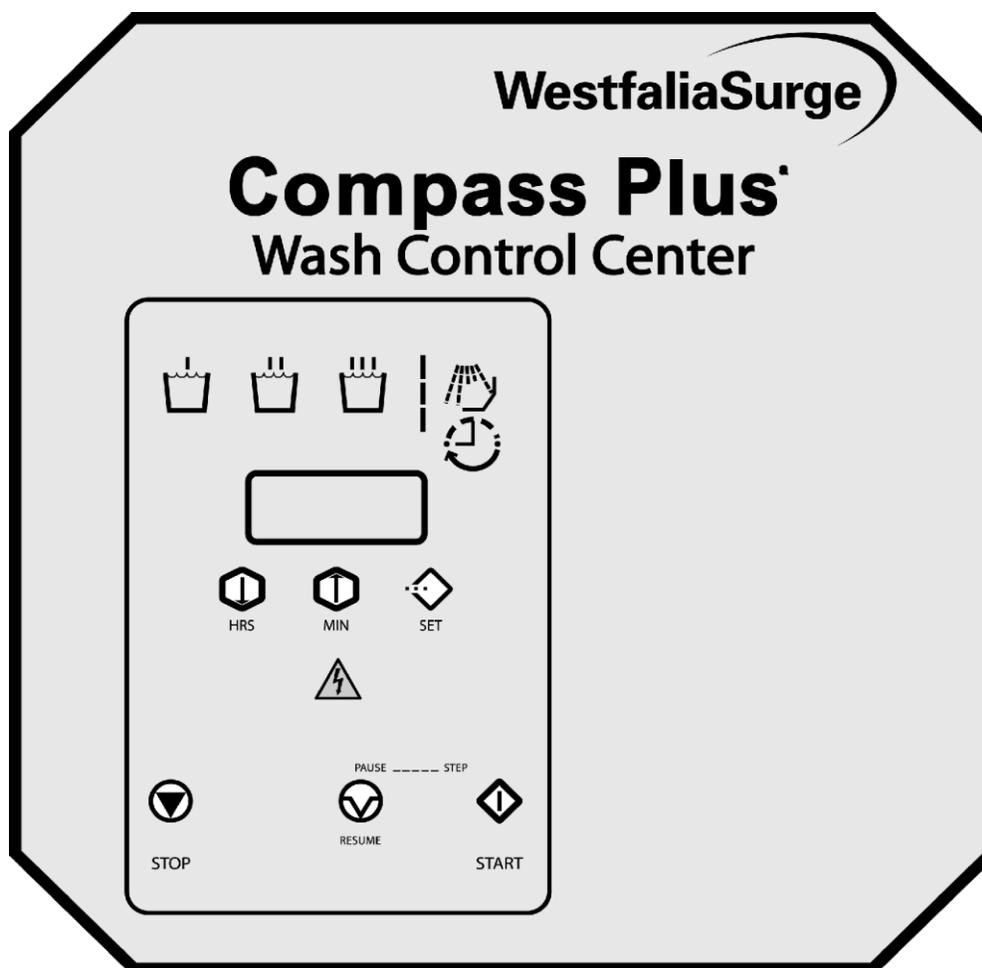


FIGURE 11 Compass Plus Front Panel without Parlor Control

6.2 General Programming Information

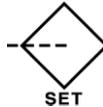
There are six membrane switches on the front cover. Their functions during the programming procedure are as follows:



The HRS button decreases the variable setting or steps forward through the variable list.



The MIN button increases the variable setting or steps backward through the variable list.



The SET button toggles to the next programming variable. The first time the SET button is pressed to go into programmable mode, the set LED will begin to flash. It will continue to flash until the unit is returned to run mode.



Pressing the STOP button at any time during the variable programming will save any changed variables and stop the programming process.



Pressing the START button when **—C-Lr** is displayed will change all the variables to 0.



Not used in the programming procedure.

Pressing the SET button will cause the variable name to be displayed. Pressing SET again will cause the numerical value for the variable to be displayed.

Pressing the HRS and MIN buttons when the variable name (for example **A— -04**) is visible will sequence forward or backward through the variable list.

Pressing the HRS and MIN buttons when the variable value (for example **00-30**) is displayed will cause the variable value to change.

Setting any time variable to zero will cause the program to ignore that variable.



Note!

When programming variables, write the settings in the left-hand column of Table VI and on the vinyl card included with the package for future reference.

To Begin Programming

1. Turn power OFF to the Compass Plus.
2. Open the access door and place jumper on HDR3 #1.
3. Close the cover and re-apply power to the Compass Plus. The display should be lit. The display may not show the correct time and will be changed in later steps.
4. Press the SET button once to start the wash options and time variables programming procedure. The display should read **—C-Lr**.



Note!

*IMPORTANT! If this is the initial start-up of the unit, press the START button when **—C-Lr** is present in the display to set the variables to zero.*

IF THIS IS THE INITIAL START-UP OF THE UNIT, PRESS THE START BUTTON TO SET THE VARIABLES TO ZERO. Failure to do so on start-up with a new unit could cause erratic operation of the Compass Plus.



Note!

Write the settings in the left-hand column of Table VI and on the vinyl card included with the package for future reference.

5. Press the SET button again. The display should read **d FT**. Press start to load default program or press SET button (Step 6) to program each variable individually.
6. Press SET button again. The display should read **A—01**. This is your air injector ON time.
7. Press SET again. The display should read **—0**. The LED in the center of the display represents the decimal point on all settings to the tenth of second. Change the air injector ON time by pressing the MIN button to increase the ON time and the HRS button to decrease the ON time, Air injector and AVC settings are in tenths of a second, a reading of **—3•0—** is equal to 3 seconds.
8. Press the SET button again. This advances the programming to the next variable and the display should read **A—02**. This is your air injector OFF time.
9. Press the SET button again. The air injector OFF time is now displayed and can now be changed.
10. See **Table VI** for a listing of all the variables that can be programmed. See the **Appendix A** for detailed variable definitions. Continue pressing SET to toggle through the remaining list of variables, changing them as necessary.
11. When the variables have been programmed for your system, press STOP. This will save all the changes and stop the programming process. The display should show the time. The time shown may not be correct but will be changed in later steps.
12. Turn power OFF to the Compass Plus.
13. Open the access door and remove jumper 1.
14. Close the door and reapply power to the Compass Plus.

Setting the Clock and the Pre-sanitation Times

The clock is set in the RUN mode. Pressing SET starts the procedure. Pressing STOP any time during the following procedure will save any changes made and put the Compass Plus into normal operation. Refer to **Table IV**.

Set the Pre-sanitation Times

Set pre-sanitation times to 00-00 if pre-sanitation is not used. Refer to **Table V**.

The Compass Plus is now programmed and ready to wash. Perform an entire wash cycle to verify the correct settings and variable values in the program. Use the programming procedure for making any changes to fine tune the Compass Plus to the pipeline. Refer to **Figure 13**.

For the listing of variables and options refer to **Table VI**.



Note!

The displayed time is in the tenths of seconds for variables **A— 01** through **A— 04**. The blinking LED in the center of the display is the decimal point.



Note!

See the **Appendix A** for detailed explanations of variables.



Note!

Loading the default program first provides a good starting point for most systems. The variables can be adjusted to fit the system. The default settings are listed in **Table VI**.

Table IV Setting the Clock

Press	Display	Option
SET	PRESENT TIME (SET LED will flash)	Change using HRS and MIN buttons. (Display is 24-hour clock.)
SET	DAYS OF WEEK	Increase using MIN, decrease using HRS.
SET	DATE OF MONTH	Increase using MIN, decrease using HRS.
SET	MONTH	Increase using MIN, decrease using HRS.
SET	YEAR	Increase using MIN, decrease using HRS.

Table V Setting the Pre-sanitation Times

Press	Display	Option
SET	Pr-E1	
SET	00-00	The display is in 24 format. Use the HRS and MIN buttons to set time.
SET	Pr-E2	
SET	00-00	The display is in 24 format. Use the HRS and MIN buttons to set time.
SET	Pr-E3	
SET	00-00	The display is in 24 format. Use the HRS and MIN buttons to set time.
SET	CURRENT TIME	Now in normal run mode. SET light should not be flashing.

Header Links HDR 3

Link 1 Prgm/Run - Short header link to enable programming variables.

Remove header link to run program.

Link 2 SHRT PRGM - Short Header link to enable **Short*** program.

Remove header link to run standard program.

Link 3 SELF-TEST - Short header link to enable self-test mode.

Remove header link to disable self-test.

Link 4 TEMP SET - Short header link to enable programming of temperature variables tmp 1 - tmp 4 (in program mode), enable temperature display in run mode if tmp 1 is set and recall of archived temperatures in set mode.

*Short Program is used as an aid to testing and troubleshooting the wash system. With header link 2 shorted press start to run short program. At the end of final Rinse, the short program pauses. Press Pause/Resume button to start PreSan. See sequence chart for short program time settings.



Note!

The short program does not change any programmed variables when the Jumper is removed from headed link 2 the program will revert to the original settings.

Table VI Setup Chart Variable Definition and Order of Entry

Program Setting	Short Setting	Default Setting	Variable	Setting Limits Minimum- Maximum	Increment	Variable Description
			-C-Lr			Press Start here to clear program to all zeros
AI-AVC						
	0.2	4.0	A1	0-30 Seconds	0.1 Second	Air Injector ON-Time
	0.6	7.0	A2	0-30 Seconds	0.1 Second	Air Injector OFF-Time
	0.2	1.0	A3	0-3 Seconds	0.1 Second	Delay to AVC ON
	0.3	3.0	A4	0-30 Seconds	0.1 Second	AVC ON-Time
	3	4	A5	0-9	Unit	AVC Frequency
INITIAL RINSE						
	1	1	P1	0-10	Unit	P1=0—Cold P1=1—Cold + Hot P1=2—Cold + 30 Seconds Hot P1=3—Cold + 60 Seconds Hot P1=4—Cold + 90 Seconds Hot P1=5—Cold + 120 Seconds Hot P1=6—Cold + 150 Seconds Hot P1=7—Cold + 180 Seconds Hot P1=8—Cold + 210 Seconds Hot P1=9—Cold + 240 Seconds Hot P1=10—Cold + 270 Seconds Hot
	1 sec	10	T1	0-60 Seconds	Second	Daily Air Injector Start
	2 sec	1:30	T2	0-8 Minutes	Second	Divert-Initial Rinse
	3 sec	0	T3	0-4 Minutes	Second	Circulation Time
	1 sec	15	T4	0-6 Minutes	Second	Drain-Initial Rinse
	1 sec	2:00	T5	0-5 Minutes	Second	Pause-Drain
	1 sec	0	T6	0-1 Minute	Second	Purge, Milk Pump
WASH						
	2 sec	30	C1	0-10 Minutes	Second	Detergent
	0 sec	2	P2	0-2	Unit	P2=0-Cold; P2=1 - Cold + Hot; P2=2-Hot
	3	3	P3	0-3	Unit	P3=0 - Chemical 10 seconds after start of fill P3=1 - Chemical 30 seconds after start of fill P3=2 - Chemical 60 seconds after start of fill P3=3 - Chemical after T7
	0	0	T7	0-3 Minutes	Second	Diverter-Wash Cycle
	5 sec	9.00	T8	0-15 Minutes	Second	Circulation Time
	1 sec	45	T9	0-6 Minutes	Second	Drain-Wash, Acid, Sanitize
	1 sec	1.00	T10	0-3 Minutes	Second	Vacuum Purge Lines
	1 sec	2.00	T11	0-5 Minutes	Second	Pause -Chlorine Dissipation

Table VI Setup Chart Variable Definition and Order of Entry (continued)

Program Setting	Short Setting	Default Setting	Variable	Setting Limits Minimum- Maximum	Increment	Variable Description
FINAL RINSE						
	2 sec	30	C2	0–10 Minutes	Second	Acid Chemical
	0	0	P4	0–2	Unit	P4=0–Cold; P4=1–Cold+Hot; P4=2–Hot
	0	2	P5	0-3	Unit	P5=0–Chemical 10 seconds after start of fill P5=1–Chemical 30 seconds after start of fill P5=2–Chemical 60 seconds after start of fill P5=3–Chemical after T1 in Acid Circulation
	5 sec	5.0	T12	0–10 Minutes	Second	Circulation Time
	2 sec	1.0	T13	0–3 Minutes	Second	Vacuum Purge Lines
SANITIZE						
	3 sec	30	C3	0–10 Minutes	Second	Sanitizer Chemical
	1	1	P6	0–2	Unit	P6=0–Cold; P6=1–Cold+Hot; P6=2–Hot
	3	3	P7	0–3	Unit	P7=0–Chemical 10 seconds after start of fill P7=1–Chemical 30 seconds after start of fill P7=2–Chemical 60 seconds after start of fill P7=3–Chemical after T1 in Sanitize Cycle
	5 sec	5.00	T14	0–10 Minutes	Second	Circulation Time
	1 sec	1.00	T15	0–5 Minutes	Second	Vacuum Purge Lines
FILL TIME						
	5 sec	15.00	T16	0–15 Minutes	Second	Water Fill Time Limit-Initial Rinse. Starts after P1.
	5 sec	15.00	T17	0–15 Minutes	Second	Water Fill Time Limit-Wash. Starts after P3.
	15 sec	15.00	T18	0–15 Minutes	Second	Water Fill Time Limit-Final Rinse. Starts after P5.
	5 sec	15.00	T19	0–15 Minutes	Second	Water Fill Time Limit-Sanitize. Starts after P7.
OPTIONAL						
	0	0	T20	0–4 Minutes	Second	Initial Rinse Divert + WATER per P1
	1 sec	0	T21	0–4 Minutes	Second	Initial Rinse Circulation + WATER per P1
	1 sec	0	T22	0–6 Minutes	Second	Wash Cycle – Extra Water per P2
	0	0	T23	0–6 Minutes	Second	Final Rinse Cycle – Extra Water per P4
	0	0	T24	0–6 Minutes	Second	Sanitize Cycle – Extra Water per P6
	0	0	P8	0–1	Unit	P8=0–Milk Pump not driven during circulation P8=1–Milk Pump ON during Circulation. Starts after T1.
	0	0	P9	0–2	Unit	P9=0–Diverter energized per Chart P9=1–Diverter energized opposite of Chart P9=2–Diverter energized per Chart + during T23, T12, T24 and T14

Table VI Setup Chart Variable Definition and Order of Entry (continued)

Program Setting	Short Setting	Default Setting	Variable	Setting Limits Minimum- Maximum	Increment	Variable Description
	0	0	P10	0-1	Unit	P10=0-Controller STOPS and waits for scheduled PRE-SAN P10=1-Controller ADVANCES directly to Sanitize Cycle
	0	0	dP-01	0-1	Unit	dP1=0-Vacuum Pump ON Only Circulation and Drain dP1=0-Vacuum Pump ON all the time
	0	0	dP-02	0-1	Unit	dP2=0-Drain closed (ON) during fill dP2=1-Pickup Valve Closed (OFF) during fill
	0	0	dP-03	0-1	Unit	dP3 Applies during T4 and T9 dP3=0-Drain open (OFF) during drain dP3=1-Pickup Valve Open (ON) during Drain
	0	0	dP-04	0-60	Unit	dP4 Applies during T10, T13 and T15 dP4=0-Drain Open (OFF) during Vacuum Purge dP4=1-Cycle Pickup [Repeat 1 seconds ON, 30 seconds OFF] dP4=2=>Cycle Pickup [Repeat 2 seconds ON, 30 Sec OFF] dP4=60=>Cycle Pickup [Repeat 60 seconds ON, 30 seconds OFF]
	0	0	CCHL	0-10 Minutes	Second	Chlorine-When dispensed separate from detergent is caustic.
	0	0	C4	0-10 Minutes	Second	Sanitizer used in Final Rinse. If C4 is used, overrides C2 on C3 tab.
	0	0	CS1	0-60	Unit	Frequency for REPLACING Hot Detergent Wash with Hot Acid Wash CS1=0-No switching of chemicals CS1=1-Replace detergent with acid every washing. CS1=2-Replace detergent with acid every other washing. CS1=60-Replace detergent with acid every 60 washings.
	0	0	CS2	0-60	Unit	Frequency for REPEATING hot detergent wash with hot acid wash: CS2=0-No repeating of acid wash CS2=1-Repeat wash detergent with acid every washing. CS2=2-Repeat wash with acid every other washing. CS2=60-Repeat wash with acid every 60 washings.
	0	0	ACC2	0-10 Minutes	Second	Acid Chemical dispensed in Hot Acid Wash if CS1 or CS2 are selected.
	0	0	DIV	0-3	Unit	DIV provides options for 2 extra diverter valves. DIV=0-No change to Diverter operation per Chart (See P9) DIV=1-Diverter operates per Chart up to T1 in Final Rinse; then Diverter 2 Operates for the rest of Final Rinse. Diverter 3 operates with Diverter 1 per chart for initial rinse only.

Table VI Setup Chart Variable Definition and Order of Entry (continued)

Program Setting	Short Setting	Default Setting	Variable	Setting Limits Minimum- Maximum	Increment	Variable Description
						DIV=2 –Diverter operates per Chart up to T7 in Wash; then Diverter 2 operates for the rest of Final Rinse. Diverter 3 operates with Diverter 1 per Chart for Initial Rinse Only. DIV=3 –Diverter operates per Chart up to T7 in Wash; then Diverter 2 operates from T9 in Wash to the End of Wash cycle. Diverter then continues per Chart from Final Rinse. Diverter 3 is inactive.
	0	0	T25	0-30	Second	Provides option for an Air Blow Tab instead of Siphon Tab.
						T25=0–No change to Siphon operation per Chart T1 through T4 of Initial Rinse.
					Second	T25=1or more—Energized after T6 or before the fill of the next cycle. For time entered.
	0.00	0.00	PRE1	0.00-23.59	Time	Military Start Time for Sanitizing
	0.00	0.00	PRE2	0.00-23.59	Time	Military Start Time for Sanitizing
	0.00	0.00	PRE3	0.00-23.59	Time	Military Start Time for Sanitizing
TEMPERATURE (IF HDR 3 Link 4 is Jumpered)						
	0	0	TMP1	0-2		TMP1=0–Temperature features disabled TMP1=1–Temperature features enabled – Display Unit shows temperature for 1 second on every 5 seconds TMP1=2–Temperature features enabled – Display Unit shows temperature continuously
	0	0	TMP2	0-1	Unit	TMP2=0-Display in degrees Celsius TMP1=1–Display in degrees Fahrenheit
	0	0	TMP3	8-88 Deg	Celsius	Specifies Temperature Threshold Value in degrees Celsius.
				45-190 Deg	Fahrenheit	Specifies Temperature Threshold Value in degrees Fahrenheit.
	0.00	0.00	TMP4	0-10 Minutes	Second	Specifies Minimum Wash Time and runs during Circulate of Wash cycle. Testing for temperatures below the Threshold Value starts after Minimum Wash Timer Ends and continues for the remaining Circulate Time if TMP4=0–TemperatureThreshold Test in Wash is disabled.

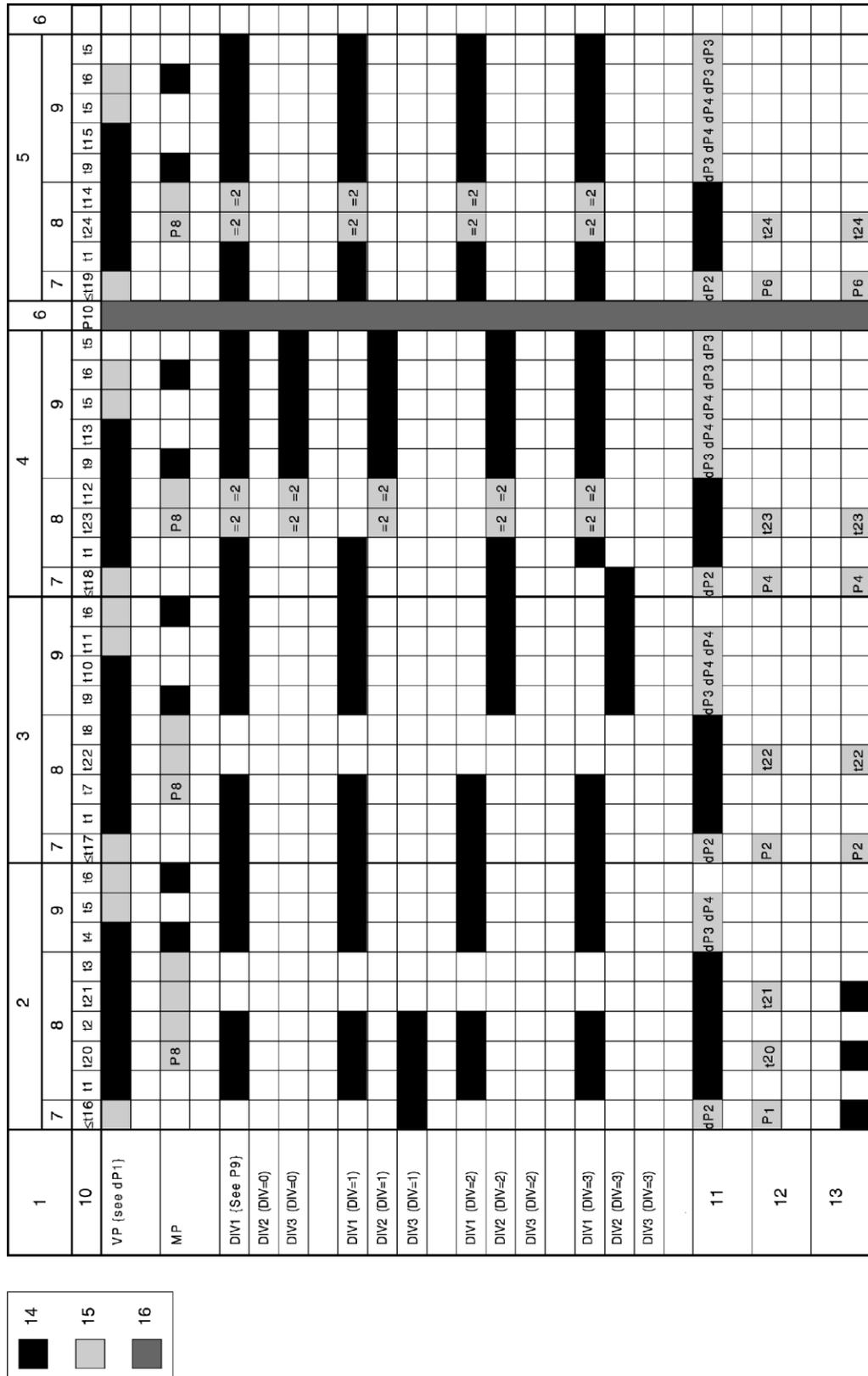


FIGURE 12 Operation Sequence Chart for the Compass Plus (continued on next page)

Legend:

- 1** Cycle
- 2** Initial Rinse
- 3** Wash
- 4** Final Rinse
- 5** Sanitize
- 6** End/Stop
- 7** Fill
- 8** Circulate
- 9** Drain
- 10** Tabs
- 11** Pick/Drain
- 12** Hot Water
- 13** Cold Water
- 14** Tab is energized for that time block (shown in black)
- 15** Tab may be energized for that time block, depending on program settings indicated (shown in light gray)
- 16** All off, waiting for sanitize. This off time may be skipped, depending on setting indicated (shown in dark gray).

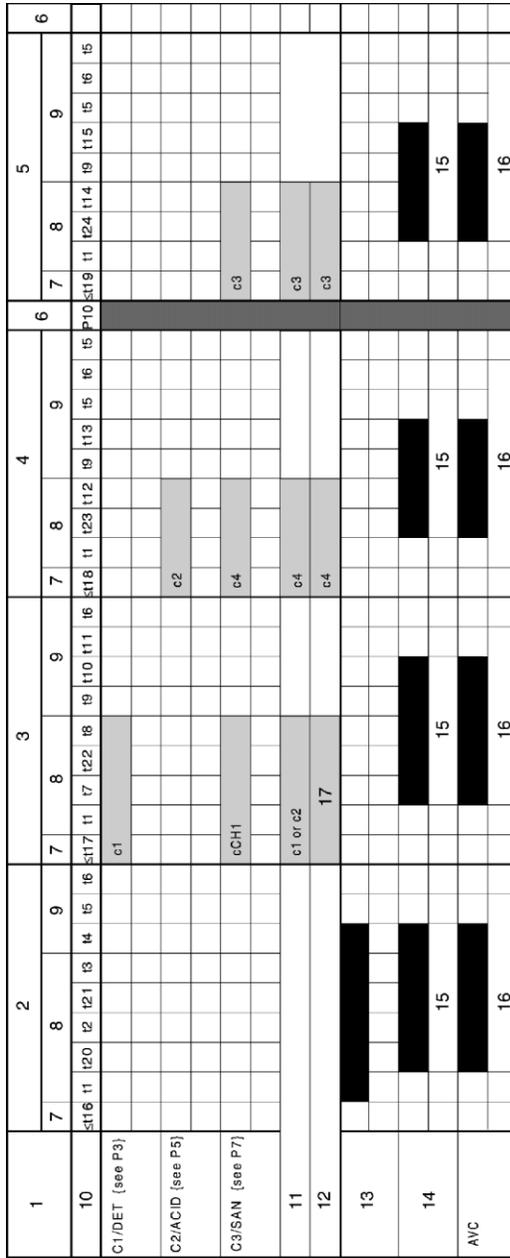


FIGURE 12 Operation Sequence Chart for the Compass Plus

Legend:

- 1** Cycle
- 2** Initial Rinse
- 3** Wash
- 4** Final Rinse
- 5** Sanitize
- 6** End/Stop
- 7** Fill
- 8** Circulate
- 9** Drain
- 10** Tabs
- 11** When using cS1, the following order of chemical dispensing will be used. CCHL is not used.
- 12** When using cS2, the following order of chemical dispensing will be used. CCHL is not used.
- 13** Siphon
- 14** Air Injector
- 15** Cycling (see a1 and a2)
- 16** Cycling (see a3, a4, and a5)
- 18** Tab is energized for that time block (shown in black)
- 19** Tab may be energized for that time block, depending on program settings indicated (shown in light gray).
- 20** All off, waiting for sanitize. This off time may be skipped, depending on setting indicated (shown in dark gray).

Suspending System Operation

One valuable feature of the Compass Plus is the ability to suspend the wash operation in any portion of the wash cycle to aid in troubleshooting or setting up the wash system.

To suspend operation:

1. Turn power off to the Compass Plus.
2. Open the door and Link Pins on HDR 3 Link 1 PRGM/RUN.
3. Close the door and reapply power to the Compass Plus.
4. Press START and immediately press PAUSE. The Pause LED will be on. The display will change to show the time duration of the first time variable (t-16) found on the sequence chart. Refer to **Figure 12**. The corresponding outputs for that time variable will be energized as shown by the blackened and shaded areas on the chart. The START button now performs the function of a STEP button. By pressing the STEP button, the operator is able to advance sequentially through the entire wash program one variable at a time. The display will show only the time duration of the time variable.

Time variables will be displayed but chemical run times or other settings will not be displayed.

Pressing RESUME any time during this process will continue the wash program from that point. Subsequently pressing PAUSE will cause the display to show the remaining time left for that particular variable and cause the system to suspend the operation at that point in the wash cycle. Pressing STOP any time during this procedure will cause the system to put the system back in the normal operating mode. The following procedure is helpful when setting the air injection rates:

Programming Air Injection Rates

1. Turn power OFF to the Compass Plus, open the door and Link Pins on HDR 3. Link 1PRGM/RUN.
2. Close the door and reapply the power to the Compass Plus.
3. Press SET again. The LED display will show d-Ft.
4. Press the SET button. The LED display will show **—C-Lr**.
5. Press SET again. The LED display will show **A—01**.
6. Press SET again. The LED display will show the air injector ON time. Use the HRS and MIN buttons to increase or decrease the setting.
7. Press the SET button. The LED display will show **A—02**.
8. Press SET again. The LED display will show the air injector OFF time. Use the HRS and MIN buttons to increase or decrease the setting.
9. Press STOP to save the changes and stop the programming process.
10. Press the START button to fill the wash vat to the desired setting.
11. Press PAUSE when the vacuum pump starts.
12. Press the STEP button repeatedly to advance to t3 of the initial rinse cycle. The wash system should be operating with the vacuum pump on, the diverter off, the air injector on and the AVC on. At this time, the air injection rates may be tested and graphed.
13. If the air injection rate or AVC settings need to be changed, put a stopper in the wash vat to save the water, press STOP and continue back at Step 3.
14. If the air injection rates are programmed satisfactorily, press STOP. Turn off power to the Compass Plus, open the door and remove Link from HDR 3 Link 1.
15. Close the door and reapply power to the Compass Plus.

Sequence of Time Variables

To choose and suspend the wash cycle at various points (Refer to **Figure 13**):

- A. In program mode, press START and immediately press PAUSE. The display will show the time value for t16. Press STEP and the Compass Plus will move to the next variable t1. Press STEP again and the Compass Plus moves to the variable t20, again showing the time value for the variable. Pressing STEP again would move to t2 and so on. Pressing STOP at any time during the process halts operation and de-energizes all outputs.
- B. *Stepping to t3 is recommended for testing the air injector and AVC. Notice that the VP, PICK/DRAIN, SIPHON, AIR INJ and AVC tabs are energized.

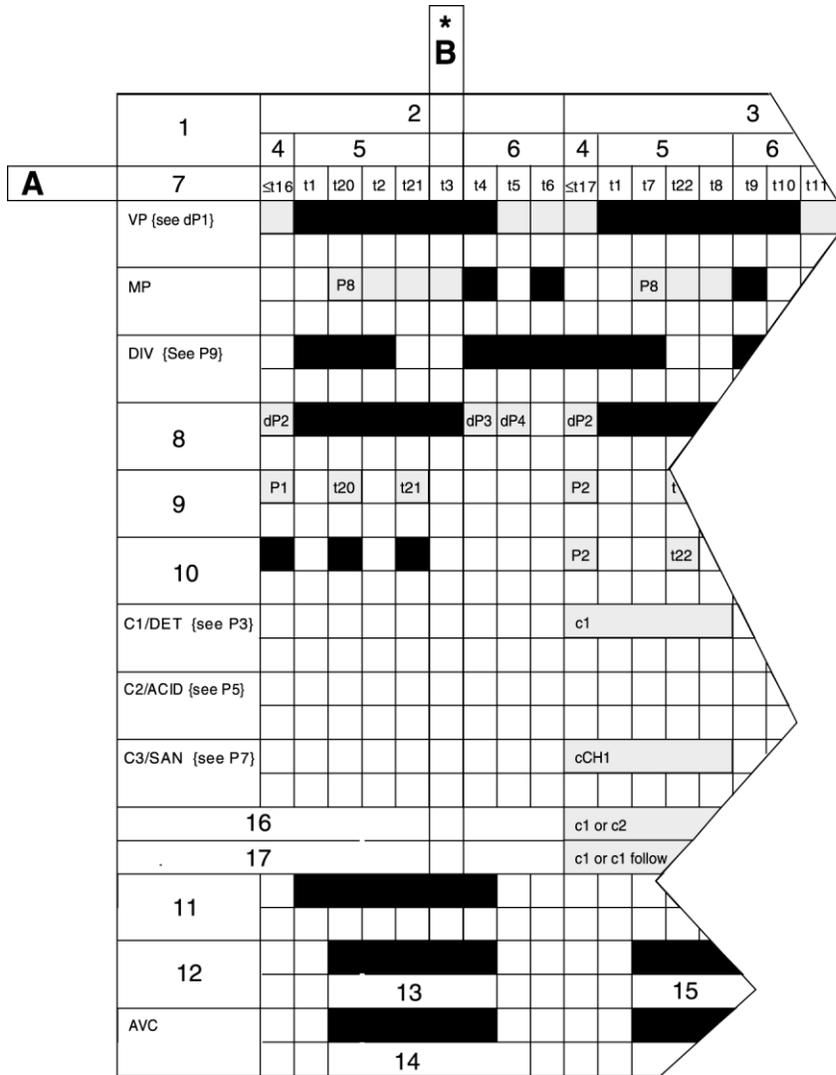


FIGURE 13 Sequence Chart During Suspended Operation

Legend:

- A** Tabs are energized as program steps through the sequence.
- B** Program steps through sequences from left to right.
- 1** Cycle
- 2** Initial Rinse
- 3** Wash
- 4** Fill
- 5** Circulate
- 6** Drain
- 7** Tabs
- 8** Pick/Drain
- 9** Hot
- 10** Cold
- 11** Siphon
- 12** Air Injection
- 13** Cycling (see a1 and a2)
- 14** Cycling (see a3, a4, and a5)
- 15** Cycling (see 1a)
- 16** When using cS1, the following order of chemical dispensing will be used. CCHL is not used.
- 17** When using cS2, the following order of chemical dispensing will be used. CCHL is not used.
- 18** Tab is energized for that time block (shown in black)
- 19** Tab may be energized for that time block, depending on program settings indicated (shown in light gray)
- 20** All off, waiting for sanitize. This off time may be skipped, depending on setting indicated (shown in dark gray).

6.3 Quick Load "Default" Program

A method is available for loading the Compass Plus wash program with a standard list of variable entries which closely resembles standard mechanical timers. This program may be useful in some installations. Loading the quick load "default" program will replace any previously programmed variables with new ones. The program is only a starting point and some adjustments will probably be necessary.

To Load the Default "Standard" Program:

1. Turn power OFF to the wash control unit.
2. Open door to the control unit.
3. Apply a jumper to HDR 3 link 1 (PRGM/RUN).
4. Close the door and reapply power to the wash control unit.
5. Press Set button, Display will read CLr.
6. Press Set button a second time, Display will read dFt.
7. Press Start to load Default program.
8. The Default program is now loaded, The display will read A-01.
9. Turn off power to the wash control unit.
10. Open door to the wash control unit.
11. Remove jumper from HDR 3 link 1.

7 Owner's Manual and Operation Instructions



HAZARDOUS CHEMICALS This product is used with potentially hazardous chemicals that can cause severe injury or death. Always read and follow instructions provided by the chemical manufacturer for proper handling procedures. Keep children away from chemicals at all times. Follow the chemicals at all times. Follow the chemical manufacturer's instructions for proper first-aid procedures.

IMPORTANT! WestfaliaSurge™ equipment owners and operators should read and understand all operation and maintenance information. Keep this manual on file for future reference.

7.1 Automatic Operation

1. Press the START button on the front of the Compass Plus. The red LEDs in the INITIAL RINSE symbol and next to the START button will be turned on and the wash vat will start filling with water. The wash program will continue through the INITIAL RINSE, WASH and FINAL RINSE cycles.
2. At the end of the FINAL RINSE, the Compass Plus will wait for the upcoming pre-sanitation setting. (Setting of the pre-sanitation times is covered in **Table IV**). The PRE-SAN LED will flash until the pre-sanitation cycle starts.

To eliminate an upcoming pre-sanitation cycle, press the STOP button. The PRE-SAN LED should be turned off.

If the operator inadvertently presses STOP, the hold for PRE-SAN can be reactivated by pressing START, then PAUSE/RESUME, then STEP until END is displayed, then press PAUSE/RESUME. The unit will now be waiting for the next scheduled pre-sanitation (if within 14 hours).

7.2 Manual Operation

Manual operation can be used in the event that a certain wash cycle needs to be run or it is desired to advance right to PRE-SAN. Pressing STOP at any time during the following process will stop manual mode and put the Compass Plus back in normal operating mode. Refer to **Table VII**.

Pressing RESUME during any of the above stages will cause the wash program to start at that point and continue to the end of the entire wash cycle.

Setting the Clock and Pre-sanitation Times

The Compass Plus Clock features a 24-hour display. Example: 2 o'clock in the morning would be **02-00** on the Compass Plus display. 2 o'clock in the afternoon would be **14-00** on the Compass Plus display.

Pressing STOP any time during the following process will cause the Compass Plus to save any changes and return to normal operation. Refer to **Table VIII**.

7.3 Operation Instructions —Compass Plus with Parlor Control

The Compass Plus with Parlor Control allows operation of the washing and milking systems from a single control box. The parlor control section of the control box contains a MILK/OFF/WASH switch to control the mode the system is operating and two toggle switches allowing the manual operation of two milk pumps and two Air Blow Valves. A terminal strip is provided to connect the components of the milking and washing systems. The terminal strip includes three relays and internal wiring required to operate a vacuum pump contactor and two milk pump contactors.

Operation Milk Mode:

MILK/OFF/WASH switch in MILK position.

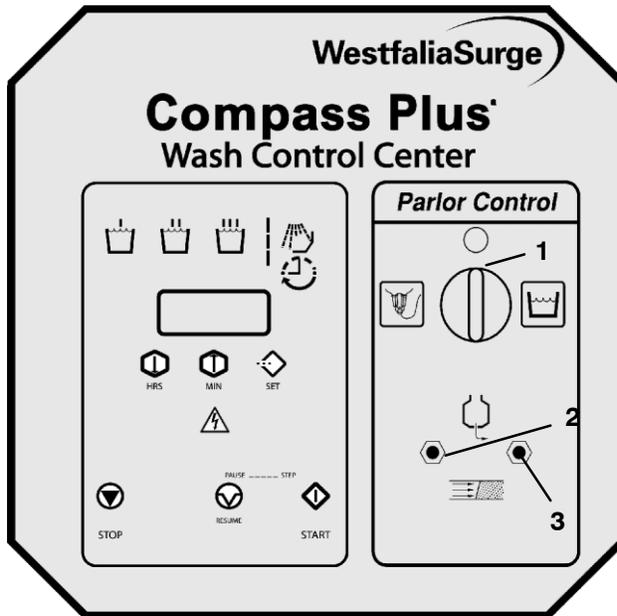
- Vacuum Pump will start.
- Pulsators will start.
- Detacher Power Supply will energize.
- Any other milking mode equipment connected to system will energize.

MILK/OFF/WASH switch in OFF position.

- All milk and wash equipment not energized.

MILK/OFF/WASH switch in WASH position.

- Move milk pump discharge from bulk tank to wash vat.
- Press start button to begin wash cycle.
- All WASH equipment is energized per chart. See **Figure 12**.



Legend:

- 1** Milk/Off/Wash Switch
- 2** Up (Milk Pump 1 Manual On)
- 3** Down (Receiver 1 Air Blow)

Table VII Manual Mode

ACTION	DISPLAY
Press START—INITIAL RINSE and START LEDS will be turned on. Water will start to fill vat.	TIME
Press PAUSE/RESUME within 15 seconds of pressing the START button. The PAUSE/RESUME LED should be turned on and the START LED will be flashing. System operation is now suspended. The INITIAL RINSE LED is turned on. Pressing PAUSE/RESUME at this time will cause the operating sequence to resume at the filling of the vat for the INITIAL RINSE cycle.	F1-L1
Press START (STEP)—Operation remains suspended. Both the INITIAL RINSE and WASH LEDS are turned on. Pressing PAUSE/RESUME at this time will cause operating sequence to resume at the filling of the vat for the WASH cycle.	F1-L2
Press START (STEP)—Operation remains suspended. The INITIAL RINSE, WASH and FINAL RINSE LEDS are turned on. Pressing PAUSE/RESUME at this time will cause operating sequence to resume at the filling of the vat for the FINAL RINSE cycle.	F1-L3
Press START (STEP)—Operation remains suspended. The INITIAL RINSE, WASH and FINAL RINSE LEDS are turned on. Pressing PAUSE/RESUME at this time will cause the system to hold for the next upcoming pre-sanitation cycle.	—1E-nd
Press START (STEP)—Operation remains suspended. The INITIAL RINSE, WASH, FINAL RINSE and PRE-SAN LEDS are turned on. Pressing PAUSE/RESUME at this time will cause the system to immediately start filling the vat for a pre-sanitation cycle.	Pr-E—
Press START (STEP)—Operation remains suspended. The INITIAL RINSE, WASH, FINAL RINSE and PRE-SAN LEDS are turned on. Pressing START, PAUSE/RESUME or STOP at this point will end the manual mode.	—1E-nd
	TIME

Table VIII Setting the Clock and Pre-Sanitation Times

ACTION	DISPLAY
Press SET—The SET LED should be flashing.	TIME
Press HRS button to change the hours. Press the MIN button to change the minutes.	TIME
Press SET—Press the HRS or MIN buttons to scroll to the correct day display.	DAY
Press SET—Press the HRS button to decrease the date and the MIN button to increase the date.	DATE
Press SET—Press the HRS or MIN buttons to scroll to the correct month.	MONTH
Press SET—Press the HRS button to decrease the year and the MN button to increase the year.	YEAR
Press SET—The following procedure is to set PRE-SANITATION start time number 1.	Pr-E1
Press the HRS button to change the hours. Press the MIN button to change the minutes. Leave the display at all zeros if no Pre-SANITATION desired. Press SET.	00-00
Press SET — The following procedure is to set PRE-SANITATION start time number 2.	Pr-E2
Press the HRS button to change the hours. Press the MIN button to change the minutes. Leave the display at all zeros if no Pre-SANITATION desired. Press SET.	00-00
Press SET—The following procedure is to set PRE-SANITATION start time number 3.	Pr-E3
Press the HRS button to change the hours. Press the MIN button to change the minutes. Leave the display at all zeros if no Pre-SANITATION desired. Press SET.	00-00

Power Outage Routine

In the event of a power failure, the controller may alter its control sequence.

If power is off only momentarily, or less than 30 seconds, the controller will continue where it left off when power resumes. If the unit was washing, it will continue where it was in the washing cycle. If the unit was waiting to start sanitize it will continue to wait for the scheduled sanitize.

If power is off for more than 30 seconds while the unit is waiting to start a scheduled sanitize, the control will continue its wait for the scheduled time when power returns. Sanitize start should occur at the scheduled time.

If power is off for more than 30 seconds during the Initial Rinse, Wash or Final Rinse cycles, when power returns the unit will hold for 10 minutes with no outputs energized. After the 10 minutes wait, the control will resume at the Wash Cycle Drain point on the wash chart and continue from there. If the Final Rinse has already occurred, it will be repeated as if it had not already been completed.

If power is off for more than 30 seconds during Pre-Sanitize, when power returns the unit will resume immediately at the Sanitize Drain point on the wash chart and continue from there.

Temperature Warning Display

If the temperature feature is used, the wash water temperature is monitored throughout the wash cycle. If the temperature of wash water returning to the vat falls below the setting programmed in TMP-3, the Compass Plus will suspend the wash circulation cycle after the time programmed in TMP-4 (minimum wash time) has timed out and continue to the Final rinse cycle. The Compass Plus display will show a warning signal. The display will scroll through **LOW, TMP** then display **the lowest wash solution temperature seen** by the temperature sensor and then **current temperature** seen by the sensor. The warning display will reset when the next wash cycle is started. The wash solution temperature will be stored in memory; The Compass Plus will store the wash solution temperatures of the last sixteen wash cycles in an archive file. Refer to the Wash solution temperature archive recall in the Appendix.

8 Maintenance



Note!

*This product does not require any specific Maintenance Checks on a routine basis.
Replace the Circuit Board when the battery life is ended*

Clean outside of Control Box with soft damp cloth. Take care not to energize unit by pushing start button while cleaning.

9 Troubleshooting

Use the decision chart below to troubleshoot products that are not operating properly.

9.1 Troubleshooting Chart

Symptom	Possible Cause	Solution/Action
No display.	Receiver panel not turned to WASH position.	Turn receiver panel to WASH position.
	Power off to receiver panel.	Check fuse panel for blown fuse or breaker box for tripped breaker.
	Blown fuse on board.	Replace defective fuse.
Scrambled display.	Possible defective circuit card.	Push RTC Reset button on Compass Plus PCB. See Figure 7 . Clear program and re-program.
	Possible error in programmed variable.	
Compass Plus losing the time or program.	Power not being applied to Compass Plus long enough to keep battery charged. Should be powered a minimum of 5 hours out of each day.	Leave receiver panel switch in WASH position longer. Have your WestfaliaSurge dealer wire the Compass Plus to a constant power source.
Cycle LEDs are lit but nothing is working.	Receiver panel not turned to the WASH position.	Switch to WASH.
	Power outage routine is holding system off for 10 minute delay because power was lost to the Compass Plus for more than 30 seconds.	Avoid turning the receiver panel from WASH to OFF during the wash cycle. Check power supply to dairy.
	Possible defective card.	Contact WestfaliaSurge dealer or service person.
Wash system misses a programmed PRE-SAN Cycle.	PRE-SAN time set wrong.	Set the PRE-SAN time according to operating instructions.
	Power was out during scheduled start time.	Manually start sanitize cycle.
	STOP button being pushed between the end of the wash cycles and the pending PRE-SCAN cycle.	Use the manual mode of operation to reset the pending PRE-SAN cycle if the STOP button is pushed.

Troubleshooting Chart (Continued)

Symptom	Possible Cause	Solution/Action
Wash system calling for a PRE-SAN Cycle even though one not desired.	A PRE-SAN cycle time has been entered.	Go through the PRE-SANITATION setup procedure and remove the unwanted PRE-SAN set time by changing it to all zeroes, Pre1-00.00, Pre2-00.00, and Pre3-00.00.
Erratic operation/erratic sequence of Wash Cycle.	Electronic noise present on dairy scrambling EPROM chip.	Use shielded cable to wire switch outputs. Use a line filter before the power input to Compass Plus. Clear variables (CLr) before reprogramming.
	Variables programmed wrong	Read instructions and reprogram Compass Plus accordingly.
	System improperly grounded	Repair or improve system grounding.
	Low voltage to digital timer circuit, particularly during vacuum pump motor start up.	Use preferred power connection method described in <i>Connecting the Power Inputs</i> . Use a time delay in the Vacuum Pump circuit.
	Button stuck.	Replace decal.
	Neutral wiring from outputs not complete to NV tab.	Return output neutrals to NV tab.
Buttons do not work.	Defective membrane switch.	Use self-test to verify membrane switch operation. Replace membrane switch/cover assembly if necessary.
Compass Plus loses program.	Battery loses charge between washings.	Power Compass Plus all the time and wire switch inputs to receiver EB tab.
	Battery life is exceeded.	Replace board.
Wash Vat overflows.	Pressure switch not making contact when vat full.	Replace switch. Check pressure switch hose for air leak.
Wash Vat will not fill up.	Time variable t16, t17, t18 and t19 set too short.	Reprogram variables to longer duration or increase rate of water flow to wash vat.

Troubleshooting Chart (continued)

Symptom	Possible Cause	Solution/Action
Water Fill Valves will not open up.	No voltage to valves.	Use self-test feature to power the valve in question. Check power at output tab on the Compass Plus board. If power in but no power out then replace board.
	Voltage to valve but valve will not open.	Replace Valve Coil. Check valve screen for obstructions. Rebuild or replace valve.
	Blown fuse.	Replace fuse FS1.
Vacuum Pump starts immediately upon pressing the Compass Plus START button.	Pressure switch wired to normally closed contact or faulty pressure switch.	Wire pressure switch to normally open contacts. Replace defective pressure switch.
Display shows 'tmp' then 'err'.	Temperature probe resistance out of range. Shorted wires, broken wires, defective sensor.	Replace sensor, inspect wires.

9.2 Self Diagnostic Routine



ELECTRICAL SHOCK HAZARD During this test procedure portions of the Compass Plus board have high voltage on exposed connectors. Extreme caution must be exercised to avoid electrical shock.



Disconnect output loads before running self test. Not doing so may result in blowing output fuse F51.

A self diagnostic test routine is available for the installer or service person to use in checking the front display lights, outputs, and membrane buttons.

- Disconnect power to the unit. The clock should be blank, the milk pump control panel should be switched to OFF and all other potential power sources should be off.
- Open the Compass Plus door.
- Disconnect all the wires connected to the output tabs listed in steps 2 and 3. Cover any exposed wire ends with tape so they do not touch anything when the door is closed.
- Verify that the program Link is in the RUN position.
- Apply a jumper to TEST Link 3.
- Close the Compass Plus door.
- Turn on power to the unit.

1. The unit will go through a sequence of turning on all segments of the display and then all LEDs. If all the LEDs do not turn on, the board is faulty and needs to be replaced. Press STOP twice.
2. The unit will energize tabs VP, MP, DIV, PICK/DRAIN, HOT and COLD in that order and keep them energized. Power must be properly connected to L3 and N3 for outputs to be energized. Carefully open the door of the Compass Plus. DO NOT TOUCH ANY OF THE TABS OR WIRES! The voltage measured between tabs L3 and N3 will be from 24 volts AC to 240 volts AC depending on the installation. Using a voltmeter, measure the voltage between tabs L3 and N3. Attach one voltmeter lead to N3. Use the other lead of the voltmeter to test the energized tabs one at a time for the same voltage. If power is applied at L3 and N3 and the proper tabs are not energized during this phase of the test, the circuit board could be faulty and should be replaced. Activate the pressure switch to create momentary electrical contact between PSW1A and PSW1B. To activate the pressure switch, fill a glass with water, insert the sensing tube for the pressure switch into the glass and raise the glass so that the sensing tube is immersed in at least 2 inches[50.8] of water. This should close the pressure switch. If it does not, the pressure switch could be faulty.
3. The unit will de-energize tabs energized in step 2 and then energize tabs C1/DET, C2/ACID, C3/SAN, SIPHON, AI and AVC in that order and keep them energized. With one voltmeter lead attached to N3, use the other voltmeter lead to test the energized tabs for voltage one at a time. If power is applied at L3 and N3 and the proper tabs are not energized during this phase of the test, the circuit board could be faulty and should be replaced. Remove the voltmeter leads and carefully close the Compass Plus door. Press STOP.
4. The Initial Rinse, Wash, Final Rinse and Sanitize LEDs turn on to indicate the keyboard test mode. Press the membrane buttons in the following order to display the following:
 - Pause/Resume—"Pse" shown on display
 - Start—"Strt" shown on display
 - HRS—"HrS" shown on display
 - MIN—"Min" shown on display
 - SET—"Set" shown on display

Press Stop again—"Stop" shown on display

Press Stop again—"Wdo" is displayed for one second then 7-segment display sequence is restarted.

The self-diagnostic test is now complete. The front panel display lights, control outputs and membrane buttons have been checked of proper operation. If all tests have passed, the Compass Plus PCB and decal membrane switches are in working order.

- Disconnect power to the Compass Plus.
- Open the Compass Plus door, reattach output wires.
- Remove jumper from TEST Link 3.
- Close Compass Plus door.
- Turn on power to Compass Plus.

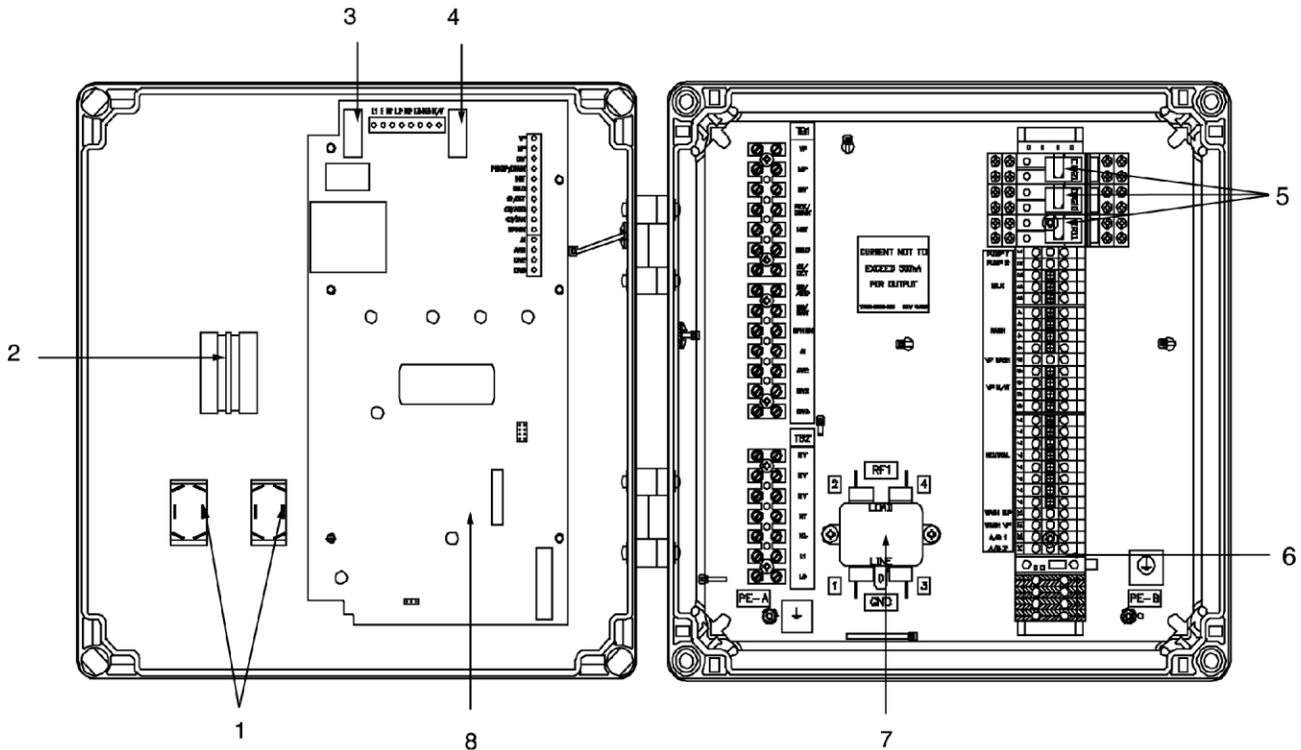
Compass Plus is ready to return to service.

10 Spare Parts

Model: **Compass Plus® Wash Control Center**



Part Number: **7750-0108-229**
7750-0103-245
7750-0108-230



Item	Part Number	Description
1	7750-0109-877	Switch Toggle 2 PDT MOM ON
2*	7750-0109-149	Switch 3 Position Selector
3*	7750-0104-978	Fuse 1 amp 5x20 mm Fast (10)
4*	9105-1433-001	Fuse 3.15 amp 5x20 mm
5	7750-0038-948	Relay 115 VAC for 7750-0103-245
	7750-0109-148	Relay 230 VAC for 7750-0108-230
6*	7750-0109-146	Fuse 6.3 amp 5x20 Slo Blo (10)
7*	7750-0036-733	Filter RF line
8*	7750-0109-397	PCB Compass Plus (also replacement for Navigator PCB)
•	7750-0109-147	Decal Front Cover (not shown)
•*	7750-0098-747	Program Record Card (not shown)

* Recommended for Dealer Inventory

• Not Illustrated

11 Appendix**11.1 Variable Definitions**

The list of variables follows the order in which they are entered into the Compass Plus. See **Table VI**. Some variables are used for more than one cycle and are listed as such. The actual sequence of operation is shown in **Figure 12** (Sequential Chart for Compass Plus).

All variables must be filled in except for those found under OPTIONAL. The OPTIONAL variables may be necessary in certain regions to facilitate proper washing.

11.1.1 AI / AVC Variables

1. — **C-Lr** This variable means CLEAR. If the START button is pressed when — **C-Lr** is visible the program memory will be erased and all variables will be set to zero. The programmer will want to clear the variable list for a new unit start-up or if the unit program is corrupted due to external electrical noise.
2. **dFT** This variable means Default. If the START button is pressed when dFT is visible the default program is loaded.
3. **A—01** Air injector ON time. This variable will set the time the air injector tab is energized during the circulation cycles. The air injector ON time can be set from 0 to 30 seconds in tenths of a second. (For example, a setting of —**4•0**— is equivalent to 4 seconds). Consult your WestfaliaSurge™ *Maintenance Manual* for proper air injector ON time setting.
4. **A—02** Air injector OFF time. This variable will set the time the air injector tab is de-energized during the circulation cycles. The air injector OFF time can be set from 0 to 30 seconds in tenths of a second. (For example, a setting of —**4•0**— is equivalent to 4 seconds). Consult your WestfaliaSurge *Maintenance Manual* for proper air injector OFF time setting.
5. **A—03** Delay to AVC on. This variable sets the time interval between the air injector turning off and the Automatic Vacuum Control (AVC) being energized. The delay to AVC ON can be set **from 0 to 3 seconds in tenths of a second. (For example, a setting of —2•0— is equivalent to 2 seconds)**. Set this variable to operate the AVC just after the slug reaches the receiver jar.

**Note!**

The delay to AVC time plus AVC ON time should be less than the air injector OFF time. If it is not, the AVC will operate after every air injection cycle. (A—02 > A—03 + A—04)

6. **A—04** AVC ON time. This variable sets the length of time that the AVC tab is energized. The AVC ON time can be set from 0 to 30 seconds in tenths of a second. (For example, a setting of —**4•0**— is equivalent to 4 seconds).
7. **A—05** AVC frequency. This variable sets how many times the air injector will be energized before the AVC tab is energized.

Initial Rinse

8. **P—01** Cold or tempered rinse. This variable sets the temperature of the rinse water. Set the variable value to:

- 0 for a cold rinse
- 1 for a tempered rinse (cold + hot)
- 2 for a cold rinse cold + 30 second hot
- 3 for cold + 60 seconds hot
- 4 for cold + 90 seconds hot
- 5 for cold + 120 seconds hot
- 6 for cold + 150 seconds hot
- 7 for cold + 180 seconds hot
- 8 for cold + 210 seconds hot
- 9 for cold + 240 seconds hot

A cold rinse saves hot water. A warm rinse can preheat the milk piping to help maintain a higher temperature for the wash cycle, and may do a better job of flushing milk residue from the line.

9. **t—01** Delay to air injector start. 0 to 60 second duration in 1 second increments with display in seconds. This variable sets the time from the start of circulation to the first opening of the air injector. By delaying the first opening of the air injector, the system can draw enough water from the wash vat to fill the piping the required 20% needed for proper slug formation. Delaying the first air injector cycle also helps the system to achieve proper vacuum faster, allowing for faster starting of the wash cycle. This variable sets the delay to air injector for the initial rinse, wash, final rinse and sanitize cycles.

10. **t—02** Divert for initial rinse. 0 to 8 minutes duration in 1 second increments with display in minutes and seconds. This variable sets the amount of time that the wash water will be diverted to go directly down the drain during the initial rinse circulation cycle. Typically, systems should use a single pass initial rinse flush and **t—02** should equal the time required to empty the wash vat. If the system does not have a diverter, then set the **t—02** variable to zero.

11. **t—03** Initial rinse after divert. 0 to 4 minutes duration in 1 second increments with display in minutes and seconds. This variable sets additional circulation time without the diverter energized. This is generally only used if a diverter is not used and some circulation is desired to get more of the milk residue into suspension before draining. The **t—02** variable and the **t—03** variable add together to comprise the bulk of the initial rinse circulation time. If it is desired to divert the entire rinse cycle then set **t—02** to zero.

12. **t—04** Drain for initial rinse. 0 to 6 minutes duration in 1 second increments with display in minutes and seconds. This variable sets the amount of time the wash at drain valve will be open and the milk pump will run. The diverter tab is also energized. This time period allows the system to draw any remaining water out of the system with the vacuum pump and helps to clear milk lines, milking units and so forth. When a diverter is used, this can be set for short duration based on the time it takes to evacuate most of the wash solution from the system.

13. **t—05** Pause. 0 to 5 minutes duration in 1 second increments with display in minutes and seconds. This variable allows the system to drain via gravity by shutting everything off except the diverter tab. The wash vat drain is open. Set this variable to allow time for vacuum dissipation and additional time for draining of precoolers or other equipment which will default drain into the sink after final pump down. Set the value higher for systems that do not use a diverter. **t—05** is used in the initial rinse, final rinse and sanitize cycles.

14. **t—06** Purge. 0 to 1 minute duration in 1 second increments with display in minutes and seconds. This variable will turn the milk pump ON to remove any remaining wash solution in the receiver jar. **t—06** is used in the initial rinse, wash, final rinse and sanitize cycles. The primary use of this variable is in the United Kingdom.

Wash

15. **c—01** Detergent. 0 to 10 minutes in 1 second increments with display in minutes and seconds. This variable sets the time necessary for dispensing the detergent into the wash vat. Set the time long enough to empty the chemical container or to dissolve any powders or tablets. The time may be set to within one second of the desired run time for tube (peristaltic) pump dispensers as well. The detergent will dispense for the entire time of **c—01** even if the wash vat is full, the water fill valves are shut-off and circulation has begun.

16. **P—02** Hot, tempered or cold wash. This variable sets the temperature of the wash water solution. Set the variable value to:

———0 for a cold wash

———1 for a tempered wash

———2 for a hot wash.

17. **P—03** Beginning of chemical dispense. This variable allows the detergent to start dispensing after there is some water in the wash vat. This prevents concentrated chemical from “burning” the stainless steel surface of the wash vat. The variable also allows the chemical to be added after the start of circulation and after the divert cycle. This reduces chlorine dissipation and prevents losing the chemical down the drain if a diverter is being used. Set the variable value at:

———0 for 10 second delay

———1 for 30 second delay

———2 for 60 second delay

———3 for delay after wash cycle divert (**t—07**)

18. **t—07** Divert for wash cycle. 0 to 3 minutes in 1 second increments with display in minutes and seconds. This variable allows the system to divert the first part of the wash cycle. Generally this will be used if additional line preheating is required.

19. **t—08** Wash circulation cycle. 0 to 15 minutes in 1 second increments with display in minutes and seconds. This variable sets the remaining circulation time for the wash cycle and should be set to allow at least 20 air injection cycles. It may also be set based on the ability of the system to maintain proper temperature.

20. **t—09** Drain for wash, final rinse and sanitizer cycle. 0 to 6 minutes in 1 second increments with display in minutes and seconds. The vacuum pump, milk pump and diverter are energized and the vat drain is open. The larger the system, the longer the drain down time that will be required. This should be set long enough to pump down the system but not long enough as to run the milk pump dry. Use vacuum purge (**t—10**) to extend the drain time without running the milk pump.

21. **t—10** Vacuum air purge. 0 to 3 minutes in 1 second increments with display in minutes and seconds. The vacuum pump and diverter are energized and the wash vat drain is open. This time period allows the system to draw any remaining solution out of the system with the vacuum pump and helps to clear milk lines, milking units and so forth.

22. **t—11** Pause. 0 to 5 minutes in 1 second intervals with display in minutes and seconds. This time period allows for chlorine dissipation. The diverter is the only device energized. For slow draining systems, set this variable value higher to allow more time to drain.

Final Rinse (Acid Rinse)

23. **c—02** Acid chemical dispense. 0 to 10 minutes in 1 second increments with display in minutes and seconds. This variable sets the time necessary for dispensing the acid into the wash vat. Set the time long enough to empty the chemical container or dissolve any powders or tablets. Chemical will continue to dispense even if the wash vat is full, water fill valves are shut off and circulation has begun.

24. **P—04** Hot, tempered or cold final rinse. This variable sets the temperature of the rinse water solution. Set the variable value to:

———0 for a cold rinse

———1 for a tempered rinse (hot and cold)

———2 for a hot rinse

25. **P—05** Beginning of chemical dispense. This variable allows the acid to start dispensing after there is some water in the sink. This prevents concentrated chemical from “burning” the stainless steel surface of the wash vat. The variable also allows the chemical to be added after the air injector start.

———0 for 10 second delay

———1 for 30 second delay

———2 for 60 second delay

———3 for delay after air injector start (**t—01**)

26. **t—12** Final rinse circulation time. 0 to 10 minutes in 1 second increments with display in minutes and seconds. This time variable sets the final rinse circulation duration. cir

27. **t—13** Vacuum air purge. 0 to 3 minutes in 1 second increments with display in minutes and seconds. The vacuum pump and diverter are energized and the wash vat drain is open. This time period allows the system to draw any remaining solution out of the system with the vacuum pump and helps to clear milk lines, milking units and so forth.

Sanitize

28. **c—03** Sanitizer chemical dispense. 0 to 10 minutes in 1 second increments with display in minutes and seconds. This variable sets the time necessary for dispensing the sanitizer into the wash vat. Set the time long enough to empty the chemical container or dissolve any powders or tablets. The sanitizer will continue to dispense even if the wash vat is full, water fill valves are shut off and circulation has begun.

29. **P—06** Hot, tempered or cold sanitize. This variable sets the temperature of the sanitizer solution. Set the variable value to:
- 0 for a cold sanitize
 - 1 for a tempered sanitize (hot and cold)
 - 2 for a hot sanitize
30. **P—07** Beginning of chemical dispense. This variable allows the sanitizer to start dispensing after there is some water in the sink. This prevents concentrated chemical from “burning” the stainless steel surface of the wash vat and can be used to reduce chlorine dissipation. The variable also allows the chemical to be added after the air injector start.
- 0 for 10 second delay
 - 1 for 30 second delay
 - 2 for 60 second delay
 - 3 for delay after air injector start (**t—01**)
31. **t—14** Sanitizer circulation time. 0 to 10 minutes in 1 second increments with display in minutes and seconds. This time variable sets the sanitizer circulation duration.
32. **t—15** Vacuum air purge. 0 to 5 minutes in 1 second increments with display in minutes and seconds. The vacuum pump and diverter are energized and the wash vat drain is open. This time period allows the system to draw any remaining solution out of the system with the vacuum pump and helps to clear milk lines, milking units and so forth. A longer purge makes for a dryer system.

11.1.2 Additional Required Variables

33. **t—16** Fill time limit for initial rinse (0-15 minutes)
- Applications include using it as a limiting run time in case of pressure switch failure to avoid running an excessive amount of water down the drain. Other applications would be for filling strictly on the basis of time and not using the pressure switch in this cycle.
 - If a pressure switch trips before **t—16** times out, circulation will begin at the activation of the pressure switch. If **t—16** times out prior to the pressure switch being activated, circulation will begin immediately after timing out **t—16**.
 - **t—16** is a time value in seconds.
34. **t—17** Fill time limit for wash (0-15 minutes).
- Applications include using it as a limiting run time in case of pressure switch failure to avoid running an excessive amount of water down the drain. Other applications would be for filling strictly on the basis of time and not using the pressure switch in this cycle.
 - If a pressure switch trips before **t—17** times out, circulation will begin at the activation of the pressure switch. If **t—17** times out prior to the pressure switch being activated, circulation will begin immediately after timing out **t—17**.
 - **t—17** is a time value in seconds.
35. **t—18** Fill time limit for final rinse (0-15 minutes).
- Applications include using it as a limiting run time in case of pressure switch failure to avoid running an excessive amount of water down the drain. Other applications would be for filling strictly on the basis of time and not using the pressure switch in this cycle.
 - If a pressure switch trips before **t—18** times out, circulation will begin at the activation of the pressure switch. If **t—18** times out prior to the pressure switch being activated, circulation will begin immediately after timing out **t—18**.

36. **t—19** Fill time limit for sanitize (0-15 minutes)

- Applications include using it as a limiting run time in case of pressure switch failure to avoid running an excessive amount of water down the drain. Other applications would be for filling strictly on the basis of time and not using the pressure switch in this cycle.
- If a pressure switch trips before **t—19** times out, circulation will begin at the activation of the pressure switch. If **t—19** times out prior to the pressure switch being activated, circulation will begin immediately after timing out **t—19**.
- **t—19** is a time value in seconds.

11.1.3 Optional Variables

37. **t—20** Adds more water in the initial rinse cycle during diverting.

- Applications include where more water is required to achieve sufficient flushing of solids during the diverted initial rinse.
- Water valves will open based upon the P1 setting for hot, warm or cold.
- **t—20** is a time value in seconds (0-4 minutes).

38. **t—21** Adds more water in the initial rinse cycle after diverting.

- Applications include where the wash vat is too small to hold the necessary solution volume or when the first slug or two are diverted to warm up the pipeline.
- Water valves will open based upon the P1 setting for hot, warm or cold.
- **t—21** is a time value in seconds (0-4 minutes).

39. **t—22** Adds more water in the wash cycle after circulation has started.

- Applications include where the wash vat is too small to hold the necessary solution volume or when the first slug or two are diverted to warm up the pipeline.
- Water valves will open based upon the P2 setting for hot, warm or cold.
- **t—22** is a time value in seconds (0-6 minutes).

40. **t—23** Adds more water in the final rinse cycle after circulation has started.

- Applications include where the wash vat is too small to hold the necessary solution.
- Water valves will open based upon the P4 setting for hot, warm or cold.
- **t—23** is a time value in seconds (0-6 minutes).

41. **t—24** Adds more water in the sanitize cycle after circulation has started.

- Applications include where the was vat is too small to hold the necessary solution.
- Water valves will open based upon the P6 setting for hot, warm or cold.
- **t—24** is a time value in seconds (0-6 minutes).

42. **P—08** Allows for running the milk pump continuously during the wash.

- This does not affect the operation of the milk pump during drain. The milk pump is always operated by the controller during the drain cycle.
- **—0** Milk pump works off the level probes during circulation.
- **—1** Milk pump is run continuously following the initial delay t1.

43. **P—09** Allows for reversing divert output. Changes ON to OFF and OFF to ON.
- **—0** The DIV output is energized during divert per the chart.
 - **—1** The DIV output is reversed and therefore energized during circulation and NOT during divert.
 - **—2** The DIV output is energized during divert per the chart + during t23, t12, t24 and t14.
44. **P—10** Allows for skipping STOP and going directly into sanitize.
- This may be used in dairies milking around the clock that want to sanitize after washing and do not have time to wait.
 - This also allows for up to 5 consecutive cycles in a wash cycle. 1-Rinse, 2-Wash, 3-Wash, 4-Final Rinse, 5-Sanitize (see cS1 and cS2).
 - **—0** Following a washing the controller will STOP and wait for a scheduled sanitize.
 - **—1** Sanitize cycle will be carried out immediately following the final rinse.
45. **dP-01** Allows for running the vacuum pump continuously during washing.
- Typically used in the United Kingdom and other areas where the vacuum pump must run constantly from start to stop.
 - This application requires the use of a pickup valve to facilitate filling of the wash vat.
 - **—0** This is typical for the United States and other areas where the vacuum pump is turned on and off to start and end circulation of the wash solutions.
 - **—1** This is typical for the United Kingdom and other areas using pickup valves to start and end circulation of the wash solutions.
 - VP is turned off during the final t5 before STOP and END to allow the vacuum to dissipate with the pickup valves open. This will help minimize reverse spinning the vacuum pump in the United Kingdom.
46. **dP-02** When the drain output is driving a pickup valve, this variable allows for turning OFF the pickup valve during the fill cycles. (see dP1)
- **—0** Drain/pickup valve ON during fill. This is typical for the United States and other areas where the vacuum pump is turned on and off to start and end circulation of the wash solutions.
 - **—1** Drain/pickup valve OFF during fill. This is typical for the United Kingdom and other areas using pickup valves to start and end circulation of the wash solutions.
47. **dP-03** When pickup valves are used and sink drain is also used, this variable allows for turning ON the pickup valve during the drain cycles. It also is used during t6 and final t5's to pull system vacuum down prior to shutting off vacuum pump to help minimize reverse spinning pump. (see dP1)
- **—0** Drain/pickup valve OFF during drain. This is typical for the United States and other areas using a wash vat drain.
 - **—1** Drain/pickup valve ON during drain. This is typical for the United Kingdom and other areas using pickup valves to start and end circulation of the wash solutions and no drain is used.
48. **dP-04** When pickup valves are used, this allows for pulsing the pickup valves to inject slugs of air into the system to help blow dry any milk hose loops.
- **—0** Drain is open [OFF] during vacuum purge.
 - **—1** Pickup valve is pulsed {ON 1 second...OFF 30 seconds...ON 1 second...OFF 30 seconds...and so forth.}

- ~~————~~**2** Pickup valve is pulsed {ON 2 seconds...OFF 30 seconds... ON 2 seconds...OFF 30 seconds...and so forth.}
 - ~~————~~**60** Pickup valve is pulsed {ON 60 seconds...OFF 30 seconds... ON 60 seconds...OFF 30 seconds...and so forth.}
49. **cC-HL** Chlorine. 0 to 10 minutes in 1 second increments with display in minutes and seconds. This variable is used if separate caustic and chlorine dispensers are used for the detergent wash cycle. The chlorine is set up on the SAN sanitizer tab and is started at the same time the DET detergent tab is energized. this allows the dairy to boost the chlorine value of the soap. This method is normally only used with tube (peristaltic) pump dispensers.
50. **c—04** This is a separate run time for chemical 3 (sanitizer). If used, c4 eliminates c2 in the final rinse. This will primarily be used in Scotland where Hypochlorite must be used as a final rinse instead of acid.
51. **cS-01** Replaces wash chemical c1 periodically with chemical c2.
- Periodically, chemical c2 is dispensed during the wash cycle, instead of the typical c1 chemical.
 - If **cS-01** = 8, then the 8th washing will have an alternate chemical. With twice a day washing, this would equate to once every 4 days the chemical would be substituted.
 - Typically used in areas where a hot acid wash is desired and a hot detergent wash is not required.
 - The final rinse is then typically a water rinse with no chemicals, however c4 sanitizer may be used in conjunction with **cS-01** in the final rinse.
 - Primary use will be Latin America and Europe.
52. **cS-02** Repeats wash cycle periodically with chemical substitution.
- Typically this is used in areas where a hot acid wash is desired after the detergent cycle.
 - Following the wash cycle, the wash cycle is repeated identically, except that chemical 2 is dispensed rather than chemical c1 based on the variable c2.
 - The repeat is done at a wash interval based on the entry for **cS-02**. If **cS-02**=8, then the 8th washing will be repeated. With twice a day washing, this would equate to once every 4 days a repeat would occur.
 - The final rinse is then typically a water rinse with no chemicals, however c4 sanitizer may be used in conjunction with **cS-02** in the final rinse.
 - Primary use will be Latin America.
53. **ACC2** Acid chemical dispense time for hot acid wash if **cS-01** or **cS-02** are selected. 0–10 minutes in 1 second increments.
54. **DIV** The divert variable allows for the use of up to three diverter valves to be used with the wash system. Four settings are available **DIV 0 —DIV 3**.
- **DIV = 0** No change, One Diverter output operates per chart.
 - **DIV = 1** Three Diverter outputs used, Diverter 1 operates per chart up to T1 In final rinse then Diverter 2 operates for the rest of final rinse. Diverter 3 operates with Diverter 1 per chart for Initial rinse only.

This variable allows the water used in the final rinse to be held in a separate tank and reused in the next initial rinse cycle.
 - **DIV = 2** Two Diverter outputs used, Diverter 1 operates per chart up to T7 in wash cycle then Diverter 2 operates from T9 in wash cycle to the end of the final rinse cycle. Diverter 3 output is inactive.

This variable allows the wash water and the final rinse water to be diverted to a gray water tank for use as parlor cleanup water.

- **DIV = 3** Two Diverter outputs used, Diverter 1 operates per chart up to T7 in wash cycle then Diverter 2 operates from T9 in wash cycle to the end of the wash cycle. Diverter 3 output is inactive.

This variable allows the wash water only to be diverted to a gray water tank for use as parlor cleanup water.

55. **T25** = The T25 Variable allows the siphon output tab to be used to operate a Solenoid valve to apply vacuum to a container to fill chemical or operate a Solenoid valve to air blow the discharge line after each wash cycle.

- **T25 = 0** No change in siphon operation per chart T1 - T4 of initial rinse
- **T25 > 0** Energized after T6 or before the fill of next cycle for the time entered.

Temperature Settings

The use of the temperature features available with the Compass Plus requires the optional temperature probe kit to monitor the Temperature of the wash water returning to the wash vat.

During Milk, the Compass Plus can monitor the temperature of the milk. This feature can be useful if precooling is used.

TMP-1 This setting determines the functions of the temperature feature available with the Compass Plus.

- **TMP-1 = 0** Temperature features are disabled
- **TMP-1 = 1** Temperature features are enabled—Display shows temperature for 1 second and time for 5 seconds in both milk and wash.
- **TMP-1 = 2** Temperature features are enabled — Display shows temperature continuously.

TMP-2 Determines if Fahrenheit or Celsius Temperature scales are used.

- **TMP-2 = 0** Display shows degrees Celsius
- **TMP-2 = 1** Display shows degrees Fahrenheit

TMP-3 Adjustable from 7 to 87 Degrees Celsius if **TMP-3 = 0** Or
Adjustable from 45 to 190 Degrees Fahrenheit if **TMP-2 = 1**.

This temperature setting determines the value that the Compass Plus will suspend the wash circulation cycle and continue to run the remaining portion wash program if the return wash solution falls below the set temperature.

TMP-4 Specifies the “minimum wash time” before the **TMP-3** setting will suspend the wash circulation cycle. This time starts at the start of T1 and is adjustable from 0 to 10 minutes in 1-second increments. If T7 and/or T22 are used these times must be considered when setting minimum wash time. If **TMP-4** is set to 0, this function is disabled.

Wash Solution Temperature Archive Recall

The Compass Plus will store the last 16 wash solution temperatures in memory. These temperature recordings are recalled by pressing the Set button while in the run mode. Press the set button repeatedly to toggle through the time/date settings and the pre-sanitize settings. **AC-1** will appear on the display, press set to display the most recent recording. Press set again **AC-2** will appear, Press set to display the next recording and so on through **AC-16**.



7750-9015-006
©2003 WestfaliaSurge
All Rights Reserved

20903 West Gale, Galesville, WI 54630-0659
www.westfaliasurge.com

SE22IO1E
Revised 10/03
Printed in U.S.A