AutoPilot
Conveyor Concierge™

Owner's Manual

Sonny's Enterprises, Inc.
5605 Hiatus Road
Tamarac, FL 33321
13v2

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WARNING *SAFETY REQUIREMENTS* WARNING

1. All employees must be thoroughly trained in safe operation and standard maintenance practices. All employees must review this entire manual monthly.
2. Do not enter the wash tunnel when the equipment is operating. Death or dismemberment may occur.
3. Do not wear loose fitting clothing or jewelry around moving equipment. Do not allow any part of your body or other objects (including ladders, hoses or tools) to come in contact with moving equipment. Entanglement may result causing death or dismemberment.
4. Do not leave a ladder or any other items such as wash down hoses or tools in the wash tunnel while equipment is running. Vehicle damage and injury, including death, can occur.
5. Always exercise caution when walking (never run) through the wash tunnel as there may be slippery conditions. Be careful so you do not bump into or trip over equipment.
6. Only those employees specifically instructed and trained by the location management are permitted to enter the wash tunnel to perform inspections or maintenance. At least two qualified maintenance people must be present when performing equipment repairs or preventive maintenance.
7. Do not perform any maintenance or work on equipment unless you first perform Lock-Out Safety Precautions. All electrically powered equipment must have manually operated disconnects capable of being locked in the "OFF" position. Equipment that has been "locked out" for any reason must be restarted only by the person who performed the "lock out" operation.
8. When working on any equipment that is higher than your shoulders, always use a fiberglass ladder that is in good condition.
9. Do not attempt to repair or adjust any pressurized liquid or pneumatic part, hose, pipe or fitting while that equipment is in operation.
10. Electrical connections and repairs must be performed by a Licensed Electrician Only.
11. Emergency "STOP" buttons must be well marked and their location and proper use reviewed with all personnel. Any activated "STOP" button must be reset only by the person who activated it. Clear the wash tunnel of any people, ladders, hoses, tools and other loose items before restarting the equipment. An audible device must sound to warn people that the equipment is starting.
12. Do not operate any piece of equipment that requires safety covers with those covers removed or improperly installed. Do not operate any piece of equipment if any component of that piece is suspected to be defective or malfunctioning.

13. Store all cleaning and washing solutions and oils in a well-ventilated area. Clean up fluid spills immediately to prevent hazardous safety conditions. Be certain to follow all safety procedures on MSDS Sheets for each chemical product used.
14. All hydraulic and electric systems in the wash tunnel equipped with a torque relief or overload should be checked and set at the minimum amount that will allow for proper functionality under normal washing conditions.
15. No unauthorized people should ever be permitted in the wash tunnel or near the equipment at any time.

* * *

! ! CAUTION ! !

When a piece of equipment must be in operation during inspection or maintenance, one qualified technician must stay at the power disconnect switch while another qualified technician performs the inspection or maintenance.

INTRODUCTION

This Owner's Manual contains information that is vital to the successful installation, operation and maintenance of your SONNY'S vehicle washing equipment.

Please read, and understand, the full contents of this manual before installation and operation of the equipment. Keep this booklet in a location where it may be used for ongoing reference.

Should you have any questions on the operation or servicing of this equipment please contact

AUTOPILOT CARWASH CONTROL SYSTEMS

SONNY'S ENTERPRISES INC.

5605 Hiatus Road

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GENERAL OVERVIEW

The Speed Control System is intended to use to speed up and down automatically the conveyor based on the amount of vehicles being processed in a customized period of time. Schneider products provide reliable functioning of the system.

Features

- Automatically profile the amount of car entering into the tunnel
- Ramp Up and Down the conveyor speed
- Totally configurable
- UL Listed

INSTALLATION

The Speed Control system is intended to be mounted inside the equipment room. Locate the system in a stable wall with sufficient access to it.

Power Requirements

- The system requires a 3 Phase 208 / 230 / 460 VAC (60 A) Circuit Breaker Protection provided by the customer.

Inputs

- The **3 Phase 208 / 230 / 460 VAC input** power is used to power the VFD and the 24 VDC Power Supply.
- **All inputs** are wired N.O Circuit except for the E-STOP input which is wired N.C
- The **Conveyor Input** is required when operating the System
- The **Vehicle in Bay input** is required to operate the system in AUTO MODE.

Outputs

- CAN OPEN Comm Protocol is used to communicate between PLC and VFD.

Field Wiring

- Input wiring connections are done to the specific labeled terminal blocks as identified in the Electrical Schematics section.
- Motor Output wiring connections are done to the specific terminal blocks as identified in the Electrical Schematics section.

INTERFACE & PROGRAMMING

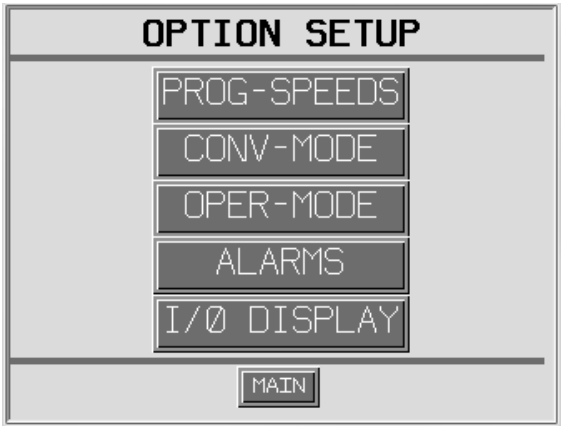
Important Note: The system will reboot and default to MANUAL Mode, in case of a power loss. Customer MUST change it back into AUTO Mode in order for the system to work.

MAIN SCREEN

This is the **MAIN** screen that will be displayed when the unit is powered up.

OPTION SETUP SCREEN

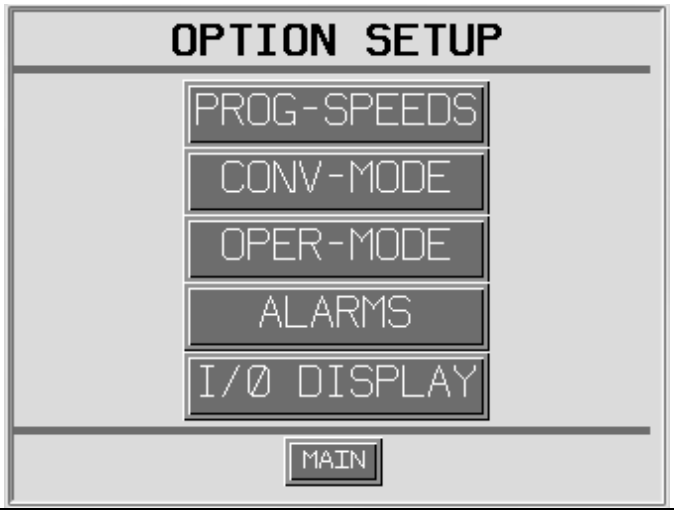
The **OPTION SETUP** screen allows you to travel throughout the other system screens.

Step	Action	Screen Display
1	To gain access to the option Setup Screen press the button 	
2	Option Setup Screen offers 5 Screen Options: 1. **PROG-SPEEDS:** Speed Setup Screen 2. **CONV-MODE:** Choose the Conveyor Mode Screen to go 3. **OPER-MODE:** Choose between MANUAL RUN or AUTO RUN 4. **ALARMS:** Alarm History 5. **I/O DISPLAY:** Input and Output Screen **MAIN** button**:** Returns to the Main Screen. 	

SPEED SETUP SCREEN

The **SPEED SETUP** screen allows the user to access:

1. The **SPEED CONFIGURATION** screen.
2. The **STARTUP SETUP** screen.

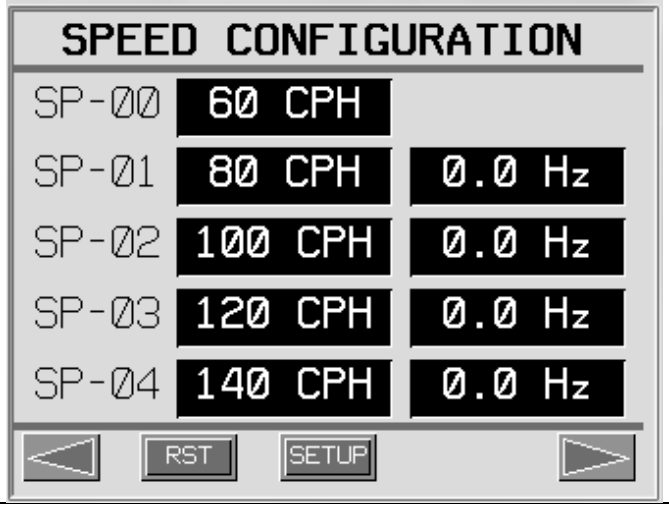
Step	Action	Screen Display
1	Press **PROG-SPEEDS Button** on screen PROG-SPEEDS **Main** button**:** Returns to the Main Screen	
2	**SPEED SETUP** Screen offers 2 Screen Options: **SPEED CONF** button**:** Move to Speeds configuration Screen **STARTUP** button**:** Move to Startup Setup Screen **SETUP** button**:** Returns to the Option Setup Screen	

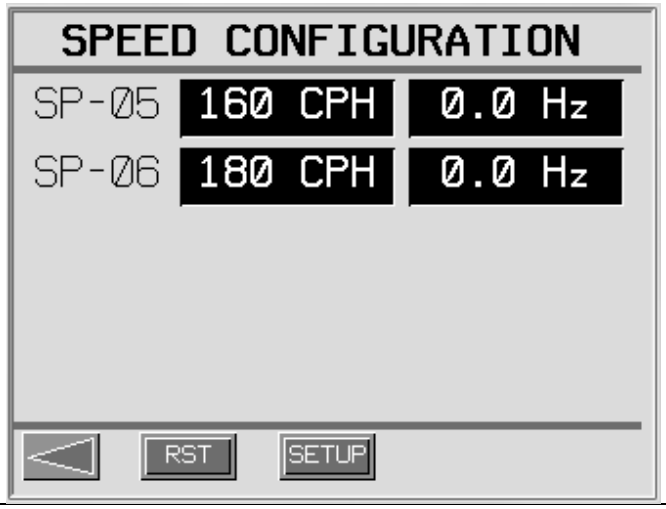
SPEED CONFIGURATION SCREEN

The **SPEED CONFIGURATION** screen allows the user to configure the motor frequencies needed to move the conveyor at the desired speed in Car Per Hour (CPH).

Customer needs to enter the Car Per Hour speed and the corresponding frequency for the motor.

SP-00 does not have any motor hertz field associated with the car per hour field because SP-00 is used for SP-01 referenece limits only.

Step	Action	Screen Display
1	Press **SPEED CONF** button on screen: SPEED CONF **SETUP** button**:** Returns to the Option Setup Screen	
2	**ARROW RIGHT** button**:** Move to next Speed Configuration Screen **ARROW LEFT** button**:** Move to Speed Setup Screen **SETUP** button**:** Returns to the Option Setup Screen **RST** button**:** Reset any current fault on the system	

3	**ARROW RIGHT** button**:** Move to next Speed Configuration Screen **ARROW LEFT** button**:** Move to previous Speed Configuration Screen **SETUP** button**:** Returns to the Option Setup Screen **RST** button**:** Reset any current fault on the system	

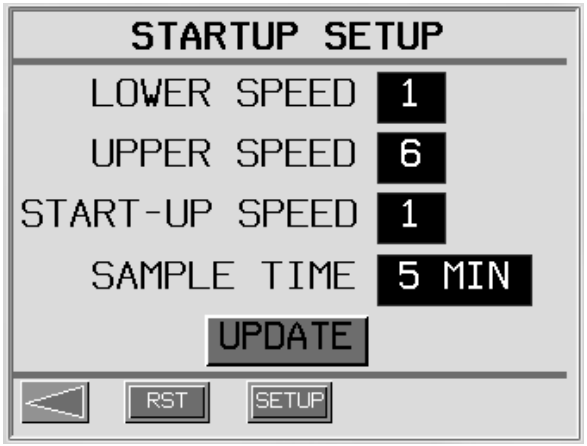
NOTE: VALUES ARE ONLY USED FOR ILLUSTRATION PURPOSES. VALUES ARE SUBJECT TO CHANGE BASED ON SPECIFIC CARWASH APPLICATIONS.

STARTUP SETUP SCREEN

The **STARTUP SETUP** screen allows the user to setup 4 important parameters:

1. **LOWER SPEED:** The minimum speed the system will run at (1 to 6)
2. **UPPER SPEED:** The maximum speed the system will run at (1 to 6)
3. **START UP SPEED:** The speed at which the system will start profiling
4. **SAMPLE TIME:** The number of vehicles entering the wash within a specified amount of time (sample time frame of 3-20 minutes available)

Note: Once the parameters are setup, the UPDATE button need to be pressed. An Alarm will pop-up if one of these parameters is not configured.

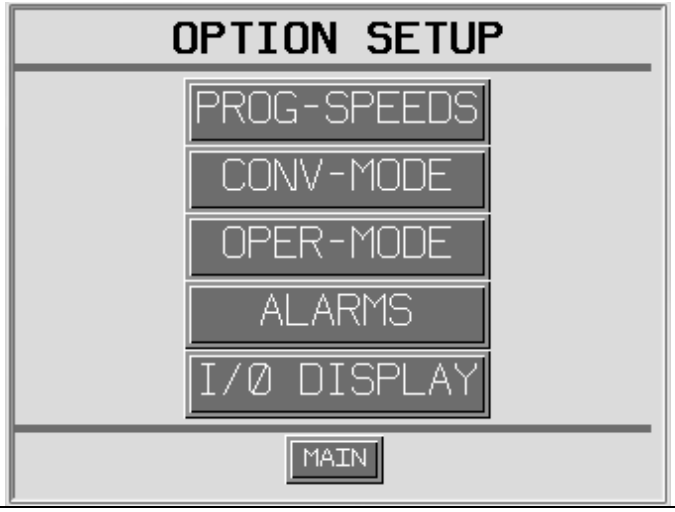
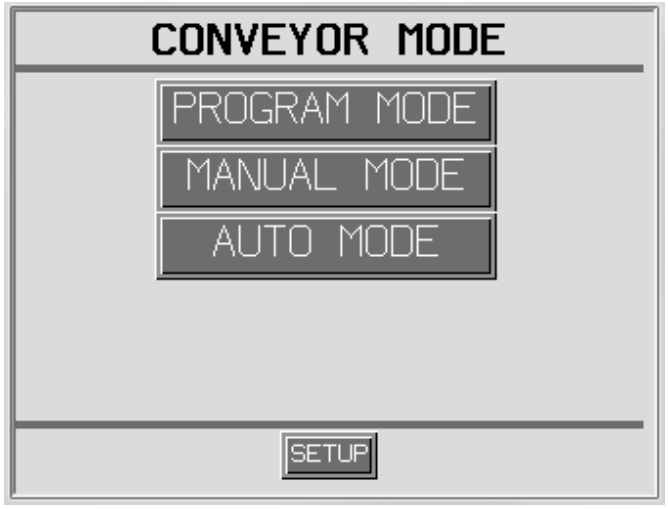
Step	Action	Screen Display
1	Press **STARTUP** button on screen: STARTUP **SETUP** button**:** Returns to the Option Setup Screen	
2	**UPDATE** button**:** Update any change done in the previous parameters **SETUP** button**:** Returns to the Option Setup Screen **RST** button**:** Reset any current fault on the system	

NOTE: VALUES ARE ONLY USED FOR ILLUSTRATION PURPOSES. VALUES ARE SUBJECT TO CHANGE BASED ON SPECIFIC CARWASH APPLICATIONS.

CONVEYOR MODE SCREEN

The **CONVEYOR MODE** screen allows the user to access:

1. The **PROGRAM MODE** screen.
2. The **MANUAL MODE** screen.
3. The **AUTO MODE** screen.

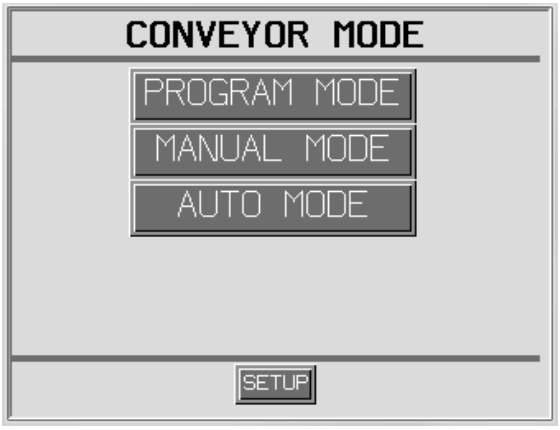
Step	Action	Screen Display
1	Press **PROG-SPEEDS Button** on screen CONV-MODE **Main** button**:** Returns to the Main Screen	
2	**CONVEYOR MODE** Screen offers 3 Screen Options: **PROGRAM MODE** button**:** Move to PROGRAM MODE Screen **MANUAL MODE** button**:** Move to MANUAL MODE Screen **AUTO MODE** button**:** Move to AUTO MODE Screen **SETUP** button**:** Returns to the Option Setup Screen	

PROGRAM MODE SCREEN

The **PROGRAM MODE** screen facilitates the user to operate the conveyor to configure the speeds to be used:

1. **SCREEN CONTROL:** using the screen START and STOP buttons to control the system.
2. **CONVEY CONTROL:** using the carwash controller signal to start and stop the system

Note: System needs to be in PROG status PROG

Step	Action	Screen Display
1	Press **PROGRAM MODE** button on screen PROGRAM MODE **Main** button**:** Returns to the Main Screen	
2	If button is at **SCREEN CONTROL:** Allows the user to start and stop the system using the **START** and **STOP** buttons **ARROW LEFT** button**:** Returns to the Option Setup Screen **SETUP** button**:** Returns to the Option Setup Screen **RST** button**:** Reset any current fault on the system	

SCREEN CONTROL button	Allows the user to start and stop the system using the **START** and **STOP** buttons
ACTUAL	Shows the actual speed the motor is running
DESIRED	Enter the desired speed the system will run.

START button	Starts the motor
STOP button	Stops the motor

3	Press **SCREEN CONTROL Button** and the button will change to **CONVEY CONTROL button :** Allows the user to start and stop the system using the **START** and **STOP** buttons in the conveyor circuit. **ARROW LEFT** button**:** Returns to the Option Setup Screen **SETUP** button**:** Returns to the Option Setup Screen **RST** button**:** Reset any current fault on the system	

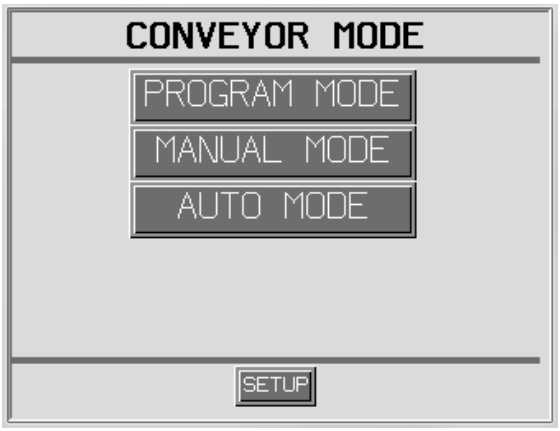
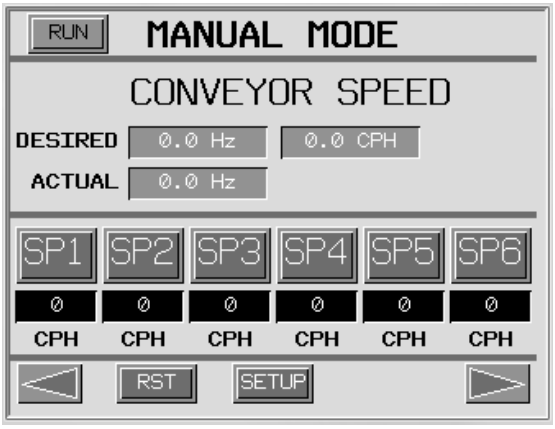
CONVEY CONTROL button	Allows the system to start and stop by using the car wash controller signal (start and stop buttons)
ACTUAL	Shows the actual speed the motor is running
DESIRED	Enter the desired speed the system will run

MANUAL MODE SCREEN

The **MANUAL MODE** screen allows the user to operate and monitor the system in MANUAL MODE:

Note: The system needs to be in RUN status 

and the OPERATION MODE needs to be in MANUAL RUN (see OPERATION MODE screen section)

Step	Action	Screen Display
1	Press **MANUAL MODE** button on screen  **Main** button**:** Returns to the Main Screen	
2	**ARROW LEFT** button**:** Returns to the Option Setup Screen **SETUP** button**:** Returns to the Option Setup Screen **RST** button**:** Reset any current fault on the system	

ACTUAL	Shows the actual speed the motor is running (Hz)
DESIRED	Shows the desired speed the system will run (Hz) and (CPH).
SP1 Button	Speed will go to Speed 1 configured in SPEED CONFIGURATION
SP2 Button	Speed will go to Speed 2 configured in SPEED CONFIGURATION
SP3 Button	Speed will go to Speed 3 configured in SPEED CONFIGURATION

SP4 Button	Speed will go to Speed 4 configured in SPEED CONFIGURATION
SP5 Button	Speed will go to Speed 5 configured in SPEED CONFIGURATION
SP6 Button	Speed will go to Speed 6 configured in SPEED CONFIGURATION

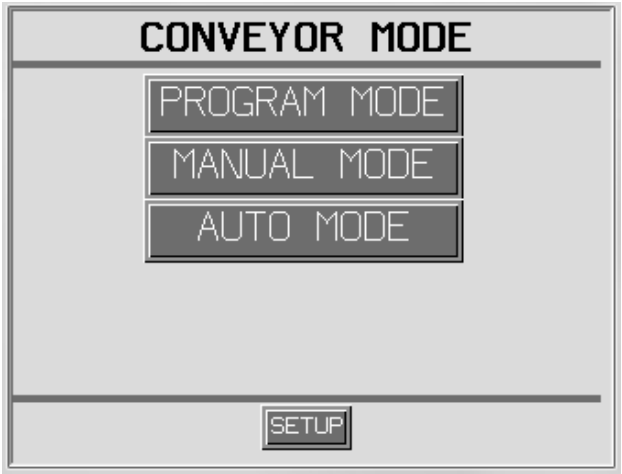
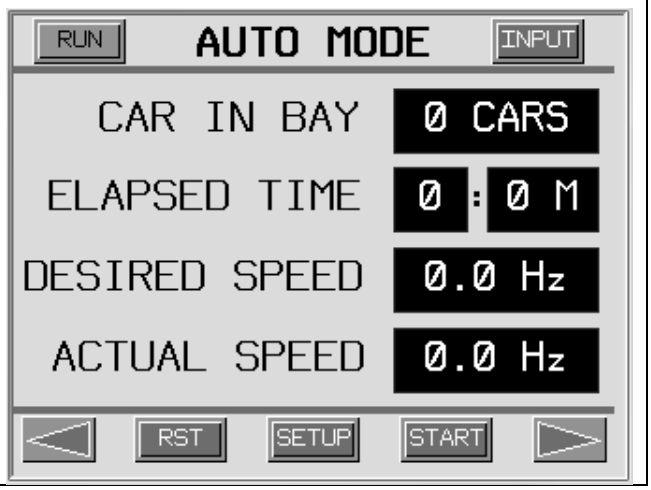
AUTO MODE SCREEN

The **AUTO MODE** screen allows the user to control the motor speed automatically based on the amount of cars being processed during the desired sample time. If the desired car limit is reached before the sample time is completed the system will change to the next speed configured.

The **INFORMATION** screen allows the user to know more information about the system and can be accessed from the **AUTO MODE** screen by pressing the Arrow Right button. 

Note: The system needs to be in RUN status 

and OPERATION MODE needs to be in AUTO RUN (see OPERATION MODE screen section)

Step	Action	Screen Display
1	Press **AUTO MODE** button on screen  **Main** button**:** Returns to the Main Screen	
2	**ARROW LEFT** button**:** Returns to the Option Setup Screen **ARROW RIGHT** button**:** Move to **INFORMATION** Screen **SETUP** button**:** Returns to the Option Setup Screen **RST** button**:** Reset any current fault on the system **START** button**:** Change the speed to the Startup Speed	

NOTE: VALUES ARE ONLY USED FOR ILLUSTRATION PURPOSES. VALUES ARE SUBJECT TO CHANGE BASED ON SPECIFIC CARWASH APPLICATIONS.

CAR IN BAY	Shows the amount of vehicle that have been processed
ELAPSED TIME	Shows the elapsed sample time
DESIRED SPEED	Shows the speed the system is set to run at in Hz and CPH
ACTUAL SPEED	Shows the actual speed the motor is running

3	**ARROW LEFT** button**:** Returns to the **AUTO MODE** Screen **SETUP** button**:** Returns to the Option Setup Screen **RST** button**:** Reset any current fault on the system **START** button**:** Change the speed to the Startup Speed	

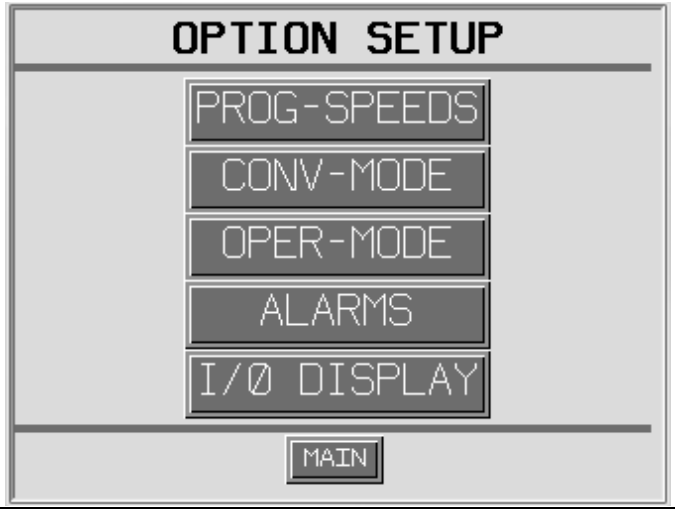
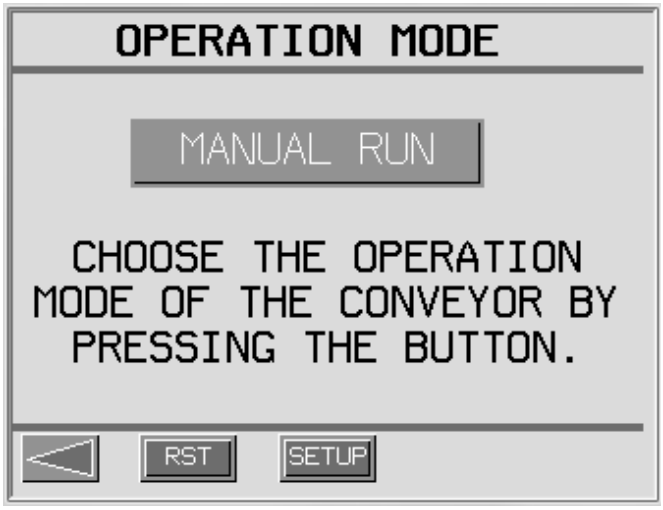
NOTE: VALUES ARE ONLY USED FOR ILLUSTRATION PURPOSES. VALUES ARE SUBJECT TO CHANGE BASED ON SPECIFIC CARWASH APPLICATIONS.

CAR IN BAY	Shows the amount of vehicle that have been processed
GO NEXT SPEED	Amount of vehicle needed to go to the next configurable speed
MAX CAR RATE	Maximum amount of vehicle per sample time that can be processed at the actual speed
ELAPSED TIME	Shows the elapsed sample time
SAMPLE TIME	Shows the set sample time
START-UP SPEED	Shows the startup speed the system is set to run at in Hz and CPH
DESIRED SPEED	Shows the speed the system is set to run at in Hz and CPH
ACTUAL SPEED	Shows the actual speed the motor is running

OPERATION MODE SCREEN

The **OPERATION MODE** screen allows the user to define in which operation mode to run the system:

1. The **MANUAL RUN:** If button is at **MANUAL RUN**, the sytem speed will be updated by pressing the speed button in the **MANUAL MODE** screen.
2. The **AUTO RUN:** If button is at **AUTO RUN**, the sytem speed will be updated automatically based on the amount of cars being processed during the desired sample time. **AUTO MODE** screen will show the user information about the status of the system.

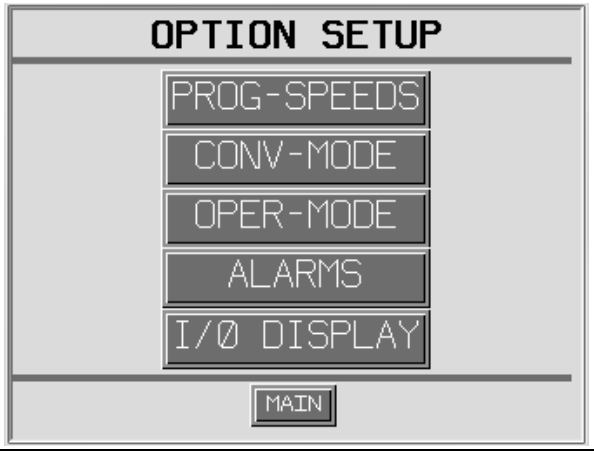
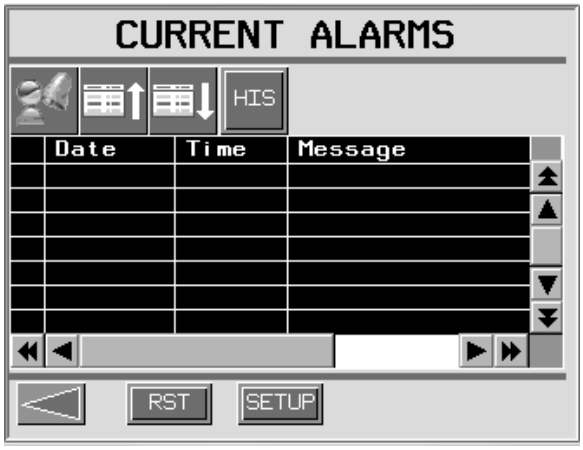
Step	Action	Screen Display
1	Press **OPER-MODE** button on screen OPER-MODE **Main** button**:** Returns to the Main Screen	
2	**OPERATION MODE** Screen: allows the user to choose between MANUAL RUN or AUTO RUN **ARROW LEFT** button**:** Returns to the Option Setup Screen **SETUP** button**:** Returns to the Option Setup Screen **RST** button**:** Reset any current fault on the system	

3	Press **MANUAL RUN** button to change to **AUTO RUN** **ARROW LEFT** button**:** Returns to the Option Setup Screen **SETUP** button**:** Returns to the Option Setup Screen **RST** button**:** Reset any current fault on the system	

ALARMS SCREEN

The **ALARMS** button allows the user to access the following screens:

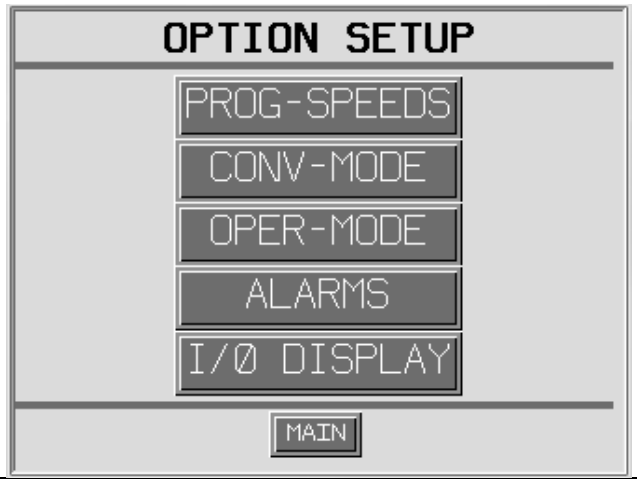
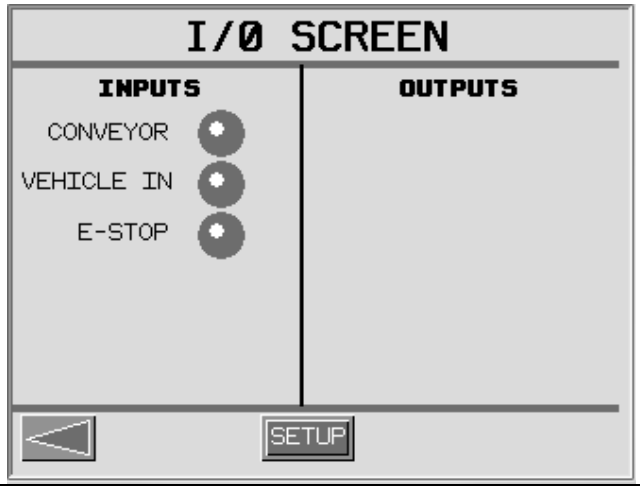
1. **CURRENT ALARMS** Screen: allows the user to check the active system faults
2. **ALARM HISTORY** Screen: allows the user to check previous system faults

Step	Action	Screen Display
1	Press **ALARMS** button on screen  **Main** button**:** Returns to the Main Screen	
2	**HIS** button**:** Move to the **HISTORY ALARM** Screen **ARROW LEFT** button**:** Returns to the Option Setup Screen **SETUP** button**:** Returns to the Option Setup Screen **RST** button**:** Reset any current fault on the system	

3	**ARROW LEFT** button**:** Returns to the **CURRENT ALARMS** Screen **SETUP** button**:** Returns to the Option Setup Screen **RST** button**:** Reset any current fault on the system	

I/O DISPLAY SCREEN

The **I/O** Screen allows the user to check the status of the system inputs and outputs.

Step	Action	Screen Display
1	Press **I/O DISPLAY Button** on screen I/0 DISPLAY **Main Button:** Returns to the Main Screen	
2	**ARROW LEFT Button:** Returns to the Option Setup Screen **RST Button:** Reset any current fault on the system	

INPUTS:

CONVEYOR Allows the user to monitor the status of the CONVEYOR input

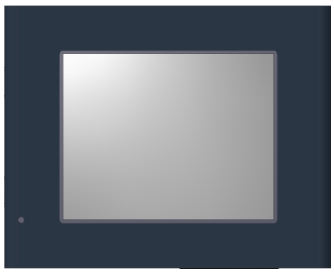
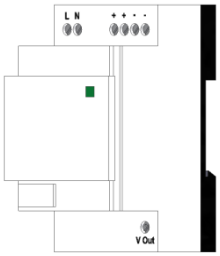
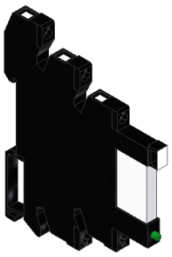
VEHICLE IN Allows the user to monitor the status of the vehicle entered the tunnel input

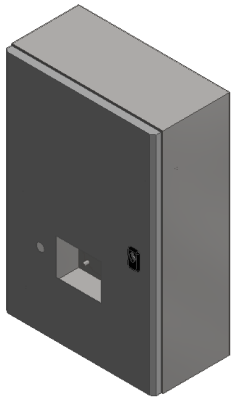
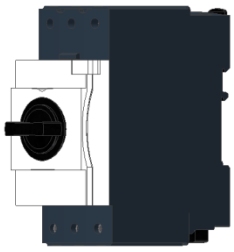
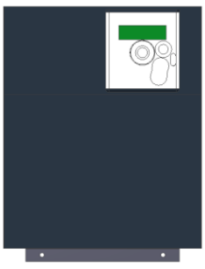
E-STOP Allows the user to monitor the status of the Door Emergency Stop input

OUTPUTS:

NO OUTPUTS HAVE BEEN SET FOR THIS SYSTEM

REPLACEMENT PARTS

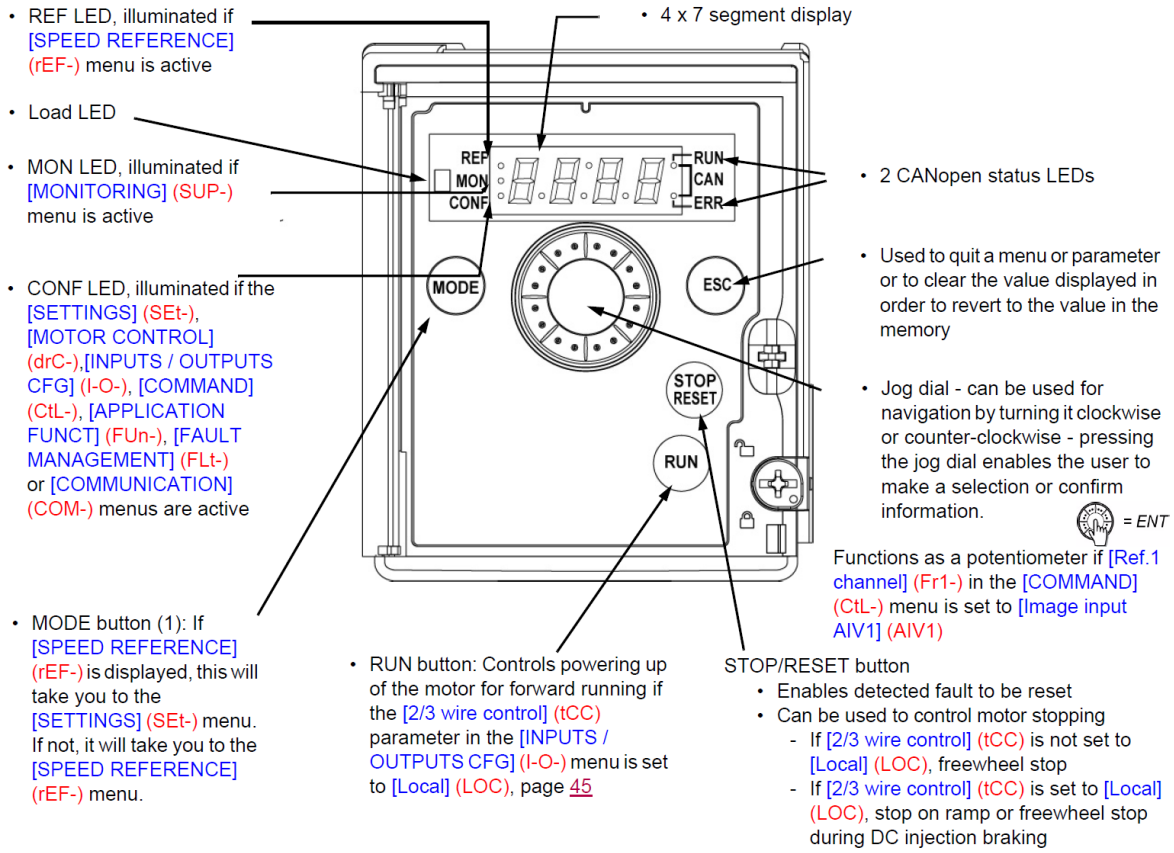
QTY	PART #	DESCRIPTION	PICTURE
1	10010290	XBTGC SCREEN PROCESSOR UNIT	
1	10010292	CAN OPEN MASTER CARD	
1	10010298	POWER SUPPLY 200VAC – 24VDC	
2	10010411	24 VAC/DC THIN RELAY W/SOCKET	

1	10010388	ENCLOSURE IP66 24”X16”X8”	
1	10010389	GALVANIZED PANEL	
1	10010305	MANUAL MSP 37-50 A	
1	10010299	ATV312 10 HP DRIVE AT 200-240 VAC	

VFD PARAMETERS & SETUP

DESCRIPTION OF THE VFD HMI

Functions of the display and the keys



- REF LED, illuminated if [SPEED REFERENCE] (rEF-) menu is active
- Load LED
- MON LED, illuminated if [MONITORING] (SUP-) menu is active
- CONF LED, illuminated if the [SETTINGS] (SEt-), [MOTOR CONTROL] (drC-),[INPUTS / OUTPUTS CFG] (I-O-), [COMMAND] (CtL-), [APPLICATION FUNCT] (FUn-), [FAULT MANAGEMENT] (FLt-) or [COMMUNICATION] (COM-) menus are active
- MODE button (1): If [SPEED REFERENCE] (rEF-) is displayed, this will take you to the [SETTINGS] (SEt-) menu. If not, it will take you to the [SPEED REFERENCE] (rEF-) menu.
- 4 x 7 segment display
- 2 CANopen status LEDs
- Used to quit a menu or parameter or to clear the value displayed in order to revert to the value in the memory
- Jog dial - can be used for navigation by turning it clockwise or counter-clockwise - pressing the jog dial enables the user to make a selection or confirm information. = *ENT*

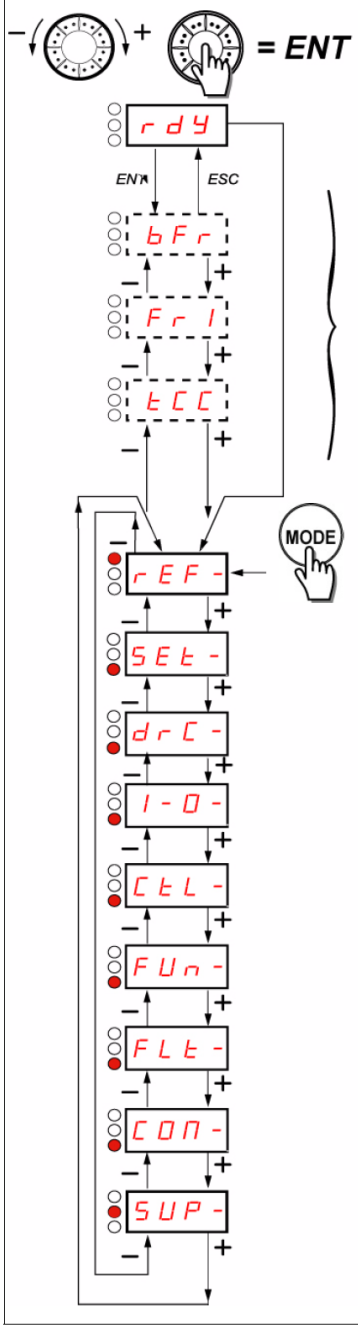
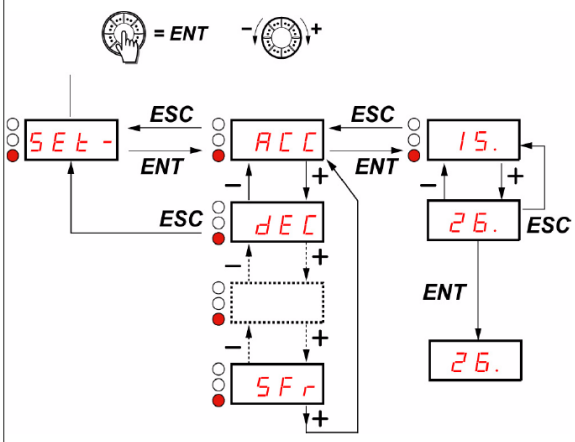
  Functions as a potentiometer if [Ref.1 channel] (Fr1-) in the [COMMAND] (CtL-) menu is set to [Image input AIV1] (AIV1)
- RUN button: Controls powering up of the motor for forward running if the [2/3 wire control] (tCC) parameter in the [INPUTS / OUTPUTS CFG] (I-O-) menu is set to [Local] (LOC), page 45

STOP/RESET button
- Enables detected fault to be reset
- Can be used to control motor stopping
  - If [2/3 wire control] (tCC) is not set to [Local] (LOC), freewheel stop
  - If [2/3 wire control] (tCC) is set to [Local] (LOC), stop on ramp or freewheel stop during DC injection braking

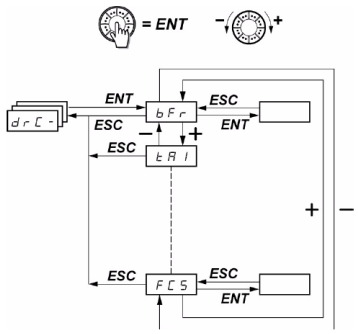
Normal display, with no fault code displayed and no startup:

- 43.0 : Displays the parameter selected in the [MONITORING] (SUP-) menu (default: motor frequency). If the current is limited, the display flashes. In such cases, CLI will appear at the top left if an ATV61/ATV71 graphic display terminal is connected to the drive.
- InIt: Initialization sequence
- rdy: Drive ready
- dCb: DC injection braking in progress
- nSt: Freewheel stop
- FSt: Fast stop
- tUn : Auto-tuning in progress

STRUCTURE OF THE MENUS

Powering up		Parameter selection
	These three parameters are only visible when the drive is powered up for the first time. The settings can be amended subsequently in the menus: [MOTOR CONTROL] (drC-) for [Standard mot. freq] (bFr), [COMMAND] (CtL-) for [Ref.1 channel] (Fr1) [INPUTS / OUTPUTS CFG] (I-O-) for [2/3 wire control] (tCC) [SPEED REFERENCE] (rEF-) [SETTINGS] (SEt-) [MOTOR CONTROL] (drC-) [INPUTS / OUTPUTS CFG] (I-O-) [COMMAND] (CtL-) [APPLICATION FUNCT.] (FUn-) [FAULT MANAGEMENT] (FLt) [COMMUNICATION] (COM-) [MONITORING] (SUP-)	

MOTOR PARAMETERS SETUP



Standard motor frequency

Return to factory settings/Restore configuration

rEF -
SEt -
drC -
I-O -
CtL -
FUn -
FLt -
COM -
SUP -

With the exception of [Auto tuning] (tUn), which can power up the motor, parameters can only be changed in stop mode, with no run command present.

On the optional ATV31 remote display terminal, this menu can be accessed with the switch in the position.

Drive performance can be optimized by:
- Entering the values given on the motor rating plate in the Drive menu
- Performing an auto-tune operation (on a standard asynchronous motor)

Code	Description	Adjustment range	Factory setting
bFr	❑ **[Standard mot. freq]**		[50Hz IEC] (50)
50 60	[50Hz IEC] (50): 50 Hz: IEC [60Hz NEMA] (60): 60 Hz: NEMA This parameter modifies the presets of the following parameters: [High speed] (HSP), page 32, [Freq. threshold] (Ftd), page 37, [Rated motor freq.] (FrS), page 39, and [Max frequency] (tFr), page 42.		
UnS	❑ **[Rated motor volt.]**	In accordance with the drive rating	In accordance with the drive rating
	Nominal motor voltage given on the rating plate. When the line voltage is lower than the nominal motor voltage, set [Rated motor volt.] (UnS) to the same value as the line voltage for the drive terminals. ATV312●●●M2: 100 to 240 V ATV312●●●M3: 100 to 240 V ATV312●●●N4: 100 to 500 V ATV312●●●S6: 100 to 600 V		
FrS	❑ **[Rated motor volt.]**	10 to 500 Hz	50 Hz
	Nominal motor frequency marked on the rating plate. The factory setting is 50 Hz, or 60 Hz if [Standard mot. freq] (bFr) is set to 60 Hz. **Note:** The ratio $\frac{\text{[Rated motor volt.] (UnS) (in volts)}}{\text{[Rated motor freq.] (FrS) (in Hz)}}$ must not exceed the following values: ATV312●●●M2: 7 max. ATV312●●●M3: 7 max. ATV312●●●N4: 14 max. ATV312●●●S6: 17 max. The factory setting is 50 Hz, or preset to 60 Hz if [Standard mot. freq] (bFr) is set to 60 Hz.		
nCr	❑ **[Rated mot. current]**	0.25 to 1.5 In (1)	In accordance with the drive rating
	Nominal motor current given on the rating plate.		

(1) In corresponds to the nominal drive current indicated in the Installation Manual and on the drive nameplate.

Code	Description	Adjustment range	Factory setting
nSP	❑ **[Rated motor speed]**	0 to 32,760 rpm	In accordance with the drive rating
	0 to 9,999 rpm then 10.00 to 32.76 krpm If, rather than the nominal speed, the nameplate indicates the synchronous speed and the slip in Hz or as a %, calculate the nominal speed as follows: • Nominal speed = synchronous speed x $\frac{100 - \text{slip as a \%}}{100}$ or • Nominal speed = synchronous speed x $\frac{50 - \text{slip in Hz}}{50}$ (50 Hz motors) or • Nominal speed = synchronous speed x $\frac{60 - \text{slip in Hz}}{60}$ (60 Hz motors)		
COS	❑ **[Motor 1 Cosinus Phi]**	0.5 to 1	In accordance with the drive rating
	Motor Cos Phi given on the motor rating plate		
rSC	❑ **[Cold stator resist.]**		[No] (nO)
nO	☐ [No] (nO): function inactive. For applications which do not require high performance or do not tolerate automatic auto-tuning (passing a current through the motor) each time the drive is powered up.		
InIt	☐ [Init] (InIt): activates the function. To improve low-speed performance whatever the thermal state of the motor.		
8888	☐ Value of cold state stator resistance used, in mΩ.		
	Note: • **It is strongly recommended that this function is activated for mechanical handling applications.** • The function should only be activated [Init] (InIt) when the motor is cold. • When [Cold stator resist.] (rSC) = [Init] (InIt), the [Auto-tuning] (tUn) parameter is forced to [Power on] (POn). At the next run command the stator resistance is measured with an auto-tune. The [Cold stator resist.] (rSC) then changes to a value of (8888) and maintains it, [Auto-tuning] (tUn) is still forced to [Power on] (POn). The [Cold stator resist.] (rSC) parameter remains at [Init] (InIt) as long as the measurement has not been performed. • Value 8888 can be forced or changed using the jog dial (1).		

(1) Procedure:
- Check that the motor is cold.
- Disconnect the cables from the motor terminals.
- Measure the resistance between 2 of the motor terminals (U. V. W.) without modifying its connection.
- Use the jog dial to enter half the measured value.
- Increase the factory setting of [IR compensation] (UFr), page 32, to 100% rather than 20%.

Note: Do not use [Cold stator resist.] (rSC) if it is not set to [No] (nO) or = [Power on] (POn) with catch on the fly ([CATCH ON THE FLY] (FLr-), page 88).

FAULT CODES

Drive does not start, no code displayed

- If the display does not light up, check the power supply to the drive and check the wiring of inputs AI1 and AI2 and the connection to the RJ45 connector.
- The assignment of the "Fast stop" or "Freewheel stop" functions will prevent the drive from starting if the corresponding logic inputs are not powered up. The ATV312 then displays [Freewheel stop] (nSt) or [Fast stop] (FSt). This is normal since these functions are active at zero so that the drive will be stopped if there is a wire break.
- Check that the run command input(s) have been actuated in accordance with the chosen control mode (the [2/3 wire control] (tCC) parameter in the [INPUTS / OUTPUTS CFG] (I-O-) menu, page 45).
- If an input is assigned to the limit switch function and this input is at zero, the drive can only be started up by sending a command for the opposite direction (see page 84).
- If the reference channel (page 51) or the control channel (page 52) is assigned to a communication network, when the power supply is connected, the drive will display [Freewheel stop] (nSt) and remain in stop mode until the communication bus sends a command.
- If the LED on the DC bus is lit and nothing appears on the display, check that there is no short-circuit on the 10 V power supply.
- If the drive displays [Ready] (rdy) and refuses to start, check that there is no short-circuit on the 10 V power supply and check the wiring of inputs AI1 and AI2 and the connection to the RJ45 connector.
- In the factory setting, the "RUN" button is inactive. Set the [Ref.1 channel] (Fr1) parameter, page 28 , and the [Cmd channel 1] (Cd1) parameter, page 57, to control the drive locally.

Fault detection codes which require a power reset after the fault is cleared

The cause of the fault must be removed before resetting by cycling power to the drive.
[PRECHARGE FAULT] (CrF), [OVERSPEED] (SOF), [AUTO-TUNING FAULT] (tnF), and [BRAKE CONTROL FAULT] (bLF) can also be reset remotely using a logic input (the [Fault reset] (rSF) parameter in the [FAULT MANAGEMENT] (FLt-) menu, page 87).

Code	Name	Probable cause	Remedy
bLF	[BRAKE CONTROL FAULT]	• Brake release current not reached • Brake engage frequency threshold [Brake engage freq] (bEn) = [No] (nO) (not set) whereas the brake control [Brake assignment] (bLC) is assigned	• Check the drive/motor connection. • Check the motor windings. • Check the [Brake release I FW] (Ibr) setting in the [APPLICATION FUNCT.] (FUn-) menu, page 80. • Apply the recommended settings for [Brake engage freq] (bEn), pages 79 and 80.
CrF	[PRECHARGE FAULT]	• Precharge relay control or damaged precharge resistor	• Replace the drive.
EEF	[EEPROM FAULT]	• Internal memory	• Check the environment (electromagnetic compatibility) • Replace the drive.
IF1	[INTERNAL FAULT]	• Unknown rating	• Replace the drive. • Restart the drive. • Contact a Schneider Electric representative.
IF2	[INTERNAL FAULT]	• HMI card not recognized • HMI card incompatible • No display present	
IF3	[INTERNAL FAULT]	• EEPROM	
IF4	[INTERNAL FAULT]	• Industrial EEPROM	

Fault detection codes which require a power reset after the fault is cleared (continued)

Code	Name	Probable cause	Remedy
OCF	[OVERCURRENT]	• Parameters in the [SETTINGS] (SEt-) and [MOTOR CONTROL] (drC-) menus are incorrect. • Inertia or load too high • Mechanical locking	• Check the parameters in [SETTINGS] (SEt-) , page 31, and [MOTOR CONTROL] (drC-) page 39. • Check the size of the motor/drive/load. • Check the state of the mechanism.
SCF	[MOTOR SHORT CIRCUIT]	• Short-circuit or grounding at the drive output • Significant ground leakage current at the drive output if several motors are connected in parallel	• Check the cables connecting the drive to the motor, and the motor insulation. • Reduce the switching frequency • Connect chokes in series with the motor
SOF	[OVERSPEED]	• Instability or • Driving load too high	• Check the motor, gain and stability parameters • Add a braking resistor • Check the size of the motor/drive/load.
tnF	[AUTO TUNING FAULT]	• Special motor or motor whose power is not suitable for the drive • Motor not connected to the drive	• Use the L ratio or the [Var. torque] (P) ratio (see [U/F mot 1 selected] (UFt), page 42). • Check that the motor is present during auto-tuning. • If an output contactor is being used, close it during auto-tuning.

Fault detection codes that can be reset with the automatic restart function after the cause has disappeared

See the [Automatic restart] (Atr) function, page 86.
These detected faults can also be reset by turning the drive off then on again or by means of a logic input (the [Fault reset] (rSF) parameter, page 87, in the [FAULT MANAGEMENT] (FLt-) menu, page 86).

Code	Name	Probable cause	Remedy
CnF	[NETWORK FAULT]	• Communication detected fault on the communication card	• Check the environment (electromagnetic compatibility) • Check the wiring. • Check the time out. • Replace the option card.
COF	[CANopen FAULT]	• Interruption in communication on the CANopen bus	• Check the communication bus • Refer to the relevant product documentation.
EPF	[EXTERNAL FAULT]	• Depending on user	• Depending on user
LFF	[4-20mA LOSS]	• Loss of the 4-20 mA reference on input AI3	• Check the connection on input AI3.
ObF	[OVERBRAKING]	• Braking too sudden or driving load	• Increase the deceleration time • Install a braking resistor if necessary. • Activate the [Dec ramp adapt.] (bra) function, page 62, if it is compatible with the application.
OHF	[DRIVE OVERHEAT]	• Drive temperature too high	• Check the motor load, the drive ventilation and the environment. Wait for the drive to cool before restarting.

Fault detection codes that can be reset with the automatic restart function after the cause has disappeared (continued)

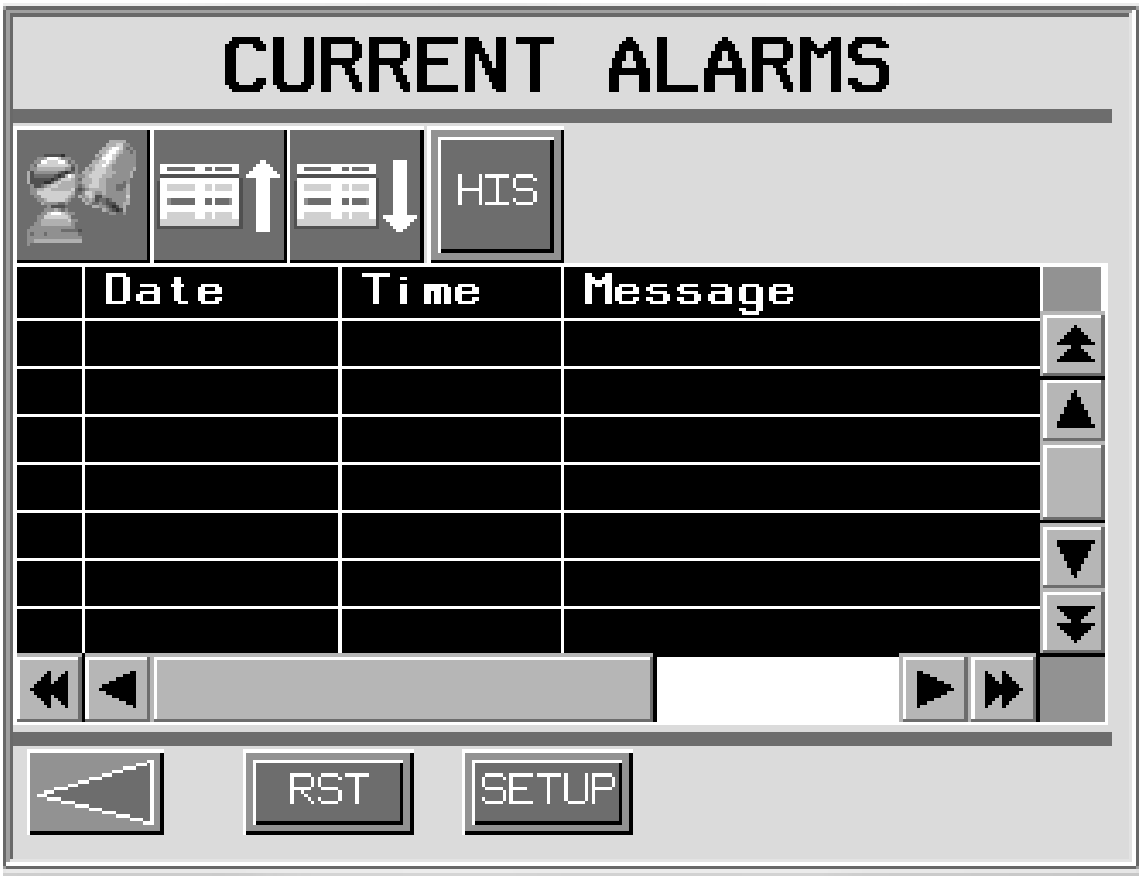
Code	Name	Probable cause	Remedy
OLF	[MOTOR OVERLOAD]	• Triggered by excessive motor current • [Cold stator resist.] (rSC) parameter value incorrect	• Check the [Mot. therm. current] (ItH) setting, page 32, of the motor thermal protection, check the motor load. Wait for the drive to cool before restarting. • Remeasure [Cold stator resist.] (rSC), page 40.
OPF	[MOTOR PHASE LOSS]	• Loss of one phase at drive output • Output contactor open • Motor not connected or motor power too low • Instantaneous instability in the motor current	• Check the connections from the drive to the motor. • If an output contactor is being used, set [Output Phase Loss] (OPL) to [Output cut] (OAC) ([FAULT MANAGEMENT] (FLt-) menu, page 89). • Test on a low-power motor or without a motor: In factory settings mode, motor output phase loss detection is active ([Output Phase Loss] (OPL) = [Yes] (YES)). To check the drive in a test or maintenance environment without having to switch to a motor with the same rating as the drive (particularly useful in the case of high-power drives), deactivate motor phase loss detection ([Output Phase Loss] (OPL) = [No] (nO)). • Check and optimize the [IR compensation] (UFr), [Rated motor volt.] (UnS), and [Rated mot. current] (nCr) parameters, and perform an [Auto tuning] (tUn) operation, page 41.
OSF	[MAINS OVERVOLTAGE]	• Line voltage is too high. • Disturbed line supply	• Check the line voltage.
PHF	[INPUT PHASE LOSS]	• Drive incorrectly supplied or a fuse blown • Failure of one phase • Three-phase ATV312 used on a single-phase line supply • Unbalanced load This protection only operates with the drive on load	• Check the power connection and the fuses. • Reset • Use a three-phase line supply. • Disable the detection by setting [Input phase loss] (IPL) = [No] (nO) ([FAULT MANAGEMENT] (FLt-) menu, page 89).
SLF	[MODBUS FAULT]	• Interruption in communication on the Modbus bus • Remote display terminal enabled ([HMI command] (LCC) = [Yes] (YES), page 58) and terminal disconnected.	• Check the communication bus • Refer to the relevant product documentation. • Check the link with the remote display terminal.

Fault detection codes that are reset as soon as their cause disappears

Code	Name	Probable cause	Remedy
CFF	[INCORRECT CONFIG.]	• The current configuration is inconsistent. • Addition or removal of an option	• Return to factory settings or retrieve the backup configuration, if it is valid. See the [Restore config.] (FCS) parameter, page 44.
CFI	[INVALID CONFIG]	• Invalid configuration The configuration loaded in the drive via the serial link is inconsistent	• Check the configuration loaded previously. • Load a consistent configuration.
USF	[UNDERVOLTAGE]	• Insufficient line supply • Transient voltage dip • Damaged precharge resistor	• Check the voltage and the voltage parameter. Tripping threshold in [UNDERVOLTAGE] (USF) ATV312●●●●M2: 160 V ATV312●●●●M3: 160 V ATV312●●●●N4: 300 V ATV312●●●●S6: 430 V • Replace the drive.

ALARM TROUBLESHOOTING

ALARM SCREEN



Press to access Alarm History Screen

ALTIVAR 312 ALARMS

This is a list of the Altivar 312 most common alarms that can be displayed on the alarm window: The cause of the fault can be checked on the previous section.

➢ **oLF**	**Motor overload**
➢ **oCF**	**Motor Overcurrent**
➢ **obF**	**DC Bus overvoltage or Error motor phase lost**
➢ **CoF**	**CANopen communication error, Heartbeat or life Guard error**
➢ **EEF**	**EEPROM error**
➢ **ohF**	**Overtemperature**
➢ **oSF**	**Overvoltage mains supply**
➢ **PhF**	**Error mains phases**
➢ **SCF**	**Motor Short Circuit, Short circuit motor phases (ground faults), Short circuit motor phase (phase to phase)**
➢ **uSF**	**Undervoltage mains supply**

Note: to reset any of these alarms press the RST button on the **ALARM** Screen

SYSTEM ALARMS

This is a list of the system alarms that can be displayed on the alarm window

Code	Description	Probable Cause	Remedy
ES	Emergency Stop Pressed	• Emergency Stop has been pressed • Wire connection is loose	• Depressed E-Stop • Check wire connection
SPNC	Startup parameters have not been configured	• Startup parameters need to be set	• Go to Startup Setup Panel
AFBE	Altivar Function blocks error	• One of the Function Blocks has an error	• Press the RST button located on ALARM screen
ASNC	Check Actual Speed setup	• Actual speed is not calibrated properly because more vehicles are being processed than the maximum car rate for the sample time	• Recalibrate the speed in Hz that give you the proper CPH • Check that the VEHICLE IN input is working correctly

Note: to reset any of these alarms press the RST button on the ALARM Screen

ELECTRICAL SCHEMATICS

Applicable to the 208-230 VAC –

Customer to supply and install incoming service disconnect and over-current protection in the form of an Inverse-Time breaker rated for 208-230 VAC, 3-Phase, 60 Hz.

Customer must supply a UL listed 50 AMPS feeder breaker @ 50 KAIC or higher to maintain interrupt rating of MCC and in accordance with local code and national safety standard code (NEC).

- All internal power wires are #6 AWG/THHN/600V
- All internal control wires are #22 AWG/MTW/600V
- Field wires to motors must be #8 AWG or less

PLC Detail Circuit Page 1a

PLC Detail Circuit Page 1b

Field Wiring - Interconnects Page 1a

Field Wiring – Interconnects Page 1b

Applicable to the 460 VAC –

Customer to supply and install incoming service disconnect and over-current protection in the form of an Inverse-Time breaker rated for 460 VAC, 3-Phase, 60 Hz.

Customer must supply a UL listed 30 AMPS feeder breaker @ 50 KAIC or higher to maintain interrupt rating of MCC and in accordance with local code and national safety standard code (NEC).

- All internal power wires are #8 AWG/THHN/600V
- All internal control wires are #22 AWG/MTW/600V
- Field wires to motors must be #8 AWG or less

PLC Detail Circuit Page 1a

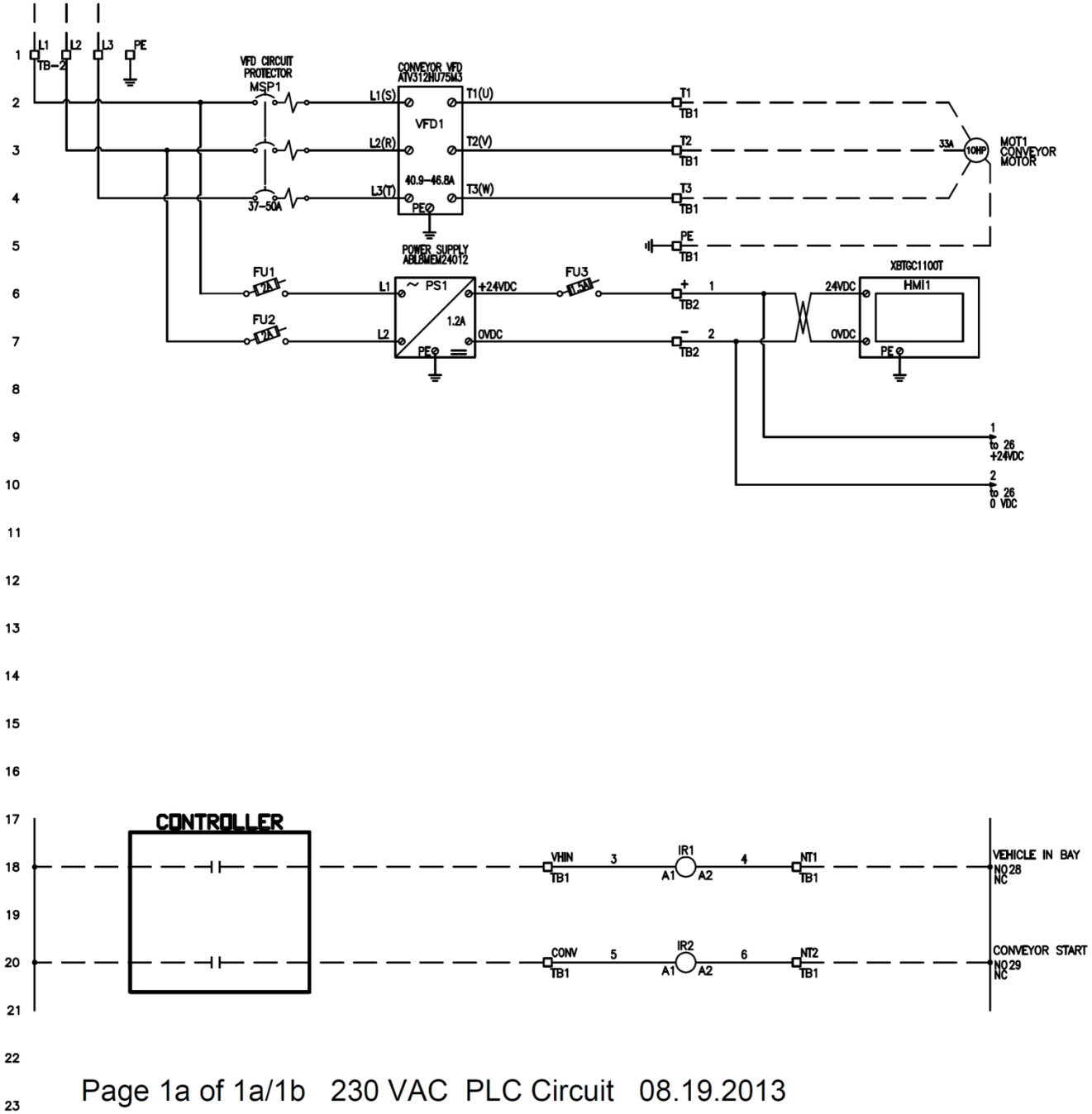
PLC Detail Circuit Page 1b

Field Wiring - Interconnects Page 1a

Field Wiring – Interconnects Page 1b

230 VAC – PLC Circuit Page 1a of pages 1a and 1b

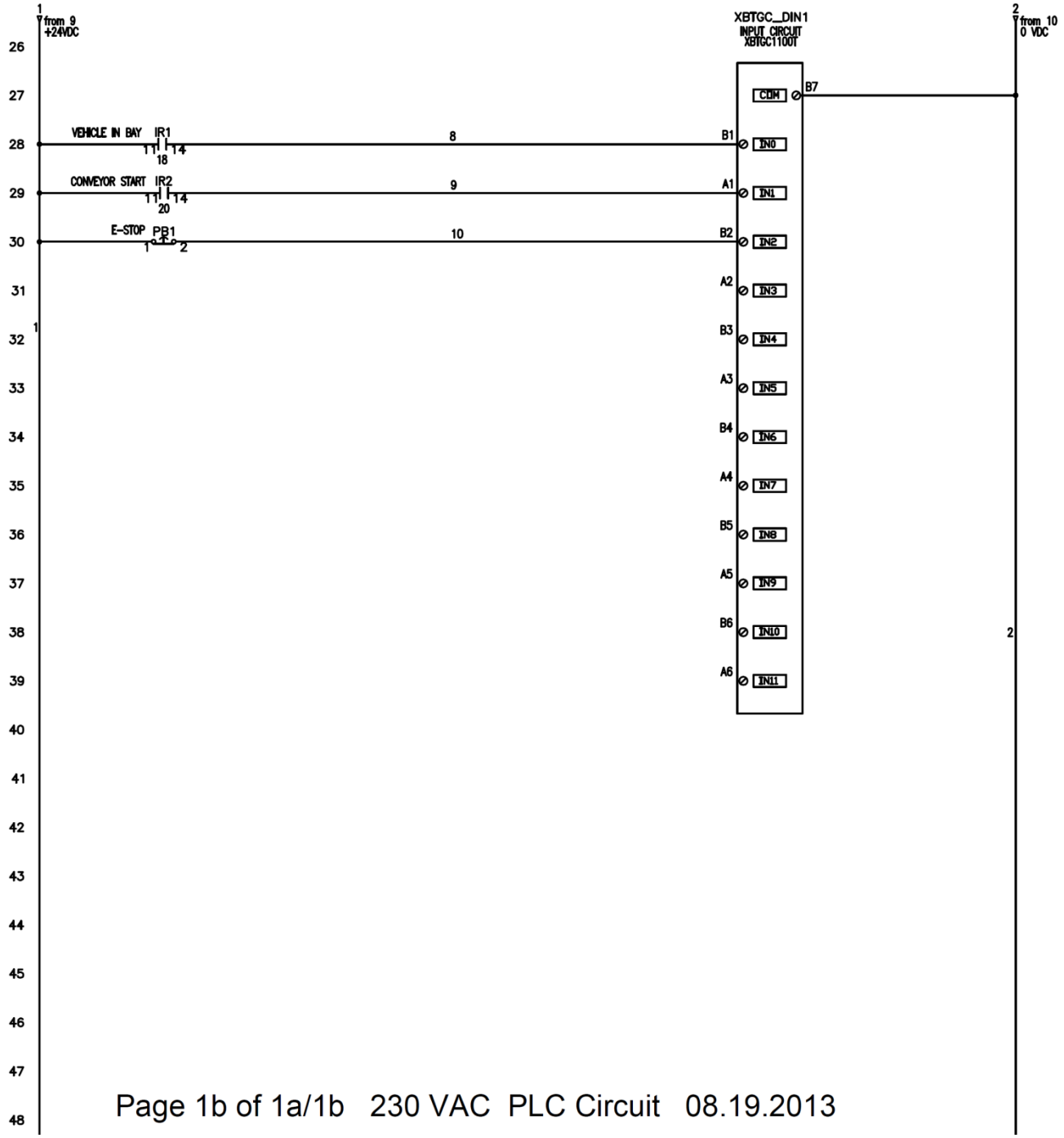
Total panel FLA = 33 AMPS



Page 1a of 1a/1b 230 VAC PLC Circuit 08.19.2013

230 VAC – PLC Circuit Page 1b of pages 1a and 1b

Total Panel FLA = 33 AMPS



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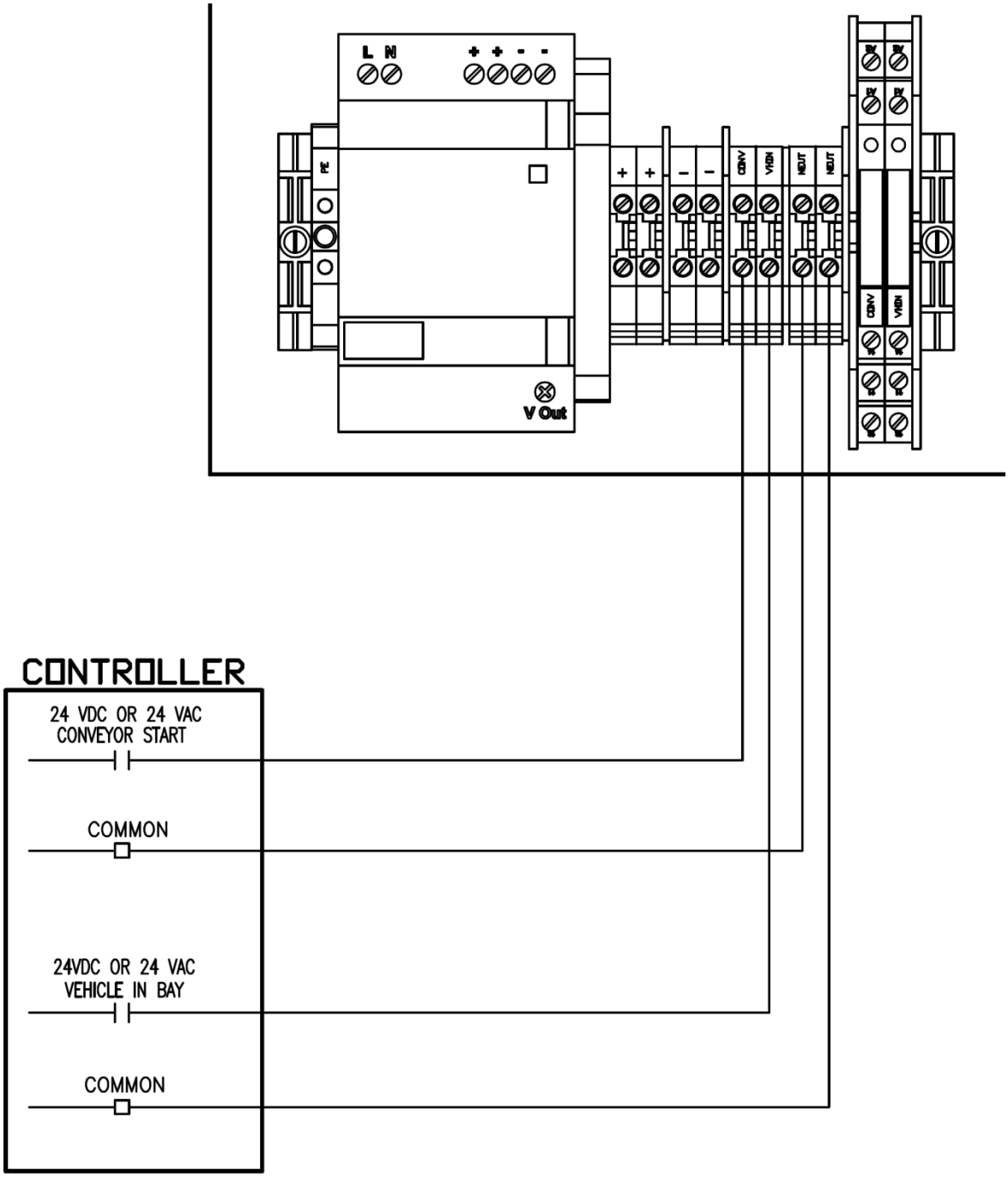
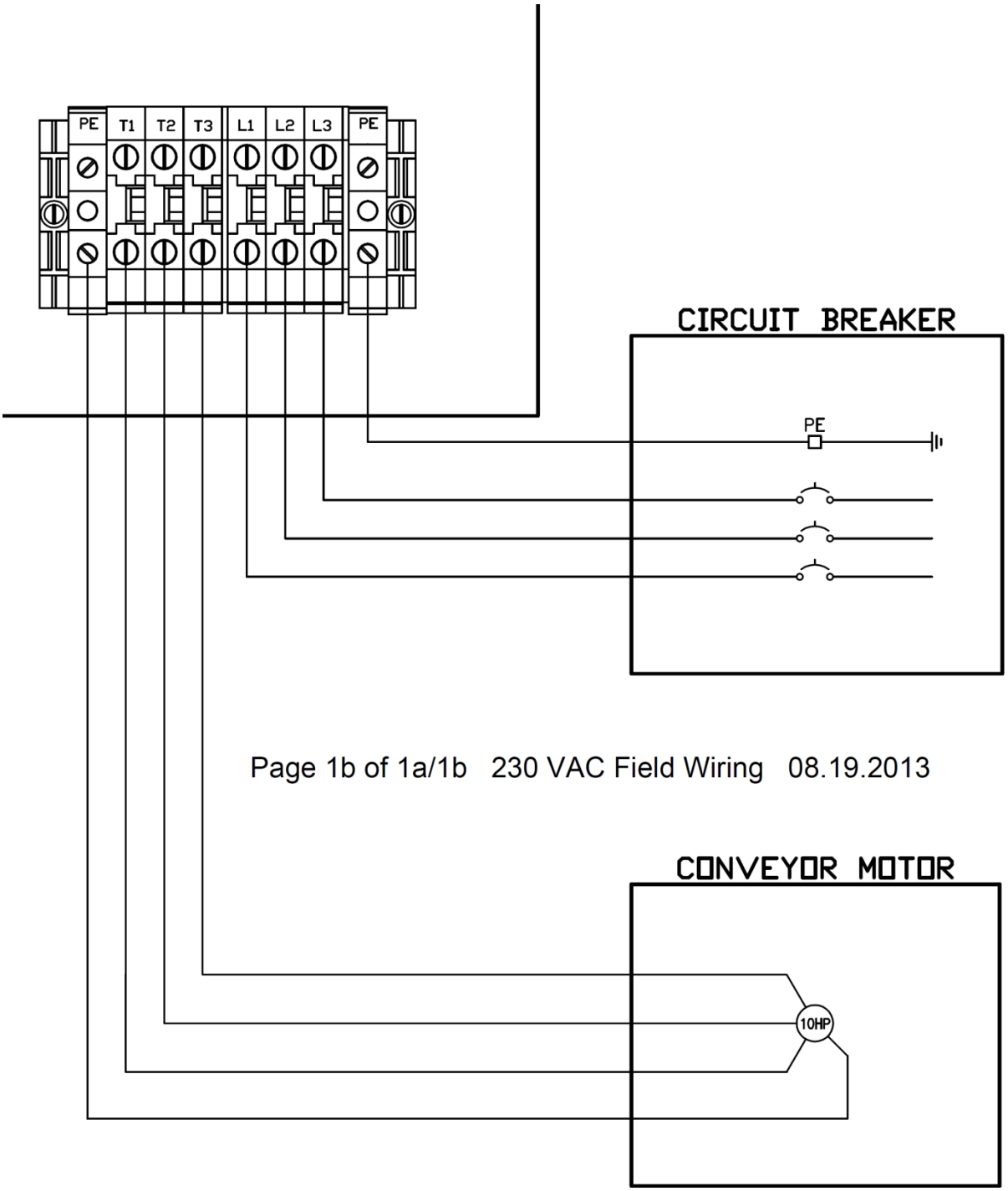


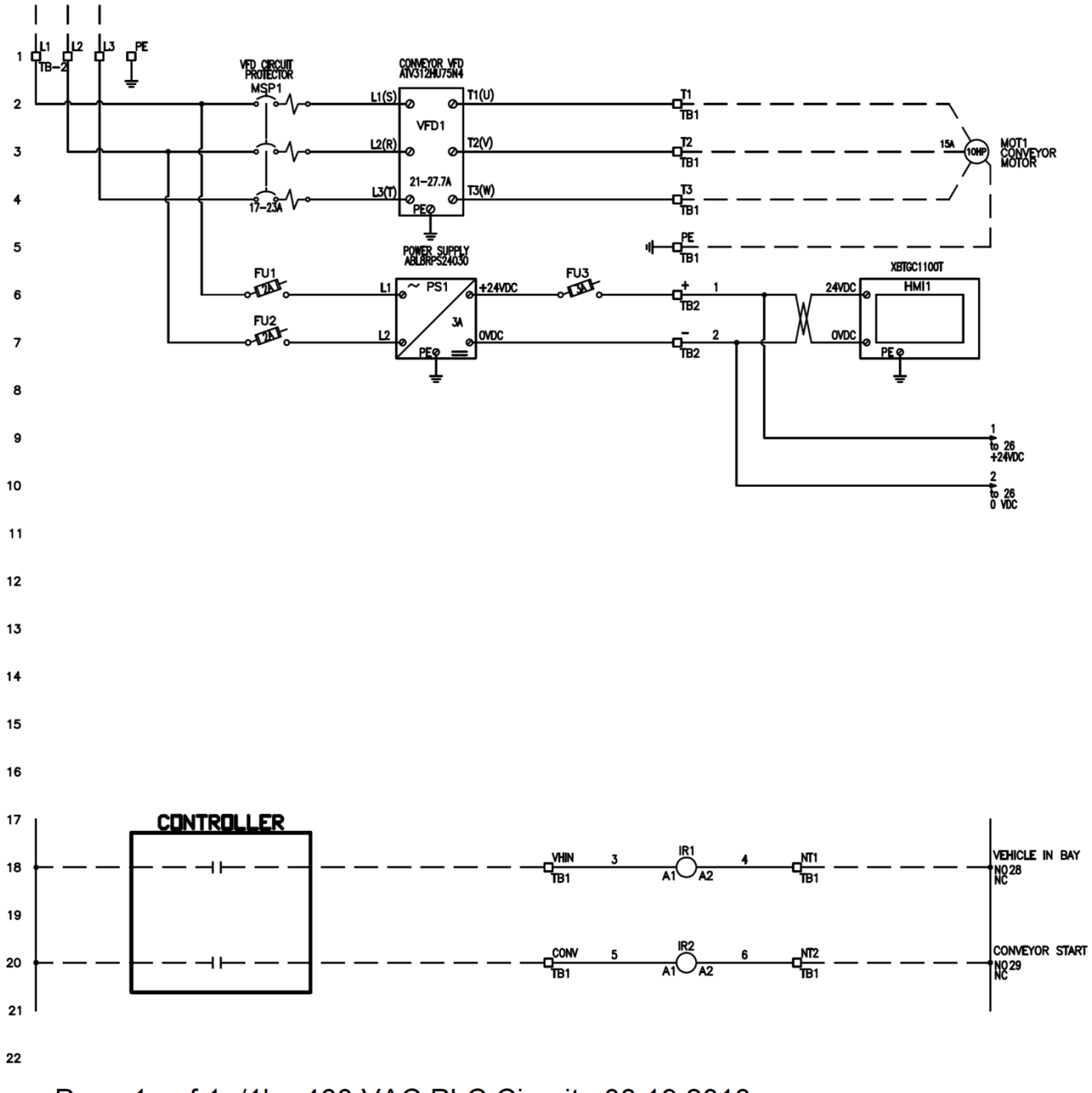
Page 1a of 1a/1b 230 VAC Field Wiring 08.19.2013

230 VAC – Interconnects Page 1b of pages 1a and 1b



460 VAC – PLC Circuit Page 1a of pages 1a and 1b

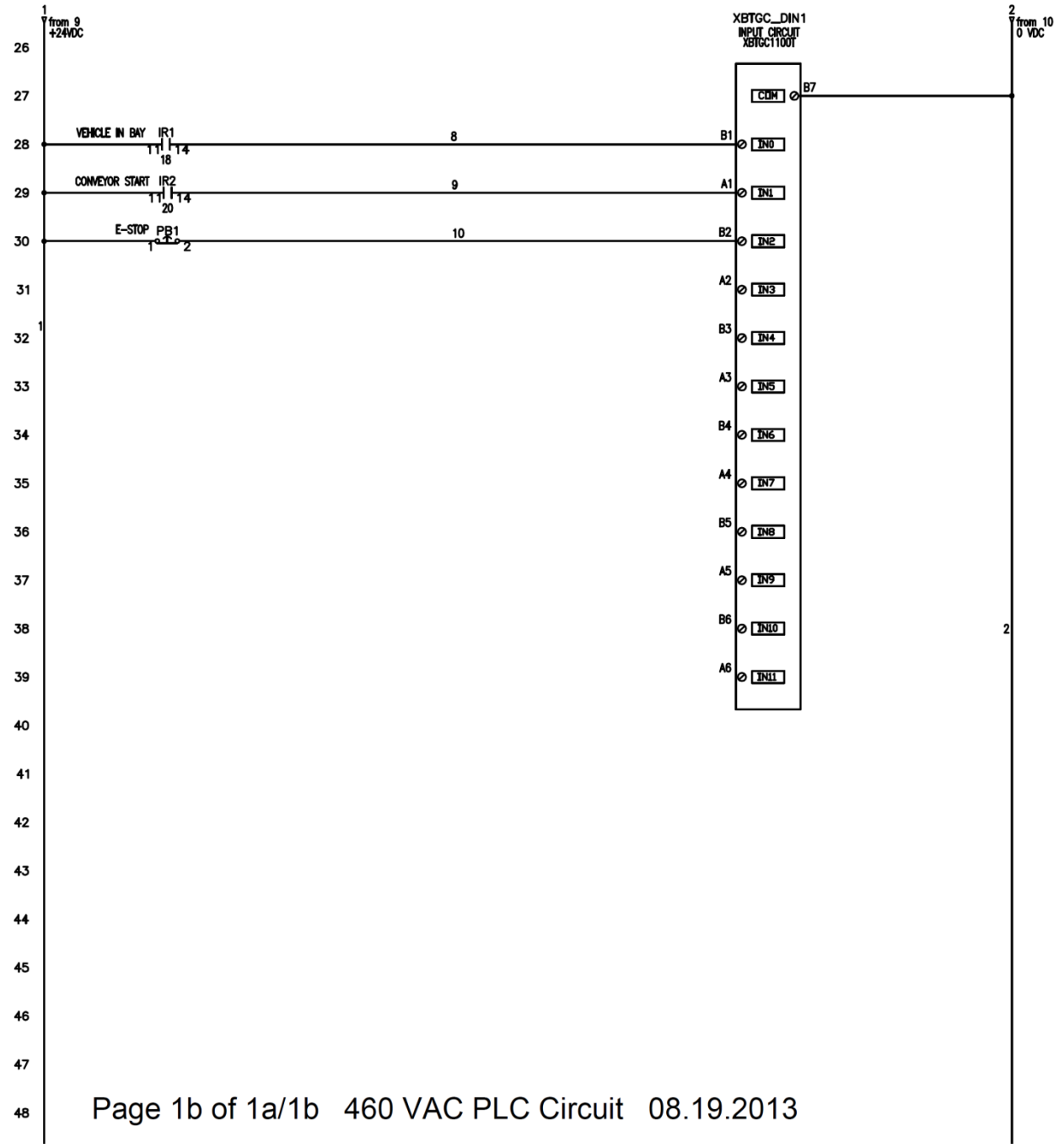
Total Panel FLA = 15 AMPS



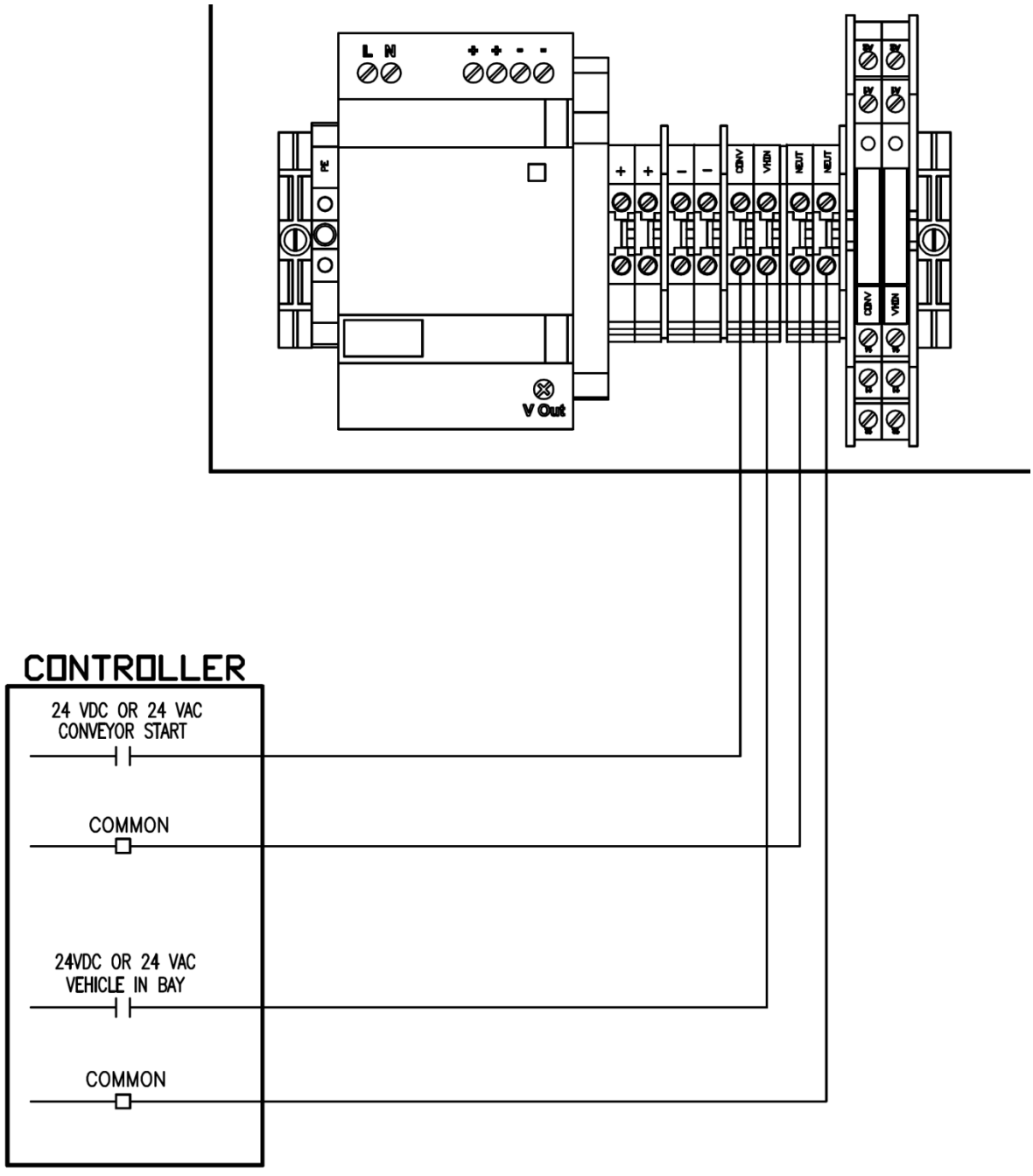
Page 1a of 1a/1b 460 VAC PLC Circuit 08.19.2013

460 VAC – PLC Circuit Page 1b of pages 1a and 1b

Total Panel FLA = 15 AMPS

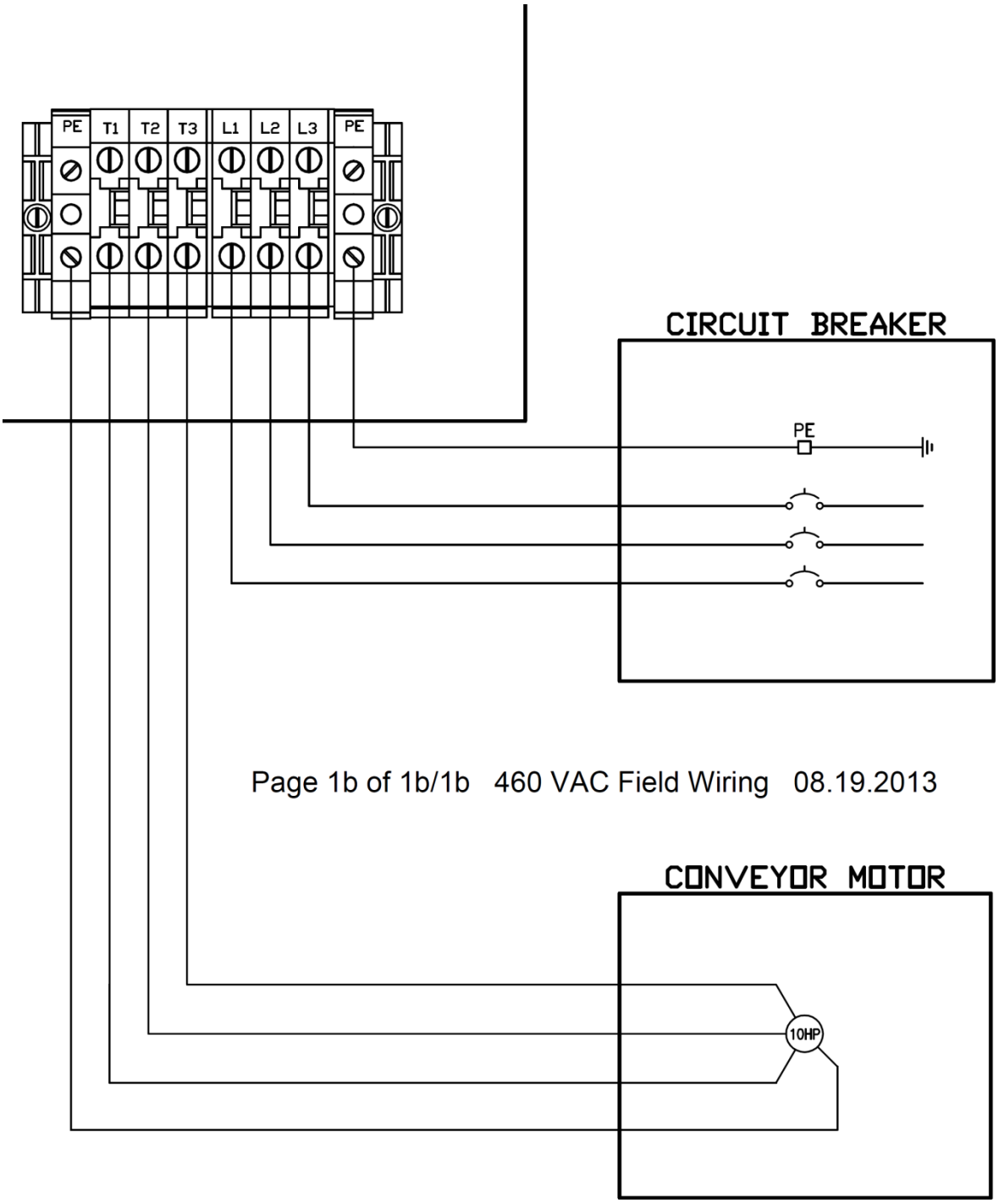


460 VAC – Interconnects Page 1a of pages 1a and 1b



Page 1a of 1a/1b 460 VAC Field Wiring 08.19.2013

460 VAC – Interconnects Page 1b of pages 1a and 1b



WARRANTY & REPAIR

SONNY'S AutoPilot CarWash Control Systems

- Telephone technical support at (800) 876–3900 Ext. 251.
- Replacement on parts manufactured by AutoPilot for one (1) year after delivery.
- Replacement on parts **NOT** manufactured by AutoPilot (i.e. printers, monitors, routers, scanners, cash drawers, etc.) for ninety (90) days after delivery.

AutoPilot warrants all equipment, which it manufactures to be free from defects in material or workmanship under normal use and service for a period of one (1) year from the date of delivery. Any defect reported within one (1) year will be replaced by AutoPilot pending a technician's evaluation and all charges for labor and material will be borne by AutoPilot. Shipping costs will be assumed by the Buyer.

For all items being sent back to AutoPilot for replacement or repair, a Return Merchandise Authorization (RMA) number is required prior to shipping. Merchandise received without an RMA# will be returned to sender. If it is determined that either no fault exists in Company, or the damage to be repaired was caused by negligence of Buyer, its agents, employees or customers, Buyer agrees to pay all charges associated with each such repair. Any tampering, misuse or negligence in handling, installation or use of Equipment renders the warranty void.

Further, the warranty is void if, at any time, Buyer attempts to make any internal changes to any of the components of the Equipment; if at any time and for any reason the power supplied to any part of the Equipment exceeds the rated tolerance; if any external device attached by Buyer creates conditions exceeding the tolerance of the Equipment; or if at any time the serial number plate is removed or defaced.

THIS CONSTITUTES THE SOLE WARRANTY MADE BY COMPANY EITHER EXPRESSED OR IMPLIED. IN NO EVENT SHALL COMPANY BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES AND BUYER'S REMEDIES SHALL BE LIMITED TO REPAIR OR REPLACEMENT OF NONCONFORMING UNITS OR PARTS.

Repair

AutoPilot has a service and support department dedicated to analyzing, repairing and testing any WashPilot™ component in need of such services. In the event a component needs to be sent to AutoPilot for warranty replacement or repair, an evaluation must first be made over the telephone by an AutoPilot technician.

CUSTOMER SERVICE

Please contact SONNY'S AutoPilot CarWash Control Systems for installation and/or operational questions regarding this piece of equipment.

Please refer to the Parts list in this manual or the SONNY'S Parts Catalog and contact SONNY'S Customer Service Order Entry Department for any replacement parts for this piece of equipment.

This manual is available on Sonny's The CarWash Factory website (www.sonnysdirect.com) on the Product Manuals/Support page.

DEPARTMENT	PHONE NUMBERS	FAX NUMBERS
Toll Free Main Line	800-876-3900	954-721-7677
Equipment Department	954-720-4100	800-495-4049

Or you can email us at autopilotsupport@sonnysdirect.com

Thank you for being a SONNY'S AutoPilot CarWash Controls equipment owner!

From all of us here at