

BIST (Built-In Self Test)

On the buses, the 'Left Turn' and 'Right Turn' lamps on the Dashboard LED display can display a flash code if there is any Dinex module communication failure or Output Feedback problem. These are generally known as BIST flash codes, for Built In Self Test. The Right Turn, Left Turn, and Diagnostic Light Test switch must all be on at once in order to begin a flash code cycle.

Once begun, the flash code sequence will go through and check all of the modules, so there is no need to hold all three switches continuously. The flash code sequence will cycle again if the three switches are on, otherwise the BIST sequence will check each module and then stop. The warning buzzer is usually on when the Diagnostic Light Test switch is on, but the buzzer is silenced during the BIST. If there is no BIST failure, then the warning buzzer will sound periodically while all three switches are held on and neither the Left Turn nor the Right Turn dashboard lamp will light.

The Right Turn lamp on the Dashboard LED display will flash quickly to show which module has a failure. The Left Turn lamp will flash slowly to show which output channel(s) from the failed module is actually bad. If the Left Turn lamp does not flash, then this indicates a module communications failure rather than an output failure.

RIGHT TURN Lamp is:	Meaning
Off	Dinex module is OK
One Flash	Module A2 #64 Fault
Two Flashes	Module A3 #65 Fault
Three Flashes	Module A4 #66 Fault
Four Flashes	Module C1 #67 Fault
Five Flashes	Module C2 #68 Fault
Six Flashes	Module D1 #69 Fault
Seven Flashes	Module D2 #70 Fault
Eight Flashes	Module D1 #71 Fault
14 Flashes	Module A1 (MBC) #77 Fault (internal)
15 Flashes	Module B1 #78 Fault
9 - 13, or 16 Flashes	Incorrect Dinex program, Incorrect Accessory (Palm PC).

LEFT TURN Lamp is:	Meaning
Off	Nothing (Or Communication Fail)
One Flash	Module output #1 failure
Two Flashes	Module output #2 failure
Three Flashes	Module output #3 failure
Four Flashes	Module output #4 failure
Five Flashes	Module output #5 failure
Six Flashes	Module output #6 failure
Seven Flashes	Module output #7 failure
Eight Flashes	Module output #8 failure

6

- T2-MK-808 Test Kit
- T2-MK-Program Test Kit

Testing Tools

G2A-MK-808 Test Kit

General Description

G2A-MK-808 is designed to diagnose and test G2A-DIO-888-K modules to support first line maintenance personnel. It is capable of testing the communications network function and simulating the direct output control of individual output point and monitor input status. It is also designed to check and support the integrity of the network. It does this by monitoring and scanning the ID of each network node. The versatility of G2A-MK-808 makes it the primary tool of the DINEX-G2A-MPX system.

Warning: ONLY AUTHORIZED AND TRAINED PERSONNEL SHALL USE THIS EQUIPMENT. The T2-MK-808 will override all safety preconditions. Mishandling may prove hazardous and harmful to the operator or third party. Special caution and authorization are required to operate this tool.

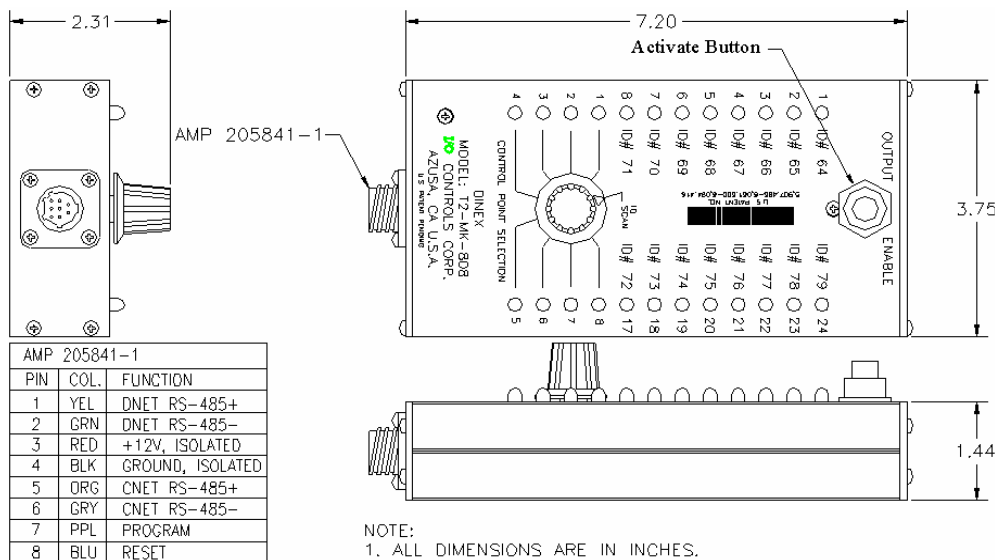


FIGURE: 6.1 – G2A-MK-808 MODULE DIAGRAM

G2A-MK-808 Tests DIO 888 Modules

- Tests communications network,
- Simulates outputs,
- Monitors inputs.

Target Device

G2A-DIO-888, and the network.

Major Test Component and Accessories

- G2A-MK-808
- I/O cables and ID Scan cable

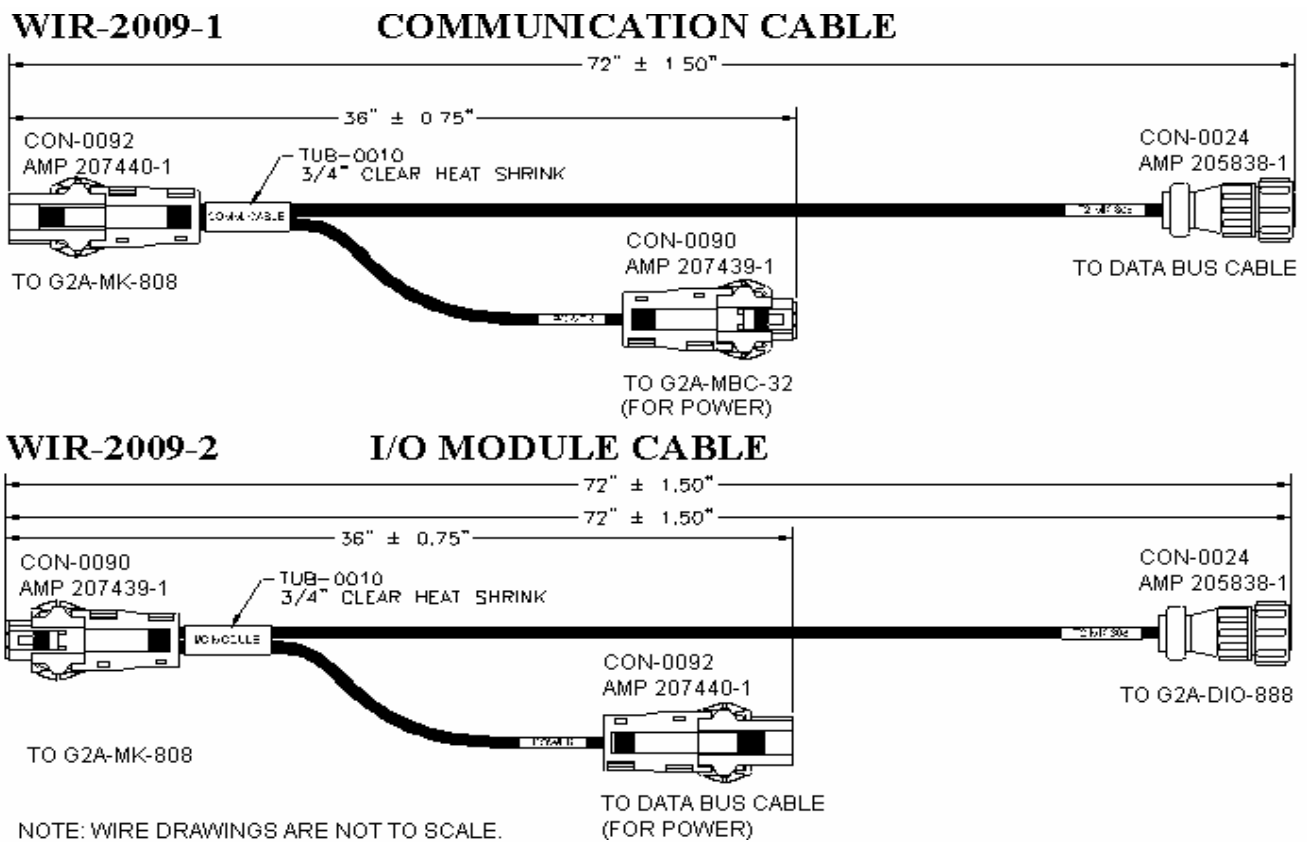


FIGURE: 6.2 – G2A-MK-808 CABLES DIAGRAM

Operating Procedure

Module ID and Input/Output Test

1. Power up the vehicle battery. Ensure that the MBC's PMS is in "wake up" mode to provide isolated power to DINEX G2A system.
2. Turn the dial on the G2A-MK-808 to "IDSCAN" position.
3. Disconnect both data bus cable connectors from the target module.
4. Connect the test cable ('I/O Modules' Cable) to target test module Connect (G2A-DIO-888) by following cable markings, i.e. connect the "I/O Modules" side of the test cable to the data side of module, connect the "Power" side of the test cable to either of the disconnected data cable connectors.
5. Target module's ID will now light up the corresponding LED on the tester.
6. Rotate the tester's dial to select the target output channel (1 through 8).
 - i. -Push the activate button to activate the selected output.
 - ii. -Repeat for different output channels.
7. At the same time the module input LEDs on the tester will light on or off corresponding to the module input status.
8. Check the activation status of the target module and the corresponding output point and input to verify the function and circuit integrity.
 - i. -Outputs - If the red LED on the module does not come on during the test of a selected output, the module or connection is suspect.
 - ii. -Inputs - If an input LED on the module is lit and the corresponding LED on the tester fails to light up, the module or connection is suspect.
 - iii. -A bad or open ground on the large AMP connector pin 23 can prevent proper module operation.

Note: Make sure that the module is connected to the tester cable first and removed last at the end of testing.

Network Integrity Test

1. Disconnect the Y cable used for I/O module test from the G2A-MK-808.
(Reconnect the I/O Module to the ring loop)
2. Replace the Y cable with another Y cable that is marked 'Comm. Cable' for Network test onto the G2A-MK-808. Follow the cable markings.
3. Disconnect both data cables from the G2A-MBC-32.
4. Set the select switch on the G2A-MK-808 to ID Scan.
5. Connect G2A-MK-808 cable to the connector of MBC data bus.
6. The corresponding tester LED should illuminate, indicating that the correct modules are connected to the main data bus.
7. Verify the network configuration and check integrity.
8. Reconnect both data cables back to the G2A-MBC-32.

T2-MK-PROGRAM Test Kit

General Description

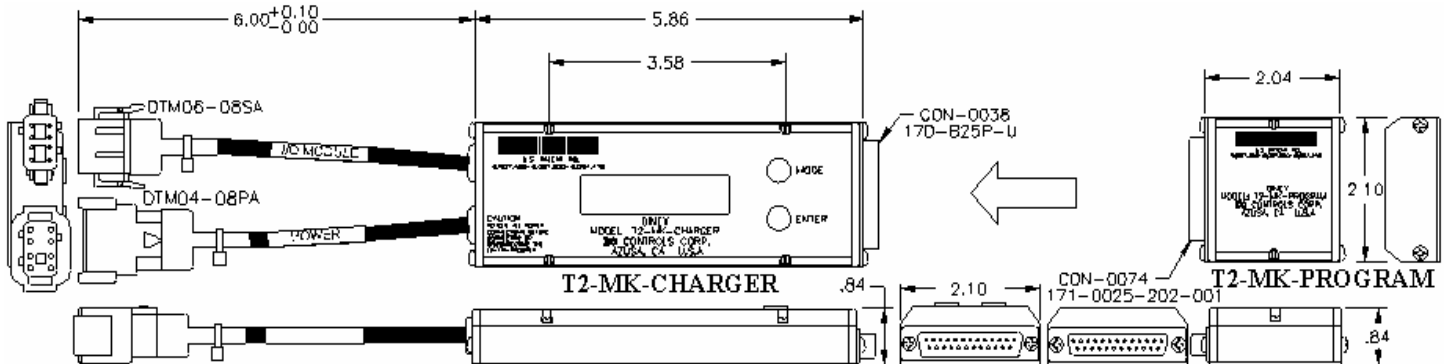
The PROGRAM KIT is designed to download program smoothly.

- T2-MK- PROGRAM holds program memory.
- T2-MK-CHARGER-R2 loads the program to the target MBC module in less than 60 seconds.

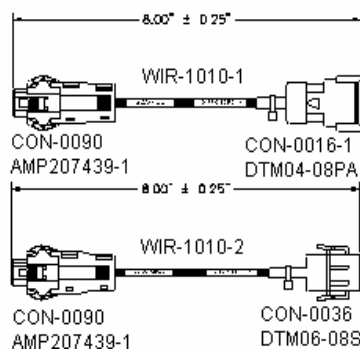
Module program changes (resulting from faults or updates) are easily corrected in the DINEX T2 system using the T2-MK-PROGRAM and T2-MK-CHARGER-R2, see the illustration above. The Charger will download the program to the target MBC in less than 60 seconds.

The PROGRAM and CHARGER are intended to be used as a pair without the aid of any additional equipment.

The LED device on the T2-MK-CHARGER-R2 can be helpful to monitor the status of downloading a new program, or verifying the program currently in the module.



DTM04-08P/DTM06-08S		
PIN	COL.	FUNCTION
1	YEL	DNET RS-485+
2	GRN	DNET RS-485-
3	RED	+12V, ISOLATED
4	BLK	GROUND, ISOLATED
5	ORG	CNET RS-485+
6	GRY	CNET RS-485-
7	PPL	NC
8	BLU	NC



- NOTE: 1. ALL DIMENSIONS ARE IN INCHES.
 2. ALL CONNECTORS USE TUB-0003 3/4" BLACK HEAT SHRINK.
 3. ALL CONNECTORS USE TUB-0016 PLASTIC TIE WRAP.
 4. ALL CONNECTOR WIRES USE TUB-0002 1/4" BLACK HEAT SHRINK.
 5. ALL WIRE LABELS USE TUB-0017 1/4" CLEAR HEAT SHRINK
 WIRE DRAWINGS ARE NOT TO SCALE.

FIGURE: 6.3 – T2-MK-CHARGER & T2-MK-PROGRAM DIAGRAM

Target Devices

G2A-MBC-32

NOTE: *When replacing a new G2A-MBC-32 module, the same system unique program must be loaded to the new module as was used in the “old” system.*

When the control system needs customer design changes, the updated program or programs must be loaded to the specific G2A-MBC-32 module to ensure that the system performs as required.

Up-loading a program to T2-MK-PROGRAM kit from a PC (for Level 2 & Level 3 or Factory used only)

Operating Procedure

1. Prepare the PC-compatible computer with the T2-MK-232 (an RS232 to RS485 converter module) in normal programming mode.
2. Identify the target, G2A-MBC-32 module and verify the program to be downloaded.
3. Select the correct program to be downloaded.
4. Connect the T2-MK-CHARGER-R2 and the T2-MK-PROGRAM modules together via their DB-25 connectors.
5. Apply power to the T2-MK-CHARGER-R2 by connecting the 9-volt AC Power adapter supplied with the T2-MK-232 kit.
6. Select “Upload Mode” on the T2-MK-CHARGER and press ENTER
7. Execute the normal PC program upload/downloading procedure to upload:
 - i. Select file to be uploaded
 - ii. Select COM port
 - iii. Select “G2A”
 - iv. Select baud rate: 115K for G2A system
 - v. Ignore the code length selection (It’s fixed length: 3FFF in hexadecimal)
 - vi. Press button called ‘Program & Verify’

6-Testing Tools

8. If an error message window is shown up, reset the CHARGER module by unplugging the power adapter. Plug it in again to reset the CHARGER. And repeat Step 6 again till a download completion message window is displayed.
9. Program download is now completed. The T2-MK-PROGRAM modules are ready for service.

Verifying or downloading the program from T2-MK-PROGRAM kit to the target module IN THE VEHICLE

Operating Procedure

1. Turn on the vehicle battery power.
2. Identify the target G2A-MBC-32 module and verify the program to be downloaded.
3. Choose the correct pre-loaded T2-MK-PROGRAM module to be downloaded.
4. Connect the T2-MK-CHARGER-R2 and the T2-MK-PROGRAM modules together via their connectors.
5. Connect the cable assembly via the 8-pin connector to target module, but disconnect the target module from the ring loop at both connections.
6. Select 'Verify' mode. By pressing 'Enter' button, it starts to verify the program in the PROGRAM module and the program in the target module.
7. If the 'Verify' OK, they both contain an identical program. The CHARGER will display 'checksum' and 'Revision number' on the LED device.
8. If the 'Verify' process shows 'Checksum Error', it means the target module has different program than in the PROGRAM module. Select 'Download mode' to start downloading process.
9. If 'Download Error – verify cksum err' status shows on the LED device, the download process is not successful. Repeat Step 6

through 9 till 'Download Completed – Verify OK! Rev. #' message is displayed.

6-Testing Tools

10. Unplug the connector from the target module.
11. Disconnect program-related connectors.
12. Program download is now complete. Reconnect connectors to original configuration as required.

Factory Troubleshooting and Repair

Note: DINEX module internal components are not field-repairable

- If Levels 1 through 3 troubleshooting and diagnostics fail to show the cause for failures or poor performances, the suspect module must be returned to the manufacturer for more rigorous troubleshooting and repair.

7

- I/O Failure
- Module Failure
- System Failure

Failure Analysis and Corrective Action

I/O Failure

This operation is to be used where a limited number of input or output points have malfunctioned within each module.

Visual Check -- Output Mode

- Check the fuse.
- Check feedback amber* and red LEDs. Amber* LED checks the circuit integrity. If the circuit is open for any reason during non-active/ red LED off mode, the amber* LED will be off. If the circuit is functioning the amber* LED will be on.
- The red LED confirms that the output is activated by the computer. If both the red and amber* LEDs are on, check the fuse.

Use Of Tools

- Use the T-MK-808 to confirm the test.

Corrective Action

- Check to see if a fuse is burned out.
- Check for possible short circuit.
- If amber* LED is off, check for open circuit.
- If both red and amber* LEDs are off, replace module and check circuit.

NOTE: Some applications use green LED instead amber LED, according to the specifications of various bus manufacturers.

Module Failure

When a full bank of functions is not working, a module failure has occurred or the output section is missing the power connection.

Visual Check

- Check the communications.
- Check LEDs. If an LED is off, and remains off, module-networking capability is malfunctioning.
- Check powers supply yellow LED. Is every yellow LED on? If the yellow LED is on, system power is fine.

Use of Tools

- T-MK-808 is used to check ID and IO.

Corrective Action

- Check DATA BUS wires integrity. Reset the module by disconnecting the data bus. Replace module.

System Failure

This level of failure is indicated when the system operates as follows:

- Abnormally.
- System is dead.
- Control of the system is lost.

Before proceeding

- Reset the system.
- Shut down/ reset the battery.

Visual Check

- Check every network module LED. All modules should be blinking rapidly.
- If LEDs are not blinking rapidly, check the MBC data bus connection.
- If LED's are blinking, run the BIST and check for DINEX module communication failure indication.

Use of Tools

- Use G2A-MK-808 ID checking mode for data bus integrity.

Corrective Action

- After resetting the system, if the condition persists. Replace the MBC module

- **G2A-MBC-32: Main Bus Controller with Power Management System Module**
- **G2A-DIO-888: Intelligent Digital Input/Output Module**
- **T2-DIO-24OG-R7: Intelligent Digital 24 Output Gateway Module**
- **T2-DIO-32LED-OB-01: 32LED indicator Panel**

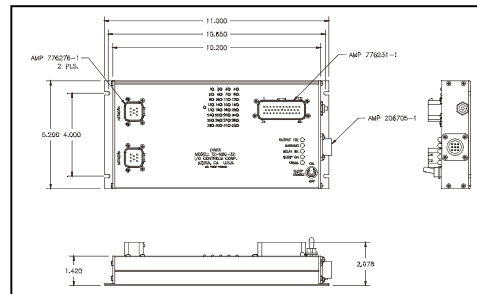
8

Technical Specification

G2A-MBC-32 Main Bus Controller with Power Management System Module

MODULE FEATURES

- Controller.
- Stores instructions for control and monitor.
- Programmable logic for sequence of operations.
- Software compiler available.
- Controls and monitors up to 16 sub-nodes.
- Interface for 32 Inputs.
- Four groups of 16-8-4-4 input points may be source reference or ground reference inputs.
- Built-in timer interrupts function.
- Supports multiple, hierarchical network levels.
- Supports connections to other computers and Automatic Test Equipment.
- For control and monitoring of devices.
- All I/O points are optically isolated.
- LED status indicators provided on all I/O points.
- Replaces relays with solid state, electrical switching.
- Polarity of I/O signals is set by hard wiring, the next assembly wiring harness as appropriate.
- Communication with 115K Baud Dinex G2 Modules



STANDARD DINEX FEATURES

Network

- Integrates with intelligent network control system.
- Allows system expansion.
- Easy to use and program.
- Interfaces to Personal Computers and other host computers.

Construction

- Small, compact, light weight and rugged.
- Simple to field replace.
- Built-in high speed RISC microprocessor with EEPROM.
- Designed with CMOS circuitry for low power consumption.
- Designed with CMOS and FET circuitry for low power consumption.

Multiplex Communication

- Fault tolerant RS485 data communication bus.
- 115 Kbps data communication rate.

- LED status indicator during communication operation.
- Dual communication ports for ring-loop hook-up capability.

APPLICATIONS

- Main Bus Controller for Multiplexing Systems.
- Master Bus Controller replacing computers.
- Controller for on-board Self-Tests and/or connections to external Automatic Test Equipment for diagnostics.
- Interfaces to switches, such as limit switches, temperature and pressure switches, pushbutton and selector switches.

PRODUCT DESCRIPTION

The Main Bus Controller (G2A-MBC-32) is a network controller with power driver, which provides the complete functions acting as a full-size computer. The module can be established as a Bus Controller which controls multiple nodes or which can directly control other node modules. The MBC module can provide a direct interface for the operator interface, including switches, LED indicators and digital displays.

OPTIONS

Module

- Alternate connector types and configurations, or color coded wire pigtails.
- Resistance for exposure to the ambient environment, without a required enclosure.
- Optional RS-232 Port by special order.

Support Equipment

- DINEX T2-MK-232 Converter Box for RS232 serial port (PC compatible) to DINEX data communication bus.
- Handheld Field Programmer.
- Simulator.

TECHNICAL SPECIFICATIONS

General

- Operating temperature range: -40°C to +85°C
- Humidity: 10% to 100%, saturated
- Shock: up to 20 g
- Vibration: 5 to 35 Hz, 2mm double amplitude, 2 hours

MODULE

Inputs

- Input voltage: 16-32 VDC
- Reverse voltage protection: 32 VDC
- Input current at rated pick-up voltage: 5mA
- Input current at maximum voltage: 15mA
- Turn on/off time: 15 millisecond maximum

System Module

LED Indicators

- green indicators for inputs.

Module and Programming

- High speed microprocessors.
- 8000 programming lines of stack code.
- Integrated word look-up table.
- 16K byte of EEPROM.
- network data exchange registers
- Fast program cycle time 3 microseconds.
- I/O excursion time 1575 microseconds.
- Extended compiler instruction set.
- Swap and rotate capability.
- Programming direct jump capability.
- Extended instruction set built into firmware.
- Direct control of other sub-level Cell Net Controllers.
- Built-in error detection, check sum protocol for faster operation.
- Uses standard ASCII text editor to generate source code, such as Microsoft DOS Edit.
- Uses Dinex Ladder Logic GUI language to generate source code, object code, system documentation.

Network Linking Capability

- One uplink to higher level controller.
- 16 downlinks to lower level controller and/or other DINEX modules.
- Note: The 32 input section uses one downlink address. Those 32 inputs may be made available to a redundant MBC controller.

PROGRAMMING SUPPORT SOFTWARE

- DINEX Ladder Logic GUI language
- DINEX G2 Utility Program.
- High Speed Compiler (PC compatible).
- IOL2.3 Downloader (PC compatible).
- Debugger/Single Step Execution.

SUPPORT DOCUMENTATION

- DINEX G2 Utility Program User Reference Manual.

PIN ASSIGNMENT

AMP 207121-1	
1-32	INPUT 1-32
33	COM1 FOR INPUT 1-16
34	COM2 FOR INPUT 17-24
35	COM3 FOR INPUT 25-28
36	COM4 FOR INPUT 29-32

AMP 207441-1	
1	DNET-A
2	DNET-B
3	+VIN
4	GROUND
5	CNET-A
6	CNET-B
7	PROG_L
8	RESET_L

AMP 206705-1	
1	12V (+)
2	12V (-)
3	RESERVE
4	WARNING OUTPUT
5	MASTER SW POS. 6
6	A 485
7	B 485
8	GROUND
9	BATTERY 24V

G2A-DIO-888 Intelligent Digital Input/Output Module

MODULE FEATURES

- 8 input points.
- 8 output points, high power DC version.
- 8 internal feedback monitoring LEDs, for determining the status of control devices and loads.
- 8 internal feedback current less than 100 uA.
- Each Output point is fuse protected, and includes an easily accessible, sealed fuse holder.
- All I/O points are optically isolated.
- Outputs may be any combination of source and sink outputs.
- LED status indicators provided on all I/O points.
- Polarity of input/output signals is set by hard wiring the next assembly wiring harness as appropriate.
- Replaces relays with solid state, electrical switching.
- Communication with 115K Baud Dinex G2A modules

STANDARD DINEX FEATURES

Network

- Integrates with intelligent network control system.
- Allows system expansion.
- Easy to use and program.
- Interfaces to Personal Computers and other host computers.

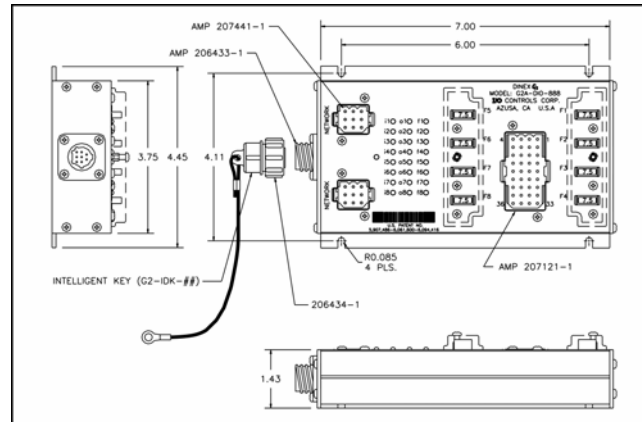
Construction

- Small, compact, lightweight and rugged.
- Simple to field replaces.
- Built-in high speed RISC microprocessor with EEPROM.
- Designed with CMOS circuitry for low power consumption.
- Designed with CMOS and FET circuitry for low power consumption.

Multiplex Communication

- Fault tolerant RS485 data communication bus.
- 115 Kbps data communication rate.
- LED status indicator during communication operation.

- Dual communication ports for ring-loop hook-up capability.



APPLICATIONS

- Used for turning on and off electrical power to control devices and loads, such as solenoid valves, lights, electrical clutches, heaters and motor starters.
- Can apply electrical power to fareboxes, radios and other electrical subsystems.
- Interfaces to switches, such as limit switches, temperature and pressure switches, pushbutton and selector switches.

PRODUCT DESCRIPTION

The G2A-DIO-888 module is a digital input and output module for on/off state devices. The module includes both inputs for monitoring switches and outputs for control devices in a very compact package. Internal feedback monitoring provides the ability to determine if a load is active, in addition to the wiring and output fuse.

Each I/O point is optically isolated and fused for protection against voltage spikes, transients and short circuits. The optical isolation also provides electrical noise immunity.

Each module has a unique programmable field address and each I/O point can be separately monitored and controlled by a Cell Net Controller or computer.

There are 8 inputs can be wired as ground-switched inputs or voltage-switched inputs. Polarity of input signals is set by hard wiring the next assembly wiring harness as appropriate.

The output section has two connections for circuit power and ground for purposes of applying power to control the output switching transistors. Each output may be a source output or a sink output. Polarity of

output signals is set by hard wiring the next assembly wiring harness as appropriate

OPTIONS

Module

- Alternate connector types and configurations, or color coded wire pigtails.
- Resistance for exposure to the ambient environment, without a required enclosure.

Support Equipment

- DINEX T2-MK-232 Converter Box for RS-232 serial port (PC compatible) to DINEX data communication bus.
- Handheld Field Programmer.
- Simulator.

TECHNICAL SPECIFICATIONS

General

- Operating temperature range: -40°C to +85°C
- Humidity: 10% to 100%, saturated
- Shock: up to 20 g
- Vibration: 5 to 35 Hz, 2mm double amplitude, 2 hours

MODULE

Inputs

- Input voltage: 8-32 VDC
- Reverse voltage protection: 32 VDC
- Input current at rated pick-up voltage: 5mA
- Input current at maximum voltage: 15mA
- Turn on/off time: 15 millisecond maximum

Outputs

- Load voltage: 8-32 VDC
- Continuous load output current: 7.5 Amp
- High power output option for ch1 to ch4: 15 Amp continuous load
- Leakage current at nominal load voltage: 100 uA max.
- Turn on/off time: 15 millisecond maximum
- Total output current is 40 Amp Maximum

LED Indicators

- 8 green indicators for inputs.
- 8 red indicators for outputs.
- 8 amber indicators for internal feedback monitoring of load.

PIN ASSIGNMENT

<i>AMP 207121-1</i>		
PIN	POWER OUTPUT CONNECTION	SINK OUTPUT CONNECTION
1,2	CH 1 POWER	CH 1 OUTPUT
5,6	CH 1 OUTPUT	GROUND
9,10	CH 2 POWER	CH 2 OUTPUT
13,14	CH 2 OUTPUT	GROUND
17,18	CH 3 POWER	CH 3 OUTPUT
21,22	CH 3 OUTPUT	GROUND
25,26	CH 4 POWER	CH 4 OUTPUT
29,30	CH 4 OUTPUT	GROUND
4	CH5 POWER	CH 5 OUTPUT
8	CH 5 OUTPUT	GROUND
12	CH6 POWER	CH 6 OUTPUT
16	CH 6 OUTPUT	GROUND
20	CH 7 POWER	CH 7 OUTPUT
24	CH 7 OUTPUT	GROUND
28	CH 8 POWER	CH 8 OUTPUT
32	CH 8 OUTPUT	GROUND
33	GROUND	GROUND
34	POWER 24V/12V	POWER 24V/12V
3	INPUT 1	INPUT 1
7	INPUT 2	INPUT 2
11	INPUT 3	INPUT 3
15	INPUT 4	INPUT 4
19	INPUT 5	INPUT 5
23	INPUT 6	INPUT 6
27	INPUT 7	INPUT 7
31	INPUT 8	INPUT 8
35	INPUT COMMON	INPUT COMMON
36	N/C	N/C

AMP 207441-1	
1	DNET-A
2	DNET-B
3	+VIN
4	GROUND
5	LOOP 5
6	LOOP 6
7	LOOP 7
8	LOOP 8
9	N/A

T2-DIO-24OG-R7 Intelligent Digital 24 Output Gateway Module

MODULE FEATURES

- For driving the LED module.
- 24 transistor 20 mA sink output points.
- Acts as gateway on DINEX network and other host system.
- Isolation output.

STANDARD DINEX FEATURES

Network

- Integrates with intelligent network control system.
- Allows system expansion.
- Easy to use and program.
- Interfaces to Personal Computers and other host computers.

Construction

- Small, compact, lightweight and rugged.
- Simple to field replaces.
- Potted for environmental protection.
- Built-in high speed RISC microprocessor with EEPROM.
- Designed with CMOS circuitry for low power consumption.
- 2 data communication connectors for in/out.

Multiplex Communication

- Fault tolerant RS-485 data communication bus.
- 115K bps data communication rate.
- LED status indicator during communication operation.

APPLICATIONS

- Interfaces with panel LED display module or with load less than 20mA output.

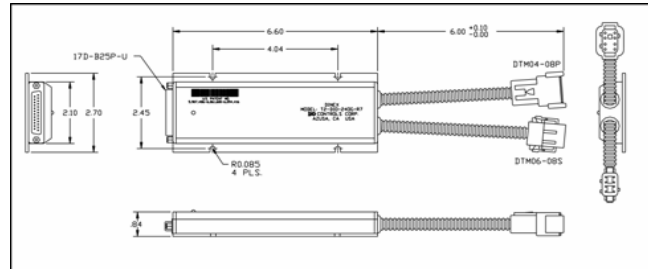
PRODUCT DESCRIPTION

The T-DIO-24OG-R2 is a digital gateway module for on/off state signals. The module is designed for grounding the output in open collector format. Each module has a unique programmable field address and each I/O point can be separately monitored and controlled by a Cell Net Controller or computer.

OPTIONS

Module

- Alternate connector types and configurations, or color coded pigtails.



TECHNICAL SPECIFICATIONS

General

- Operating temperature range: - 0°C to +65°C
- Optional extended temperature: - 35°C to +85°C
- Humidity: 10% to 100%, non-saturated
- Shock: up to 20 g
- Vibration: 5 to 35 Hz, 2mm double amplitude, 2 hours

INTERFACE INFORMATION

Computer input power: 9 VDC +3/-2V at 200mA Maximum, isolated supply.

Data communication bus and power connector: IOC MPX side: DEUTSCH DTM04-08PA 8-pin

Connector

Pin # 1 =RS-485 A
 Pin # 2 =RS-485 B
 Pin # 3 =V+
 Pin # 4 =GND
 Pin # 5 =direct circuit bypass
 Pin # 6 =direct circuit bypass
 HOST side: AMPHENOL 17D-B25P DB-25 male connector or equivalent.
 Pin #1 to PIN # 24 = BIT #1 to BIT # 24
 Pin #25 = GND

SUPPORT DOCUMENTATION

DINEX Utility Program User Reference Manual.

T2-LED32-OB-01 32LED Indicator Panel

MODULE FEATURES

- For monitoring of devices.
- 32 low level LED output.
- Each point assigned as an output point.
- Non-isolated IO.
- Acts as node in DINEX network.

STANDARD DINEX FEATURES

Network

- Integrates with intelligent network control system.
- Allows system expansion.
- Easy to use and program.
- Interfaces to Personal Computers and other host computers.

Construction

- Small, compact, lightweight and rugged.
- Simple to field replaces.
- Potted for environmental protection.
- Designed with CMOS and FET circuitry for low power consumption.

Multiplex Communication

- Fault tolerant RS-485 data communication bus.
- 115K bps data communication rate.
- LED status indicator during communication operation.

APPLICATIONS

- As instrument panel warning light cluster.
- Customized LED arrangement.

PRODUCT DESCRIPTION

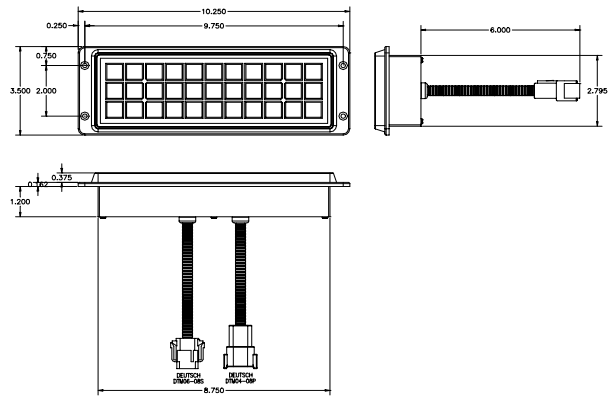
The T2-32LED-OB-01 module is a digital LED output unit for on/off state signals. The module includes 32 high brightness LED blocks for warning indicator or status indicator.

Each module has a unique programmable field address and each I/O point can be separately monitored and controlled by a Cell Net Controller or computer.

OPTIONS

Module

- Alternate connector types and configurations, or color coded pigtails.
- Discrete input connections for special items. Such as stop engine signal, check engine signal, directly connected to engine controls. Such a fire signal or ABS signal, directly connected to other control system.



TECHNICAL SPECIFICATIONS

General

- Operating temperature range: - 40°C to +85°C
- Humidity: 10% to 100%, non-saturated
- Shock: up to 20 g
- Vibration: 5 to 35 Hz, 2mm double amplitude, 2 hours

Outputs

Non-isolated LED blocks.

9

Appendix

■ ID Keys for G2A System

ID Keys for G2A System

General Description

In Dinex G2A system, each module has been signed a unique 'ID' number to identify himself. The unique address symbol (two digits of numerical number) which is assigned to each ID key. Each ID key should be connected with each functional unit (module) in the network. Each ID Key's number can not be changed (no re-writable). Some special module has built in ID function such as MBC, T2-DIO-24OG-R7, and RT2-32LED-OB-01; the ID number can be changed.

Typical Information

Module's Name	Zone Location	ID # XX
A1 (MBC)	Zone A	ID # = 77 (built in & re-writable)
A2	Zone A	ID # = 64
A3	Zone A	ID # = 65
A4	Zone A	ID # = 66
B1	Zone B	ID # = 78 (built in & re-writable)
C1	Zone C	ID # = 67
C2	Zone C	ID # = 68
D1	Zone D	ID # = 69
D2	Zone D	ID # = 70
D3	Zone D	ID # = 71

FIGURE: 9.1 – ID KEY'S TABLE

NOTE: *On some models, according to specification of each particular customer, the module's ID number may be assigned differently.*

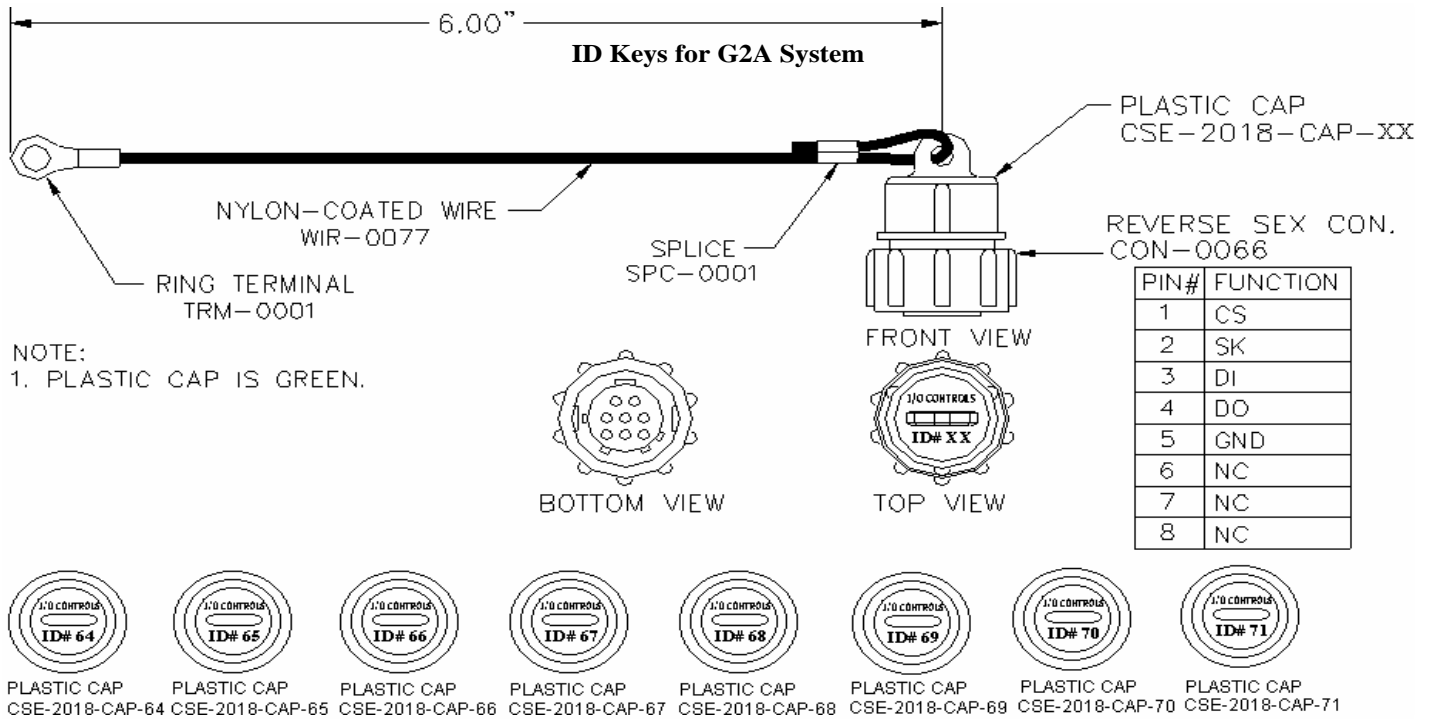


FIGURE: 9.2 – ID KEY’S DIAGRAM

Designer: Paul Boulet

Project Name: M450LXI REV A

Customer:

OEM Serial: 11

Designed By: Paul Boulet

Last Modified On: 6/10/2005

Program Revision: A

Software Version:

Build Date:

Contents

Node

A1	1
A2	3
A3	4
A4	5
B1	6
B2	7
D1	8
D2	9
D3	10
GI	11
GO	12
System	13

Cross Reference

A1	14
A2	16
A3	17
A4	18
B1	19
B2	20
D1	21
D2	22
D3	23
GI	24
GO	25
System	26

Diagram

A1-D01	27
A1-D02	28
A2-D01	29
A2-D02	30
A3-D01	31
A3-D02	32
A4-D02	33
A4-D03	34
B1-D01	35
B1-D02	36
B2-D01	37
B2-D02	38
D1-D01	39
D1-D02	40
D2-D01	41
D2-D02	42
D3-D01	43
D3-D02	44
GI-D01	45

	GO-D01	46
	S1-D01	47
Map	Map	48

WANDERLODGE MAINTENANCE MANUAL

Designer: Paul Boulet

Project Name: M450LXI REV A

A1

ID 77 **Type:** DIO 32/0
Description MBC 32IN MODULE

Input

Name	Wire #	Color	Voltage	Description
A1-I01	MBC001	TN	GND	KEY SW IGNITION
A1-I02	MBC002	RD	GND	HEADLIGHT SW ON POSITION
A1-I03	MBC003	OR	GND	HEADLIGHTS PARK POSITION
A1-I04	MBC004	YL	GND	KEY SWITCH - START POSITION
A1-I05	MBC005SP1	GN	GND	SPARE
A1-I06	MBC006SP2	BL	GND	SPARE
A1-I07	MBC007	PU	GND	SPARE
A1-I08	MBC008	GY	GND	N/A
A1-I09	MBC009	BK	GND	N/A
A1-I10	MBC010	PK	GND	HAZARD SW
A1-I11	MBC011	TN	GND	N/A
A1-I12	MBC012	RD	GND	N/A
A1-I13	MBC013	OR	GND	N/A
A1-I14				N/A
A1-I15	MBC015	GN	GND	CLEARANCE LTS SW
A1-I16	MBC016	BL	GND	N/A
A1-I17	MBC017	PU	GND	N/A
A1-I18				N/A
A1-I19	MBC019	BK	GND	N/A
A1-I20	MBC020	PK	GND	N/A
A1-I21	MBC021	TN	GND	N/A
A1-I22	MBC022	RD	GND	SMRT WHL HORN REQ
A1-I23	MBC023	OR	GND	HORN SW
A1-I24	MBC024	YL	GND	ACCESSORY (RV)
A1-I25	MBC025	GN	24V	SPARE
A1-I28		GY		12V DISCONNECT SHUTDOWN
A1-I30				N/A
A1-I31	MBC231	TN	24V	NEUTRAL SIGNAL
A1-I32				N/A

Flag

Name	Location	Description
A1-F01	A1-D01, R 0	ATS OK TO RUN FLAG
A1-F02	A1-D01, R 1	BIST COMBO FLAG
A1-F03	A1-D01, R 8	SLOW BIST FLAG
A1-F04	A1-D01, R 10	BIST CHIRP FLAG
A1-F05	A1-D01, R 12	FLASH CODE FLAG
A1-F06	A1-D02, R 2	CAT NO DATA J1939 FROM ENGINE

Designer: Paul Boulet
A1-F07

Project Name: M450LXI REV A
A1-D02, R 4 ABS NO DATA J1939

Code

Name	Description
A1-C01	DINEX G2 KERNEL 1 CALL SUBROUTINES
A1-C02	DINEX G2 KERNEL 2 MAIN BODY SUBROUTINES
A1-C03	DINEX G2 KERNEL 3 FLASH CODE FLAG
A1-C04	DINEX G2 KERNEL 4 RESET BIST
A1-C05	DINEX G2 KERNEL BIST COUNTER
A1-C06	DINEX G2 KERNEL 6 SLOW BIST FLAG
A1-C07	DINEX G2 KERNEL 7 FORCE POINTS
A1-C08	START-UP SEQUENCE J1939
A1-C09	CATERPILLAR J1939 TO DINEX
A1-C10	ABS J1939 TO DINEX
A1-C11	J1939 DINEX J1939 OUTPUTS

WANDERLODGE MAINTENANCE MANUAL

Designer: Paul Boulet

Project Name: M450LXI REV A

A2

ID 64

Type: DIO 8/8

Description ZONE A2 DIO 808

Input

Name	Wire #	Color	Voltage	Description
A2-I01	A2-003	OR	GND	HORN SELECT SW (ELECTRIC)
A2-I02	A2-007	PU	GND	HORN SELECT (AIR) SW
A2-I03	A2-011	YL	GND	CRUISE CONTROL CANCEL (FROM SMART WHEEL)
A2-I04	A2-015	GN	GND	ABS TRACT CTRL SW
A2-I05	A2-019	BK	GND	MIRROR HEAT SW
A2-I06	A2-023	OR	GND	N/A
A2-I07	A2-027	PU	GND	N/A
A2-I08				HEADLAMP FLASH (SIGNAL FROM SMART WHEEL)

Output

Name	Wire #	Color	Voltage	Location	Description
A2-O01	A2-105	GN	12V	A2D01, R 0	NEUTRAL
A2-O02	A2-113	OR	12V	A2D01, R 2	REVERSE
A2-O03	A2-121	TN	12V	A2D01, R 4	LH DIR LIGHT
A2-O04				A2D01, R 6	SMART WHL IGN
A2-O05	A2-108	GY	12V	A2D01, R 9	MIRROR HEAT
A2-O06	A2-116	BL	12V	A2D01, R 11	RH DIR LIGHT
A2-O07	A2-124	YL	12V	A2D01, R 14	AIR HORN
A2-O08				A2D02, R 0	DIMMER

Timer

Name	Timer Type	Time	Time Off	Description
A2-T03	Delay Off	300.00		5 MINUTE TIMER

Designer: Paul Boulet

Project Name: M450LXI REV A

A3

ID 65

Type: DIO 8/8

Description ZONE A3 DIO 808

Input

Name	Wire #	Color	Voltage	Description
A3-I01	A3-003	OR	GND	CRUISE ON/OFF SW
A3-I02	A3-007	PU	GND	CRUISE SET SW
A3-I03	A3-011	TN	GND	CRUISE RESUME SW
A3-I04	A3-015	GN	GND	ENGINE BRAKE ENABLE SW
A3-I05	A3-019	BK	GND	ENGINE BRAKE LOW SW
A3-I06	A3-023	OR	GND	ENGINE BRAKE MED SW
A3-I07	A3-027	PU	GND	ENG BRAKE HI
A3-I08	A3-031	TN	GND	HIGH IDLE SW

Output

Name	Wire #	Color	Voltage	Location	Description
A3-O01	A3-205/206		24V	A3D01, R 0	12V/24V IGN BUS
A3-O02				A3D01, R 2	3 MPH SIGNAL (RV)
A3-O03	A3-121	PK	12V	A3D01, R 4	IGNITION, WEBASTO
A3-O04	A3-129	BK	12V	A3D01, R 7	PARK BRAKE (RV)
A3-O05	A3-108	GY	12V	A3D01, R 10	3 MPH SIG (AIR LEVEL)
A3-O06	A3-012	RD	GND	A3D01, R 14	PARK AND ACCESSORY (FOR SLIDEOUT)
A3-O07	A3-124	YL	12V	A3D02, R 0	HI BEAM LIGHT
A3-O08	A3-232	RD	24V	A3D02, R 2	ELECTRIC HORN

WANDERLODGE MAINTENANCE MANUAL

Designer: Paul Boulet

Project Name: M450LXI REV A

A4

ID 66 **Type:** DIO 8/8

Description ZONE A4 DIO 808

Input

Name	Wire #	Color	Voltage	Description
A4-I01				N/A
A4-I02	A4-007	PU	GND	SHIFT INH (RV)
A4-I03	A4-011	TN	GND	N/A
A4-I04	A4-105	GN	GND	MASTER RLY INPUT (RV)
A4-I05				N/A
A4-I06				N/A

Output

Name	Wire #	Color	Voltage	Location	Description
A4-O01	A4-001	TN	GND	A4D02, R 0	PARK BRAKE (FOR DRL MODULE)
A4-O02				A4D02, R 2	GPS PARK LIGHTS
A4-O03				A4D02, R 5	PARK BRAKE (TT)
A4-O04	A4-025	GN	GND	A4D02, R 7	ENGINE BRAKE
A4-O05	A4-108	GY	12V	A4D02, R 9	HEADLIGHT ALERT
A4-O06	A4-012	RD	GND	A4D03, R 0	ABS TELLTALE
A4-O07	A4-020	PK	GND	A4D03, R 2	ATC TELLTALE
A4-O08	A4-132	RD	12V	A4D03, R 4	HEAT SENSOR TELLTALE

Timer

Name	Timer Type	Time	Time Off	Description
A4-T01	Turn On	2.00		TURN ON 2 SEC

Flag

Name	Location	Description
A4-F01		RAMP FLAG
A4-F02		KNEEL DOWN FLAG
A4-F03		KNEEL UP FLAG

Designer: Paul Boulet

Project Name: M450LXI REV A

B1

ID 72 **Type:** DIO 8/8
Description B1 MODULE

Input

Name	Wire #	Color	Voltage	Description
B1-I01	B1-003	OR	GND	HIGH BEAM SW
B1-I02	B1-007	PU	GND	LFT TURN SW
B1-I03	B1-011	TN	GND	RT TURN SW
B1-I07	B1-027	PU	GND	SERVICE BRK PSI SW
B1-I08	B1-031	TN	GND	P BRAKE PSI SW

Output

Name	Wire #	Color	Voltage	Location	Description
B1-O01				B1-D01, R 2	LOW BEAM LTS
B1-O02				B1-D01, R 5	HIGH BEAM LTS
B1-O03				B1-D01, R 7	LFT TURN LTS & MIRROR
B1-O04				B1-D01, R 11	RT TURN LTS & MIRROR
B1-O05				B1-D02, R 0	ON STAR BATTERY
B1-O06	B1-116	BL	12V	B1-D02, R 2	HDLMP SIG TO S WHL
B1-O07	B1-124	YL	12V	B1-D02, R 4	ON STAR IGNITION
B1-O08				B1-D02, R 6	CAT MES IGN

Timer

Name	Timer Type	Time	Time Off	Description
B1-T01	Flash	0.50	0.50	FLASH TIMER

Flag

Name	Location	Description
B1-F01	B1-D01, R 0	FLASH FLAG

WANDERLODGE MAINTENANCE MANUAL

Designer: Paul Boulet

Project Name: M450LXI REV A

B2

ID 73

Type: DIO 8/8

Description B2 MODULE

Input

Name	Wire #	Color	Voltage	Description
B2-I05	B2-019	BK	GND	FOG LT SW
B2-I06				DASH FRT DOOR LOCK SW

Output

Name	Wire #	Color	Voltage	Location	Description
B2-O01				B2-D01, R 0	FOG LTS
B2-O02				B2-D01, R 2	FRONT MARKERS
B2-O03				B2-D01, R 5	LEVEL SEN IGN
B2-O04				B2-D01, R 7	MARKER LIGHTS
B2-O06	B2-116	BL	12V	B2-D02, R 2	ADJ PEDAL CMD OUT
B2-O07				B2-D02, R 4	PARK BRK HADLEY
B2-O08					GEN RUN FRONT A/C

Designer: Paul Boulet

Project Name: M450LXI REV A

D1

ID 69

Type: DIO 8/8

Description ZONE D1 DIO 808

Input

Name	Wire #	Color	Voltage	Description
D1-I01	D1-003	OR	GND	TEMP DETECTORS
D1-I02	D1-007	PU	GND	GEN RUN SIGNAL ALT 1
D1-I03	D1-011	TN	GND	GEN RUN SIG ALT 2
D1-I04	D1-015	GN	GND	HOT HYD FLUID FAN

Output

Name	Wire #	Color	Voltage	Location	Description
D1-O01	D1-105/106		12V	D1D01, R 0	TAIL LIGHTS
D1-O02	D1-113/114		12V	D1D01, R 3	STOP LAMPS
D1-O03	D1-121/122		12V	D1D01, R 5	R/S TURN SIGNAL
D1-O04	D1-129/130		12V	D1D01, R 7	C/S TURN SIGNAL
D1-O05				D1D01, R 11	AIR DRYER
D1-O06	D1-116	BL	12V		HAND THROT ENABLE
D1-O07	D1-124	YL	12V	D1D02, R 3	BACKUP ALARM/LIGHTS
D1-O08	D1-132	RD	12V		DECEL LIGHTS

WANDERLODGE MAINTENANCE MANUAL

Designer: Paul Boulet

Project Name: M450LXI REV A

D2

ID 70

Type: DIO 8/8

Description ZONE D2 DIO 808

Input

Name	Wire #	Color	Voltage	Description
D2-I01	D2-003	OR	GND	IGN CNTL-FWD SW
D2-I02	D2-007	PU	GND	IGN CNTL-REAR SW
D2-I03	D2-011	TN	GND	REAR START SW
D2-I04	D2-015	GN	GND	ENGINE DOOR OPEN
D2-I05	D2-019	BK	GND	N/A
D2-I06	D2-023	OR	GND	WATER IN FUEL
D2-I07				CHECK ENGINE TT
D2-I08				STOP ENGINE TT

Output

Name	Wire #	Color	Voltage	Location	Description
D2-O01	D2-205	GN	24V	D2D01, R 0	FUEL HEATER
D2-O02					REAR LANDING LTS
D2-O03	D2-222	RD	24V	D2D01, R 6	STARTER SOLENOID
D2-O04	D2-229/230		24V		WATER PUMP
D2-O05	D2-208	GY	24V	D2D01, R 14	HYDRAULIC FAN RLY
D2-O06	D2-216	BL	24V		AIR DRYER
D2-O07	D2-224	YL	24V	D2D02, R 3	REAR IGN POWER
D2-O08	D2-232	RD	24V	D2D02, R 8	ALTERNATOR EXCITER/FAN POWER

Timer

Name	Timer Type	Time	Time Off	Description
D2-T01	Turn On	15.00		15 SEC TIMER
D2-T02	Delay Off	1.00		ALT EXCITER 1 SEC

Designer: Paul Boulet

Project Name: M450LXI REV A

D3

ID 71 **Type:** DIO 8/8

Description ZONE D3 DIO 808

Input

Name	Wire #	Color	Voltage	Description
D3-I01	D3-003	OR	GND	THREE MPH SPEED SIGNAL (167V5)
D3-I06	D3-023	OR	GND	CHECK TRANS SIGNAL (115S31)
D3-I07	D3-027	PU	GND	REVERSE SIGNAL (113V4)
D3-I08	D3-031	BN	GND	HOT RANS SIGNAL (105V19)

Output

Name	Wire #	Color	Voltage	Location	Description
D3-O01	D3-001	TN	GND	D3D01, R 1	THROTTLE INTERLOCK
D3-O02				D3D01, R 4	ENG SERV BRAKE
D3-O03	D3-018	GY	GND	D3D01, R 6	ENG BRK LO/HI
D3-O04				D3D01, R 8	ENG BRAKE MED/HI
D3-O05	D3-004	YL	GND	D3D02, R 0	FAST IDLE
D3-O06	D3-012	RD	GND	D3D02, R 4	TRANS SERV BRK
D3-O07	D3-020	PK	GND	D3D02, R 8	SHIFT ENABLE
D3-O08	D3-028	GY	GND	D3D02, R 13	ABS TRACT CNTRL

WANDERLODGE MAINTENANCE MANUAL

Designer: Paul Boulet

Project Name: M450LXI REV A

GI

ID 80

Type: DIO 0/32

Description GW-J1939 INPUT RUNGS

Flag

Name	Location	Description
GI-F01	GI-D01, R 0	LOW COOLANT
GI-F02	GI-D01, R 2	IDLE VALIDATION ACCEL PEDAL POSITION
GI-F03	GI-D01, R 4	STOP ENGINE
GI-F04	GI-D01, R 6	CHECK ENGINE
GI-F05	GI-D01, R 8	ABS WARN LAMP AMBER
GI-F06	GI-D01, R 10	ATC LAMP STATE

Code

Name	Description
GI-C01	J1939 FROM CAT COOLANT LEVEL
GI-C02	J1939 FROM CAT ACCEL PEDAL POSITION
GI-C03	J1939 FROM CAT BIT 1
GI-C04	J1939 FROM CAT BIT 2
GI-C05	J1939 FROM ABS BIT 1
GI-C06	J1939 FROM ABS BIT 2

Designer: Paul Boulet

Project Name: M450LXI REV A

GO

ID 79 **Type:** DIO 0/32
Description GW-J1939 OUTPUT RUNGS

Flag

Name	Location	Description
GO-F32	GO-D01, R 11	GW-J1939 COMM FAIL FLAG

Code

Name	Description
GO-C01	J1939 ENABLE CRUISE SW
GO-C02	J1939 SET CRUISE SW
GO-C03	J1939 RESUME CRUISE SW
GO-C04	J1939 COAST CRUISE SW
GO-C05	J1939 ACCEL CRUISE SW
GO-C32	J1939 OUTPUTS FROM DINEX

Designer: Paul Boulet

Project Name: M450LXI REV A

System	
ID	0
Description	System Flags
Type:	System

Flag		
Name	Location	Description
FOK	S1-D01, R 0	Force Output OK
FSCAN		System 1st Scan

Designer: Paul Boulet

Project Name: M450LXI REV A

Cross Reference for **A1**

Type: DIO 32/0

Name	Diagram	Location
A1-I01	A1-D01	Row 0, Col 0
A1-I01	A1-D01	Row 2, Col 2
A1-I01	A2-D01	Row 6, Col 0
A1-I01	A2-D01	Row 9, Col 0
A1-I01	A3-D01	Row 0, Col 0
A1-I01	A3-D01	Row 10, Col 0
A1-I01	A3-D01	Row 4, Col 0
A1-I01	A4-D02	Row 9, Col 0
A1-I01	A4-D03	Row 0, Col 1
A1-I01	A4-D03	Row 2, Col 1
A1-I01	B1-D01	Row 11, Col 0
A1-I01	B1-D01	Row 7, Col 0
A1-I01	B1-D02	Row 0, Col 0
A1-I01	B1-D02	Row 4, Col 0
A1-I01	B1-D02	Row 6, Col 0
A1-I01	B2-D01	Row 0, Col 0
A1-I01	B2-D01	Row 5, Col 0
A1-I01	B2-D02	Row 2, Col 0
A1-I01	B2-D02	Row 3, Col 1
A1-I01	D1-D01	Row 11, Col 0
A1-I01	D1-D01	Row 5, Col 0
A1-I01	D1-D01	Row 7, Col 0
A1-I01	D1-D02	Row 3, Col 0
A1-I01	D2-D01	Row 0, Col 0
A1-I01	D2-D01	Row 14, Col 0
A1-I01	D2-D01	Row 6, Col 0
A1-I01	D2-D01	Row 8, Col 0
A1-I01	D2-D02	Row 3, Col 0
A1-I01	D2-D02	Row 8, Col 0
A1-I01	D3-D01	Row 4, Col 0
A1-I01	D3-D01	Row 6, Col 0
A1-I01	D3-D01	Row 8, Col 0
A1-I01	D3-D02	Row 0, Col 0
A1-I01	D3-D02	Row 13, Col 0
A1-I01	D3-D02	Row 4, Col 0
A1-I01	D3-D02	Row 8, Col 0
A1-I01	S1-D01	Row 0, Col 0
A1-I02	A2-D02	Row 0, Col 0
A1-I02	A4-D02	Row 2, Col 1
A1-I02	A4-D02	Row 9, Col 1
A1-I02	B1-D01	Row 2, Col 1
A1-I02	B1-D01	Row 3, Col 2
A1-I02	B1-D01	Row 5, Col 1
A1-I02	B1-D02	Row 2, Col 1
A1-I02	B2-D01	Row 0, Col 1
A1-I02	B2-D01	Row 2, Col 1
A1-I02	B2-D01	Row 7, Col 0
A1-I02	D1-D01	Row 0, Col 0
A1-I03	A2-D02	Row 1, Col 0
A1-I03	A4-D02	Row 10, Col 1
A1-I03	A4-D02	Row 3, Col 1
A1-I03	B2-D01	Row 3, Col 1

WANDERLODGE MAINTENANCE MANUAL

Designer: Paul Boulet

Project Name: M450LXI REV A

A1-I03	B2-D01	Row 8, Col 0
A1-I03	D1-D01	Row 1, Col 0
A1-I04	D2-D01	Row 6, Col 1
A1-I04	D2-D01	Row 8, Col 1
A1-I10	B1-D01	Row 13, Col 0
A1-I10	B1-D01	Row 9, Col 0
A1-I10	D1-D01	Row 6, Col 0
A1-I10	D1-D01	Row 9, Col 0
A1-I22	A2-D01	Row 14, Col 1
A1-I22	A3-D02	Row 2, Col 1
A1-I24	A3-D01	Row 14, Col 0
A1-I31	A1-D01	Row 0, Col 5
A1-I31	A2-D01	Row 0, Col 0
A1-I31	B2-D02	Row 2, Col 2
A1-I31	D2-D01	Row 6, Col 4
A1-I31	D2-D01	Row 8, Col 3
A1-I31	D3-D02	Row 0, Col 1
A1-I31	D3-D02	Row 4, Col 2

Name	Diagram	Location
A1-F02	A1-D01	Row 10, Col 1
A1-F02	A1-D01	Row 12, Col 0
A1-F02	A1-D01	Row 2, Col 0
A1-F02	A1-D01	Row 3, Col 0
A1-F02	A1-D01	Row 8, Col 0
A1-F03	A1-D01	Row 10, Col 2
A1-F04	A1-D01	Row 2, Col 1

Name	Diagram	Location
A1-C01	A1-D01	Row 4, Col 0
A1-C02	A1-D01	Row 6, Col 0
A1-C03	A1-D01	Row 12, Col 1
A1-C04	A1-D01	Row 3, Col 1
A1-C05	A1-D01	Row 10, Col 3
A1-C06	A1-D01	Row 8, Col 1
A1-C07	A1-D01	Row 14, Col 1
A1-C08	A1-D02	Row 0, Col 1
A1-C09	A1-D02	Row 2, Col 0
A1-C10	A1-D02	Row 4, Col 0
A1-C11	A1-D02	Row 6, Col 0

Designer: Paul Boulet

Project Name: M450LXI REV A

Cross Reference for **A2**

Type: DIO 8/8

Name	Diagram	Location
A2-I01	A3-D02	Row 2, Col 0
A2-I02	A2-D01	Row 14, Col 0
A2-I03	D3-D01	Row 4, Col 2
A2-I04	D3-D02	Row 13, Col 2
A2-I05	A2-D01	Row 9, Col 1
A2-I08	B1-D01	Row 3, Col 1

Name	Diagram	Location
A2-T03	A2-D01	Row 9, Col 2

WANDERLODGE MAINTENANCE MANUAL

Designer: Paul Boulet

Project Name: M450LXI REV A

Cross Reference for **A3**

Type: DIO 8/8

Name	Diagram	Location
A3-I01	GO-D01	Row 0, Col 0
A3-I01	GO-D01	Row 2, Col 1
A3-I01	GO-D01	Row 4, Col 1
A3-I01	GO-D01	Row 6, Col 1
A3-I01	GO-D01	Row 8, Col 1
A3-I02	GO-D01	Row 2, Col 0
A3-I02	GO-D01	Row 4, Col 2
A3-I02	GO-D01	Row 6, Col 2
A3-I02	GO-D01	Row 8, Col 0
A3-I03	GO-D01	Row 4, Col 0
A3-I03	GO-D01	Row 6, Col 0
A3-I04	A4-D02	Row 7, Col 0
A3-I04	D3-D01	Row 6, Col 1
A3-I04	D3-D01	Row 8, Col 1
A3-I05	D3-D01	Row 6, Col 2
A3-I06	D3-D01	Row 8, Col 2
A3-I07	D3-D01	Row 7, Col 2
A3-I07	D3-D01	Row 9, Col 2
A3-I08	D3-D02	Row 0, Col 3

Designer: Paul Boulet

Project Name: M450LXI REV A

Cross Reference for **A4**

Type: DIO 8/8

Name	Diagram	Location
A4-I02	D3-D02	Row 8, Col 3

WANDERLODGE MAINTENANCE MANUAL

Designer: Paul Boulet

Project Name: M450LXI REV A

Cross Reference for **B1**

Type: DIO 8/8

Name	Diagram	Location
B1-I01	A3-D02	Row 0, Col 0
B1-I01	B1-D01	Row 2, Col 2
B1-I01	B1-D01	Row 5, Col 2
B1-I01	B2-D01	Row 0, Col 3
B1-I02	B1-D01	Row 7, Col 1
B1-I02	D1-D01	Row 5, Col 1
B1-I03	B1-D01	Row 11, Col 1
B1-I03	D1-D01	Row 7, Col 1
B1-I07	A1-D01	Row 1, Col 0
B1-I07	D1-D01	Row 3, Col 0
B1-I07	D3-D01	Row 4, Col 1
B1-I07	D3-D02	Row 4, Col 1
B1-I08	A1-D01	Row 0, Col 4
B1-I08	A3-D01	Row 14, Col 1
B1-I08	A3-D01	Row 7, Col 0
B1-I08	A4-D02	Row 0, Col 0
B1-I08	A4-D02	Row 5, Col 0
B1-I08	B2-D02	Row 2, Col 1
B1-I08	B2-D02	Row 4, Col 0
B1-I08	D2-D01	Row 7, Col 0
B1-I08	D2-D01	Row 9, Col 0
B1-I08	D2-D02	Row 4, Col 1
B1-I08	D3-D02	Row 0, Col 2

Name	Diagram	Location
B1-O03	A2-D01	Row 4, Col 0
B1-O04	A2-D01	Row 11, Col 0

Name	Diagram	Location
B1-T01	B1-D01	Row 0, Col 0

Name	Diagram	Location
B1-F01	B1-D01	Row 11, Col 2
B1-F01	B1-D01	Row 7, Col 2
B1-F01	D1-D01	Row 5, Col 2
B1-F01	D1-D01	Row 7, Col 2

Designer: Paul Boulet

Project Name: M450LXI REV A

Cross Reference for **B2**

Type: DIO 8/8

Name	Diagram	Location
B2-I05	B2-D01	Row 0, Col 2

Designer: Paul Boulet

Project Name: M450LXI REV A

Cross Reference for **D1**

Type: DIO 8/8

Name	Diagram	Location
D1-I01	A4-D03	Row 4, Col 0
D1-I02	A1-D01	Row 0, Col 2
D1-I03	A1-D01	Row 0, Col 3
D1-I04	D2-D01	Row 14, Col 1

Designer: Paul Boulet

Project Name: M450LXI REV A

Cross Reference for **D2**

Type: DIO 8/8

Name	Diagram	Location
D2-I01	D2-D01	Row 6, Col 2
D2-I01	D2-D01	Row 8, Col 2
D2-I01	D2-D02	Row 3, Col 1
D2-I02	D2-D01	Row 7, Col 1
D2-I02	D2-D01	Row 9, Col 1
D2-I02	D2-D02	Row 4, Col 0
D2-I02	D3-D01	Row 2, Col 0
D2-I02	D3-D02	Row 0, Col 4
D2-I02	D3-D02	Row 8, Col 2
D2-I03	D2-D01	Row 7, Col 2
D2-I03	D2-D01	Row 9, Col 2
D2-I04	D2-D01	Row 6, Col 3

Name	Diagram	Location
D2-O03	D2-D01	Row 8, Col 4
D2-O03	D2-D01	Row 9, Col 3

Name	Diagram	Location
D2-T01	D2-D01	Row 6, Col 7
D2-T02	D2-D02	Row 8, Col 3

WANDERLODGE MAINTENANCE MANUAL

Designer: Paul Boulet

Project Name: M450LXI REV A

Cross Reference for **D3**

Type: DIO 8/8

Name	Diagram	Location
D3-I01	A1-D01	Row 0, Col 1
D3-I01	A3-D01	Row 10, Col 1
D3-I01	A3-D01	Row 2, Col 0
D3-I07	A2-D01	Row 2, Col 0
D3-I07	D1-D02	Row 3, Col 1

Name	Diagram	Location
D3-O05	D3-D01	Row 1, Col 0
D3-O05	D3-D02	Row 8, Col 1

Designer: Paul Boulet

Project Name: M450LXI REV A

Cross Reference for **GI**

Type: DIO 0/32

Name	Diagram	Location
GI-F05	A4-D03	Row 0, Col 0
GI-F06	A4-D03	Row 2, Col 0

Name	Diagram	Location
GI-C01	GI-D01	Row 0, Col 0
GI-C02	GI-D01	Row 2, Col 0
GI-C03	GI-D01	Row 4, Col 0
GI-C04	GI-D01	Row 6, Col 0
GI-C05	GI-D01	Row 8, Col 0
GI-C06	GI-D01	Row 10, Col 0

WANDERLODGE MAINTENANCE MANUAL

Designer: Paul Boulet

Project Name: M450LXI REV A

Cross Reference for **GO**

Type: DIO 0/32

Name	Diagram	Location
GO-C01	GO-D01	Row 0, Col 4
GO-C02	GO-D01	Row 2, Col 4
GO-C03	GO-D01	Row 4, Col 4
GO-C04	GO-D01	Row 6, Col 4
GO-C05	GO-D01	Row 8, Col 4
GO-C32	GO-D01	Row 11, Col 0

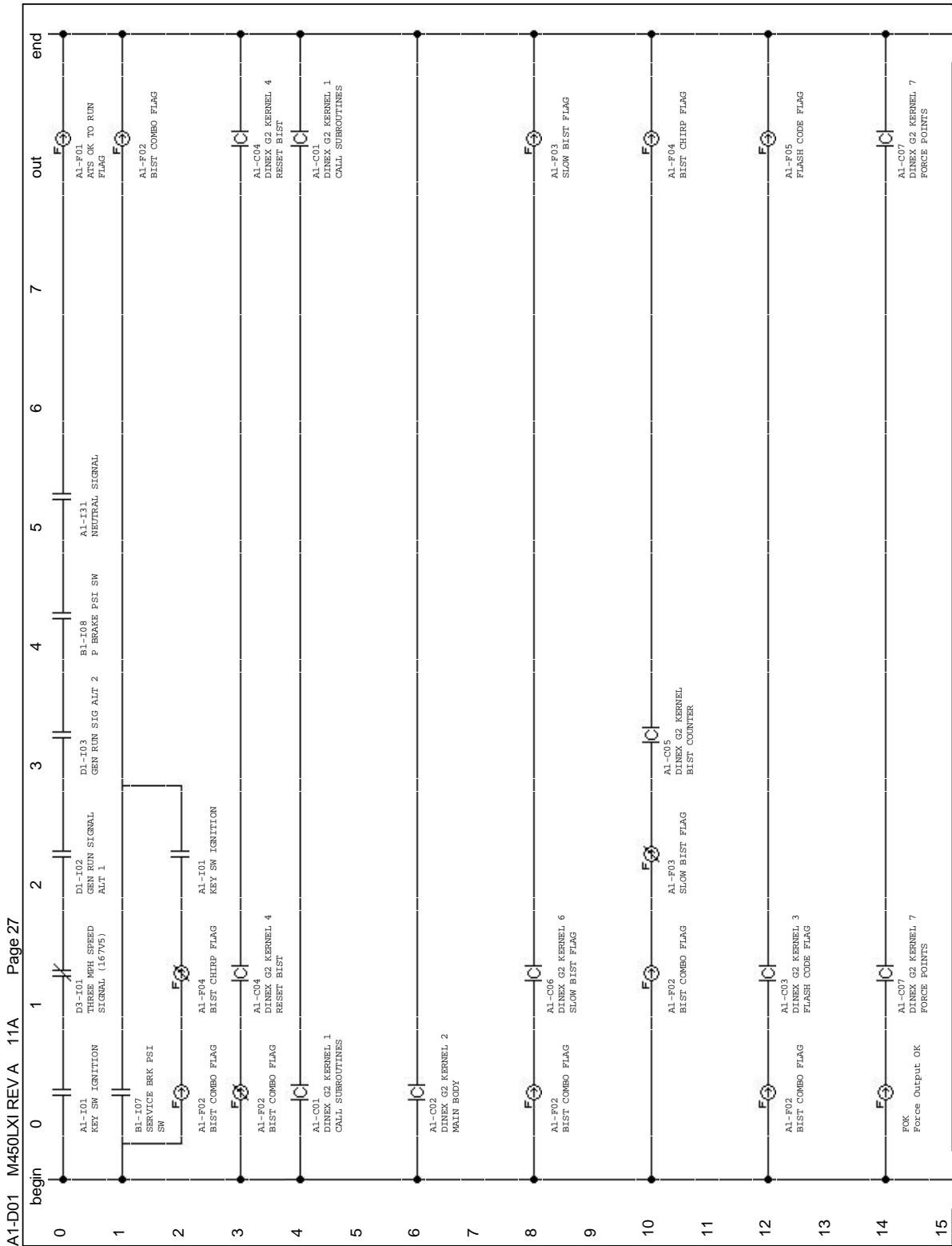
Designer: Paul Boulet

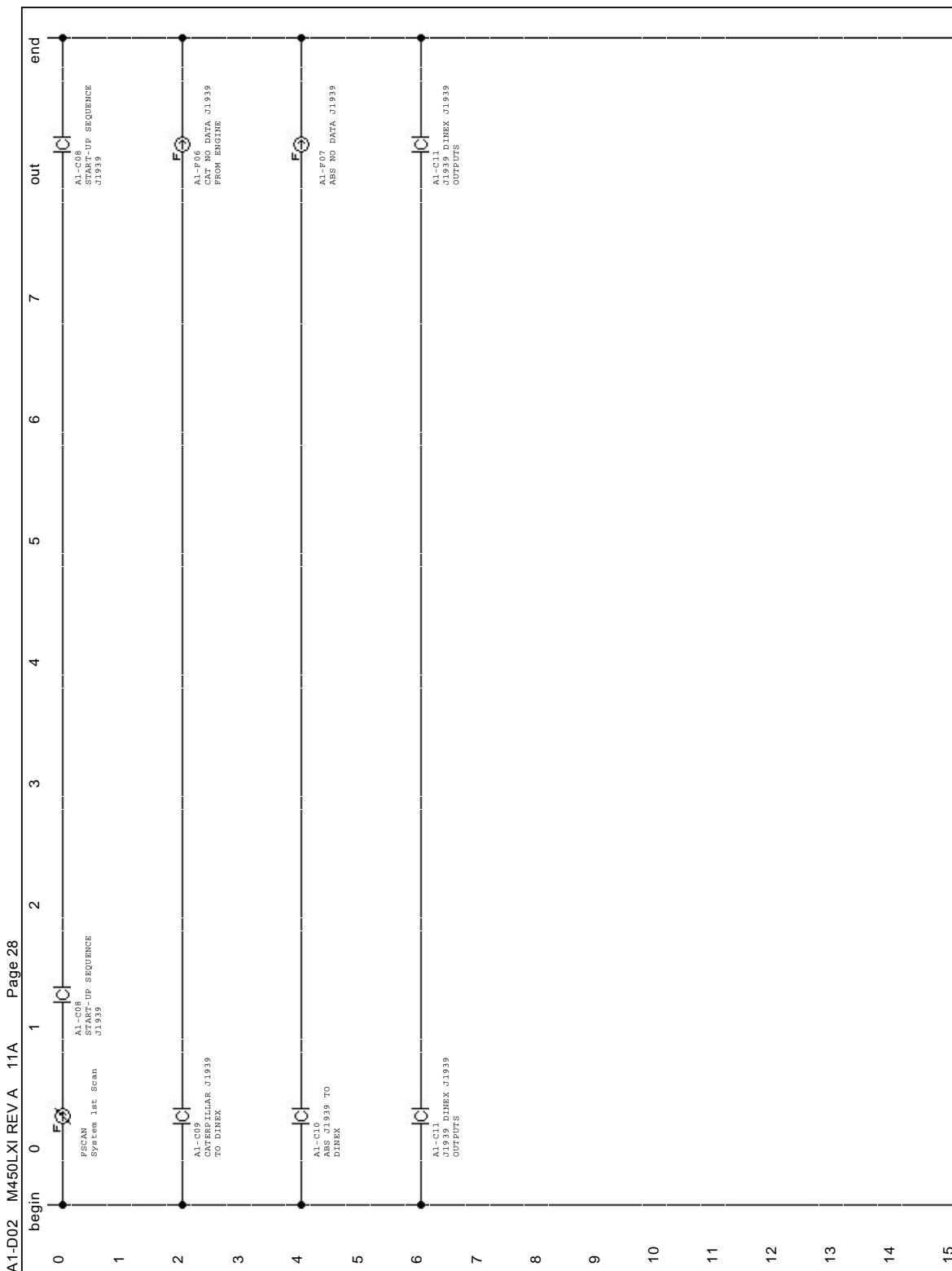
Project Name: M450LXI REV A

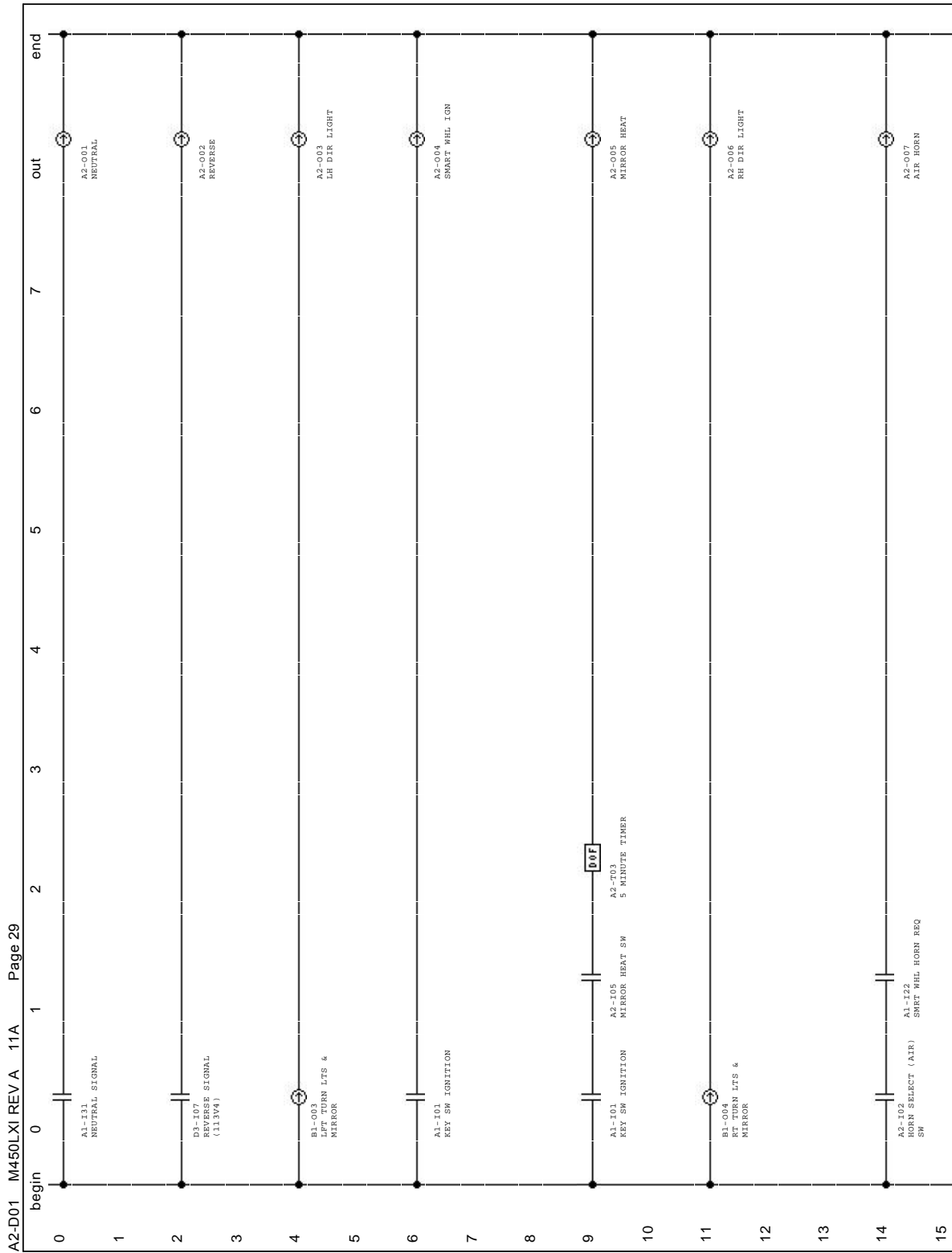
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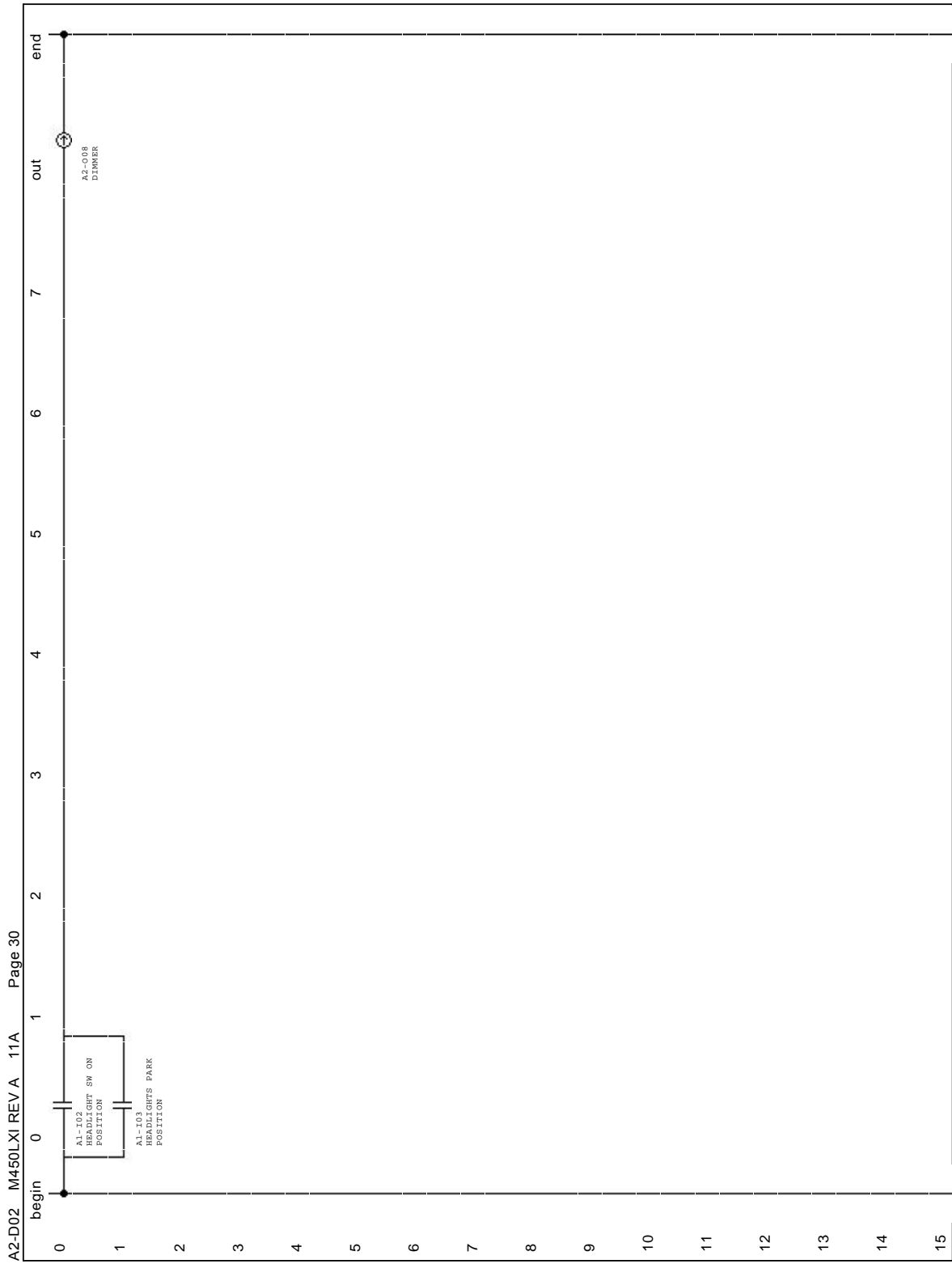
Type: System

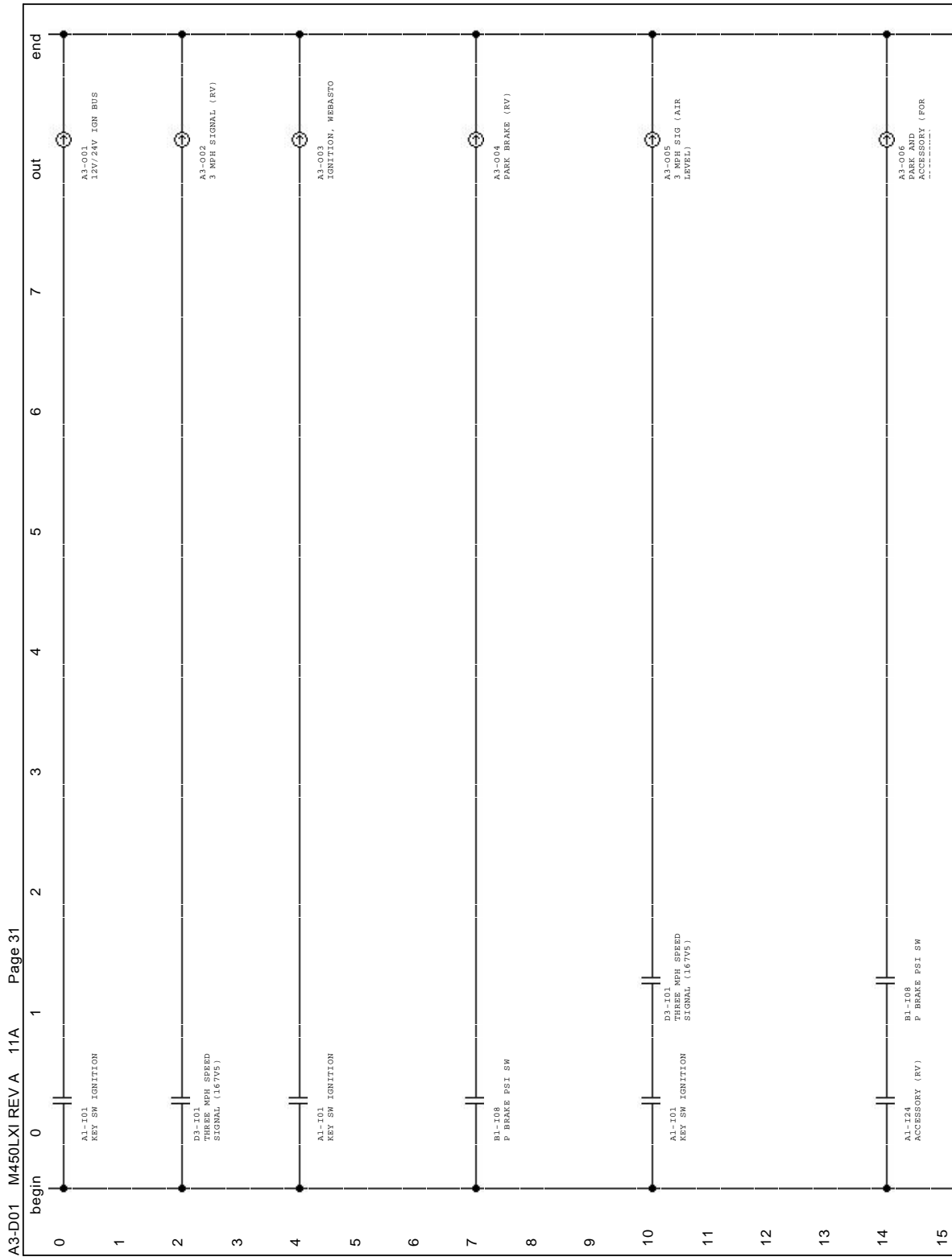
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FOK	A1-D01	Row 14, Col 0
FSCAN	A1-D02	Row 0, Col 0

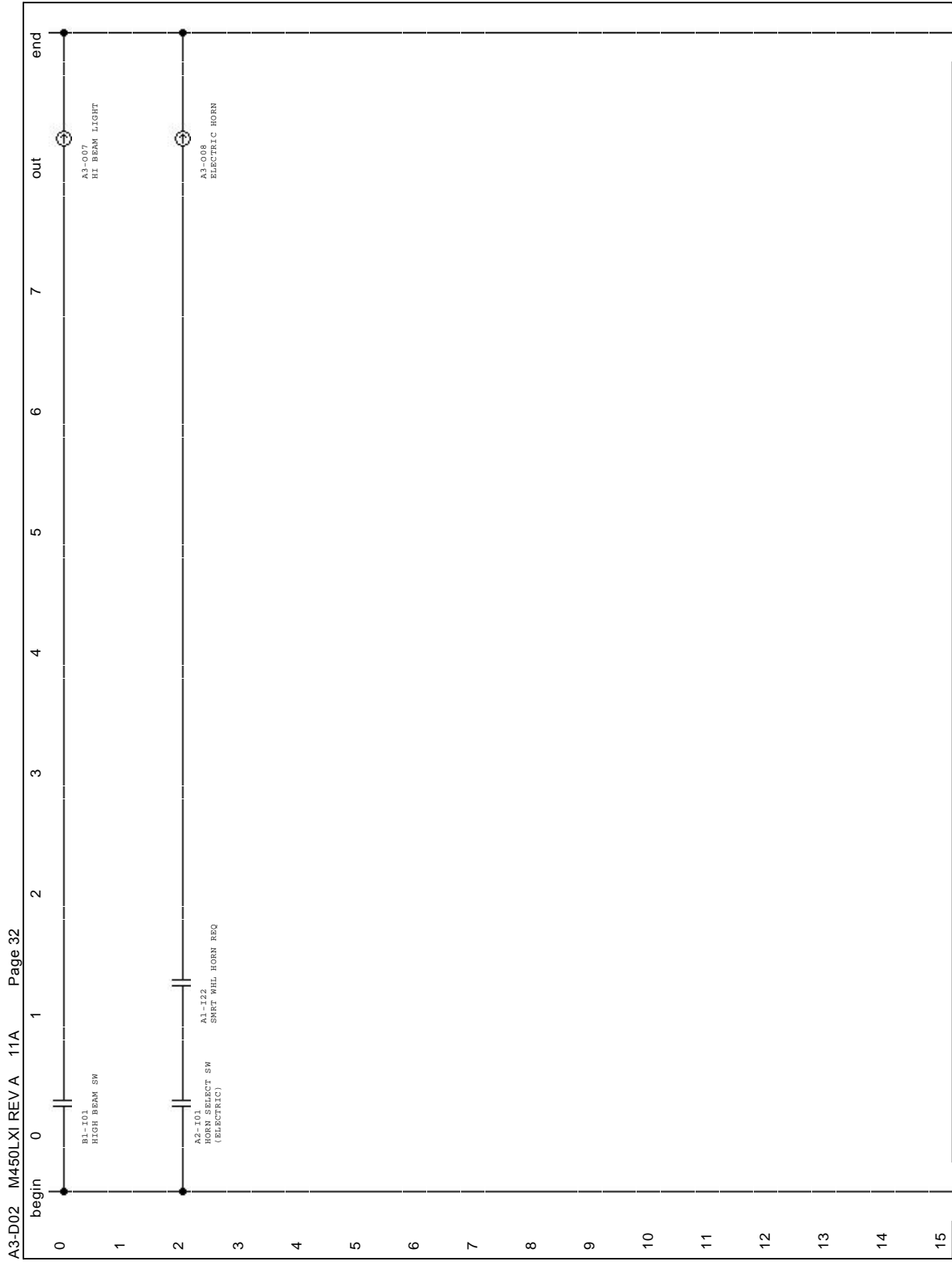


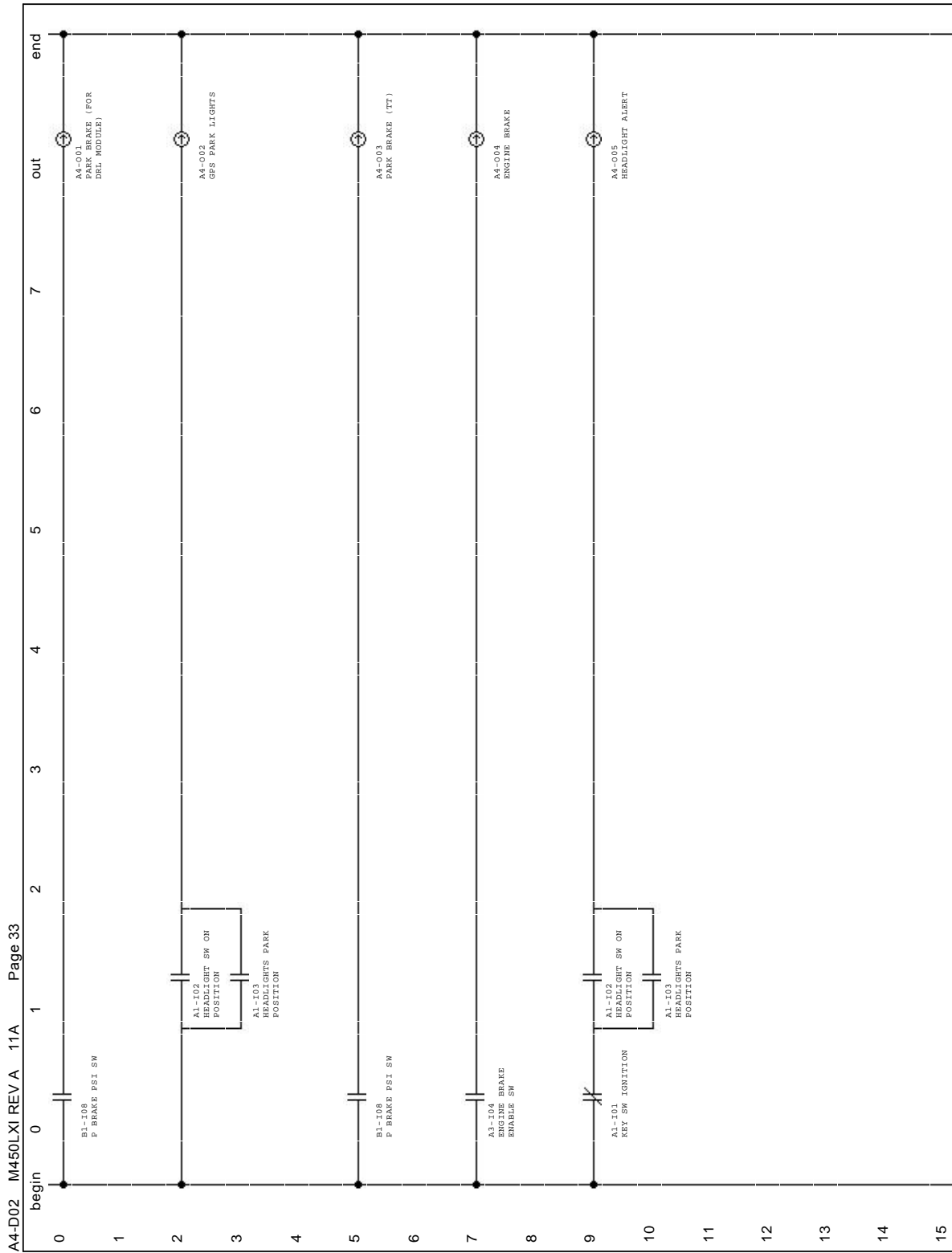


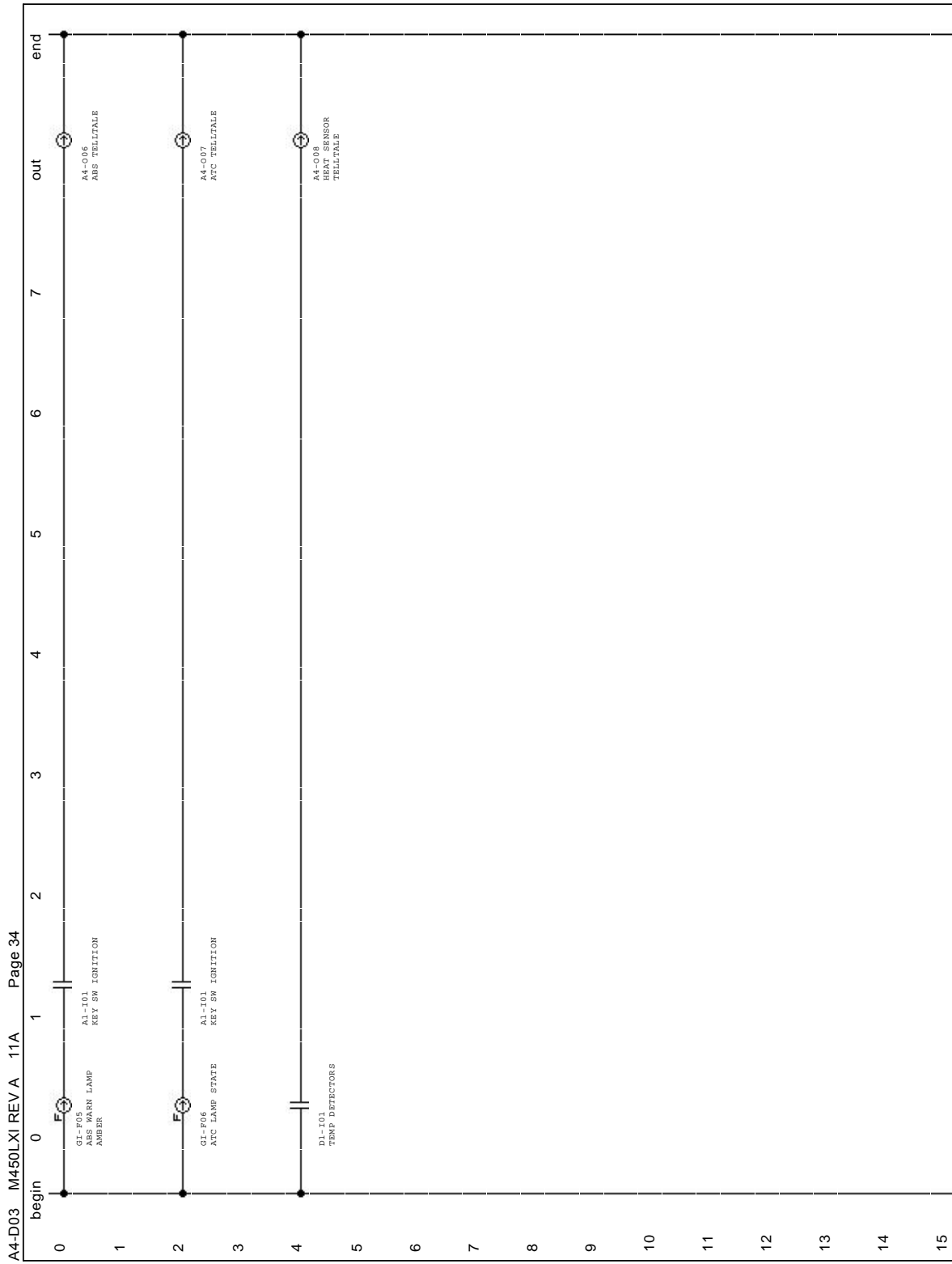


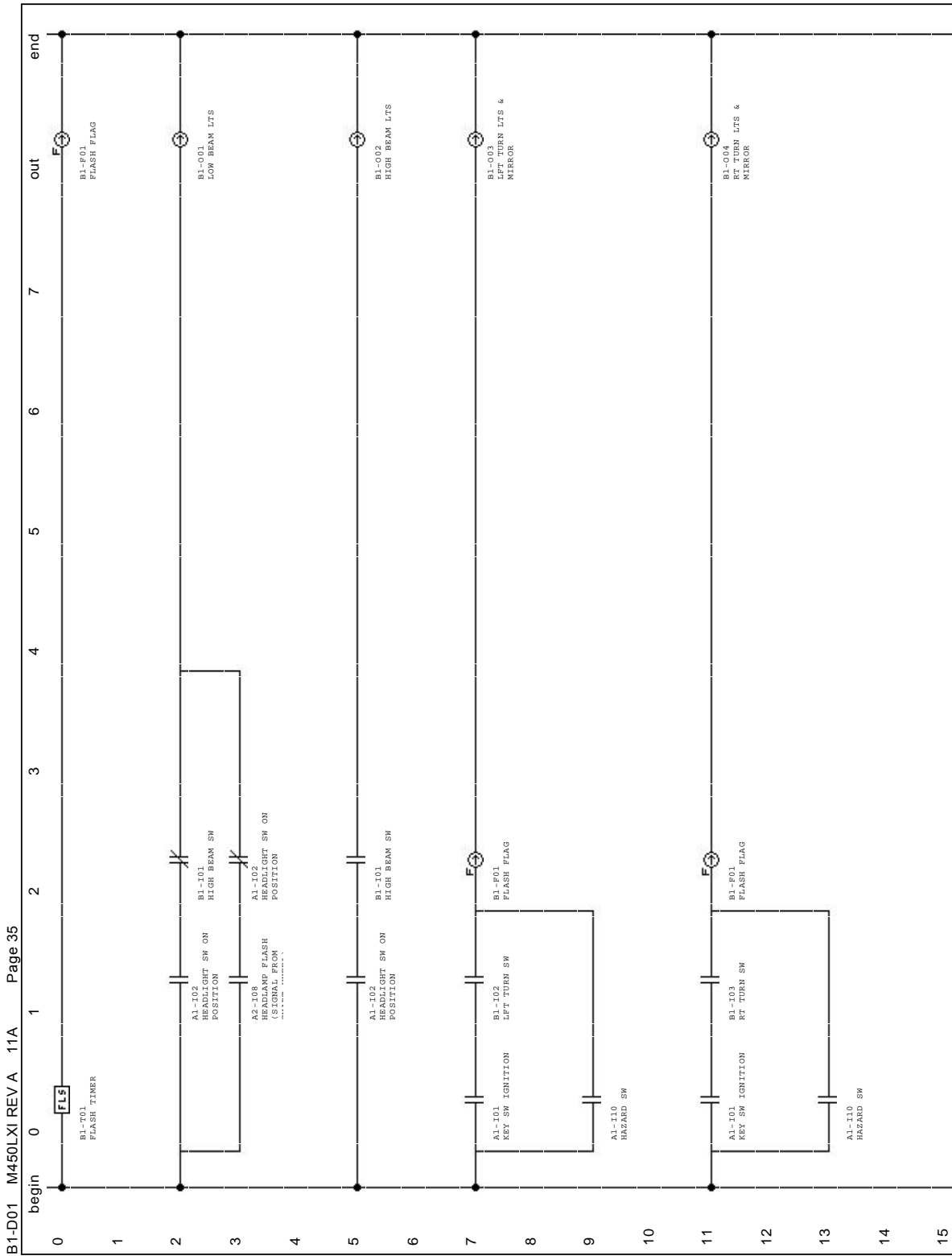


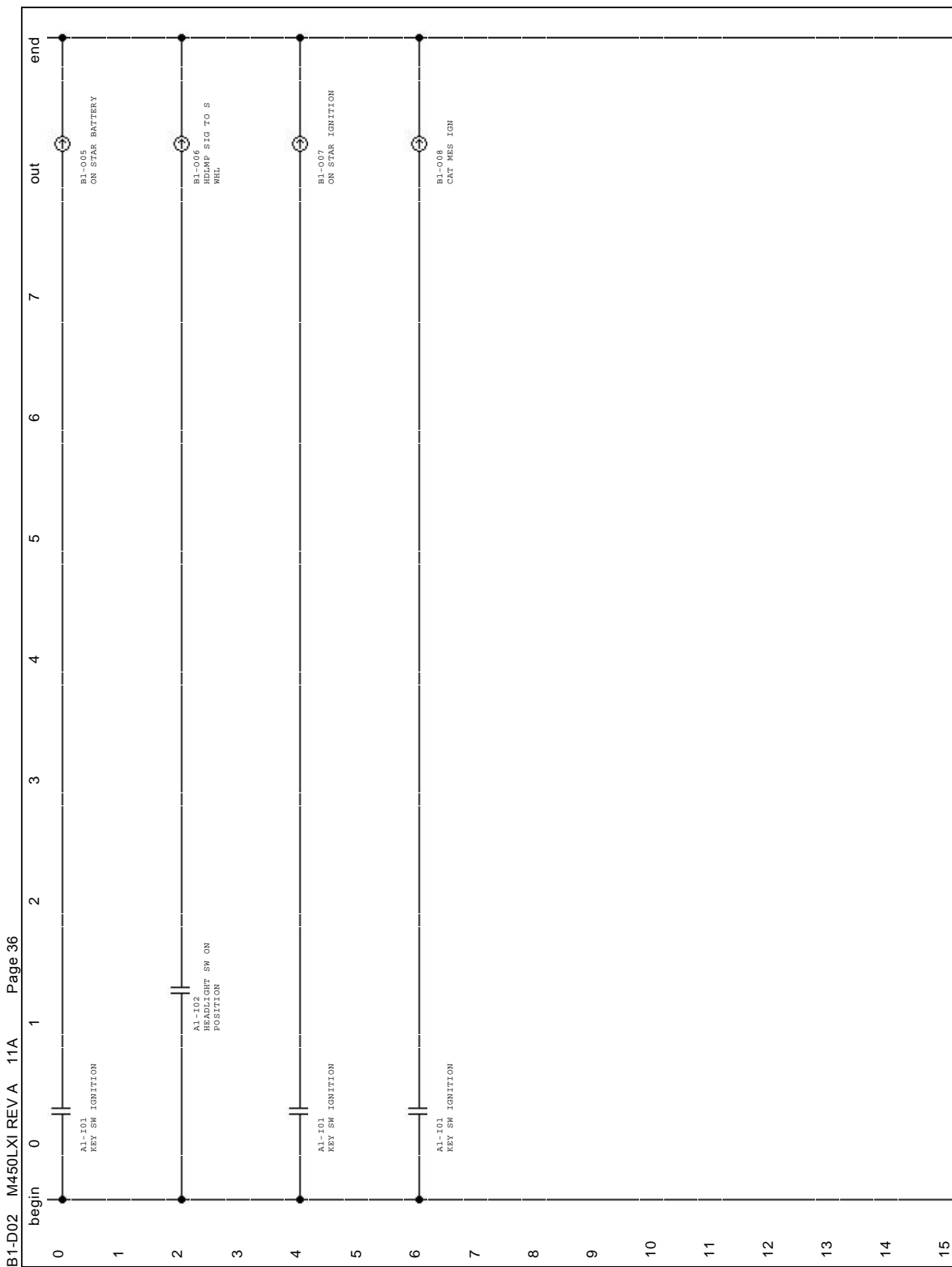


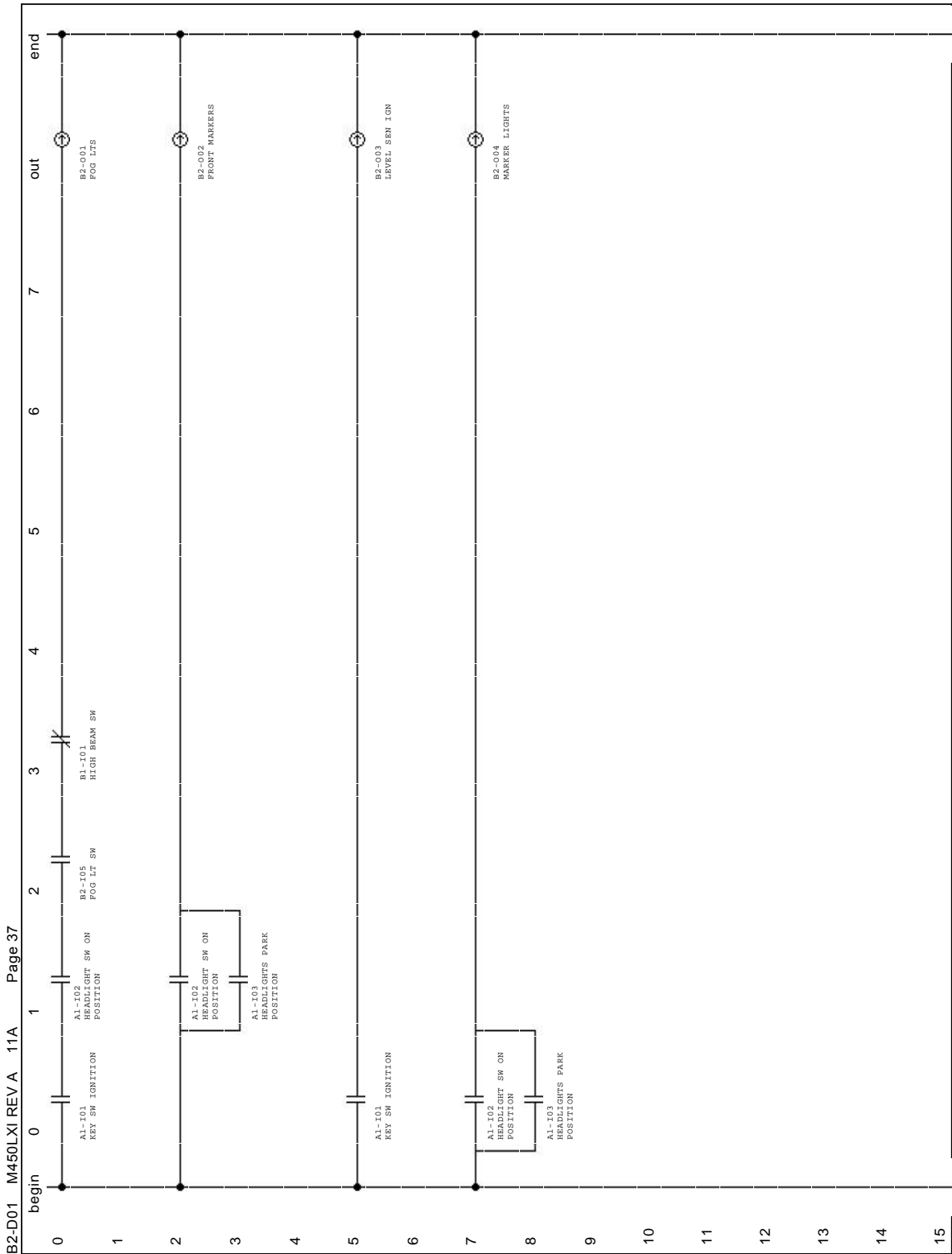


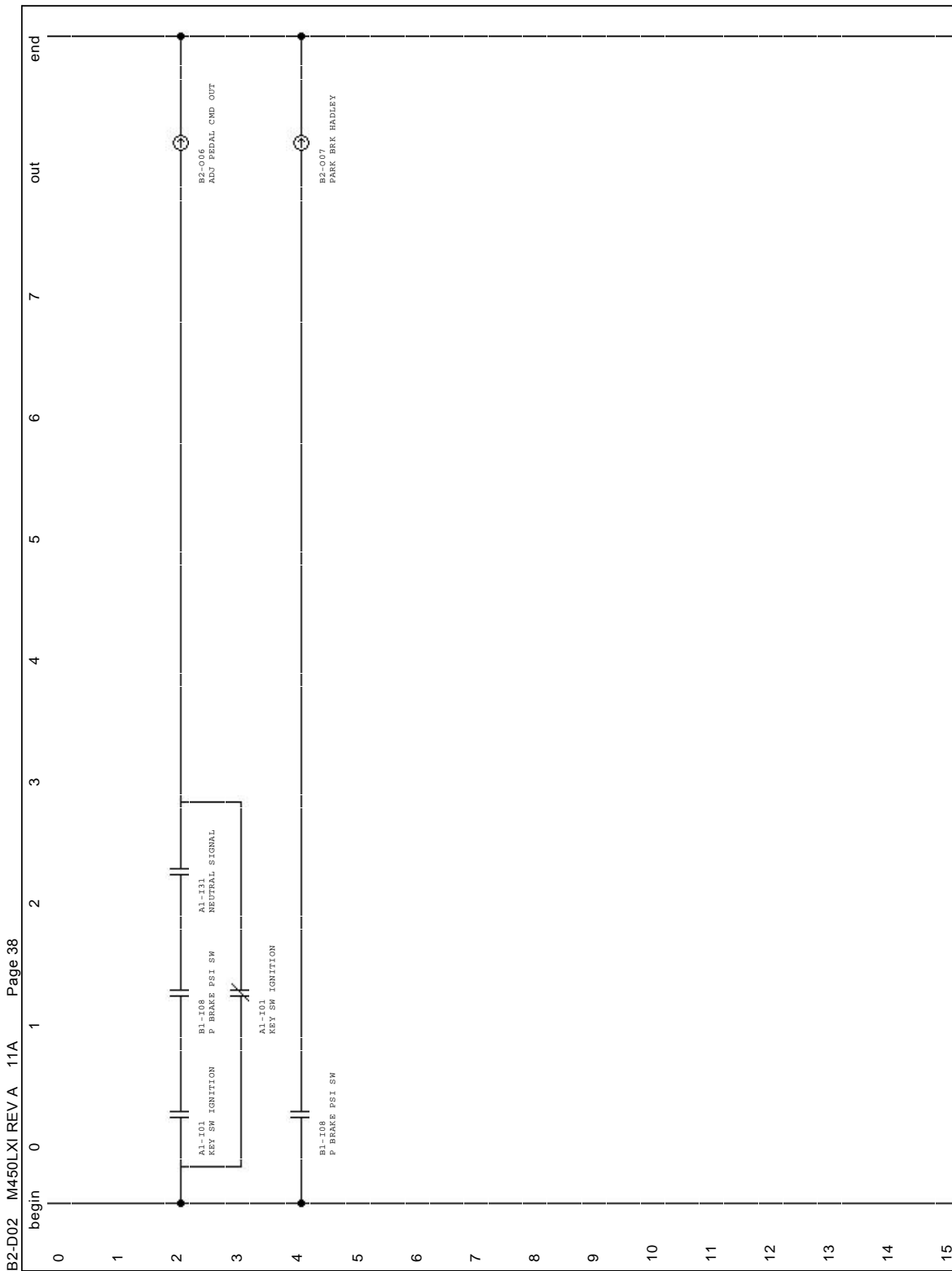


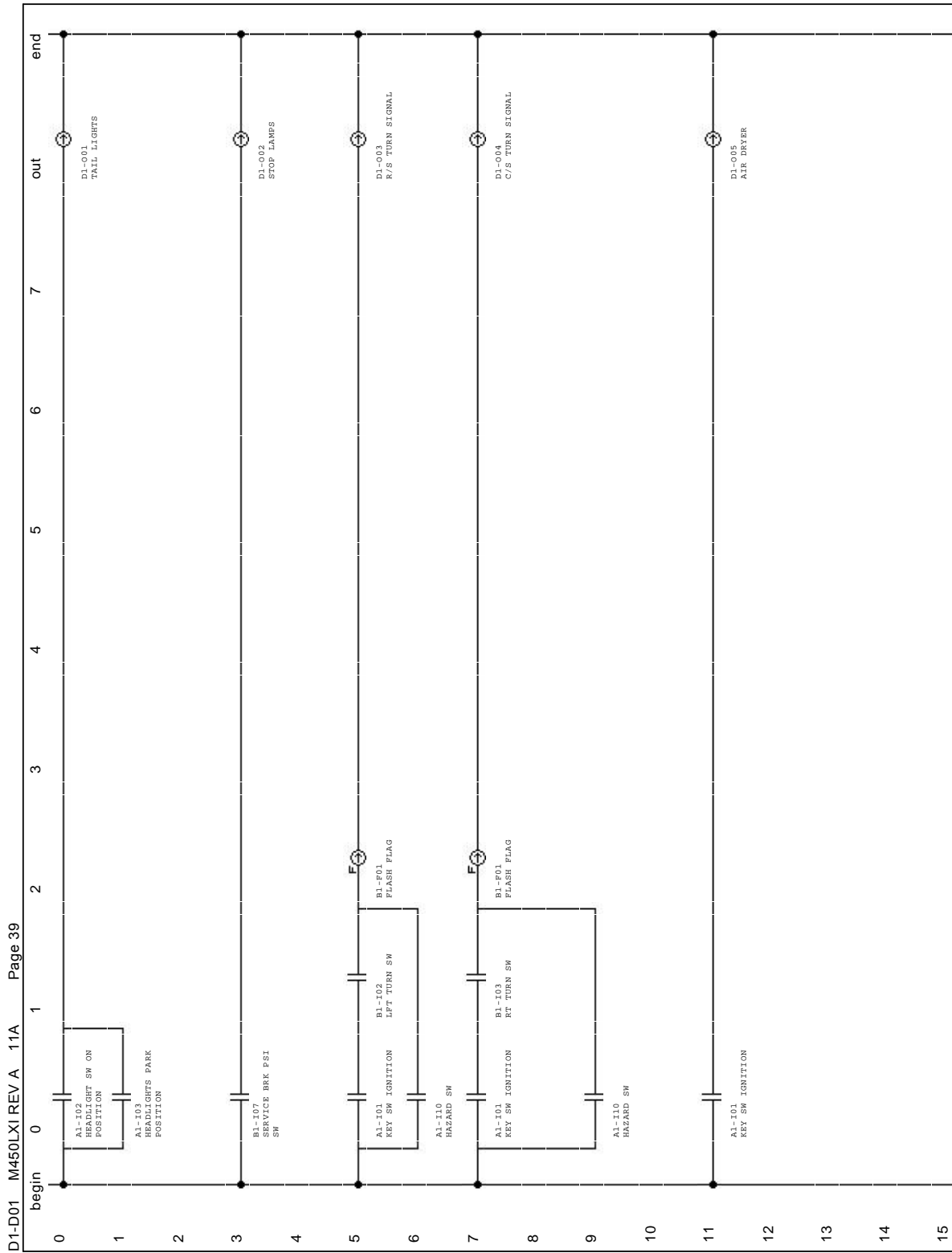


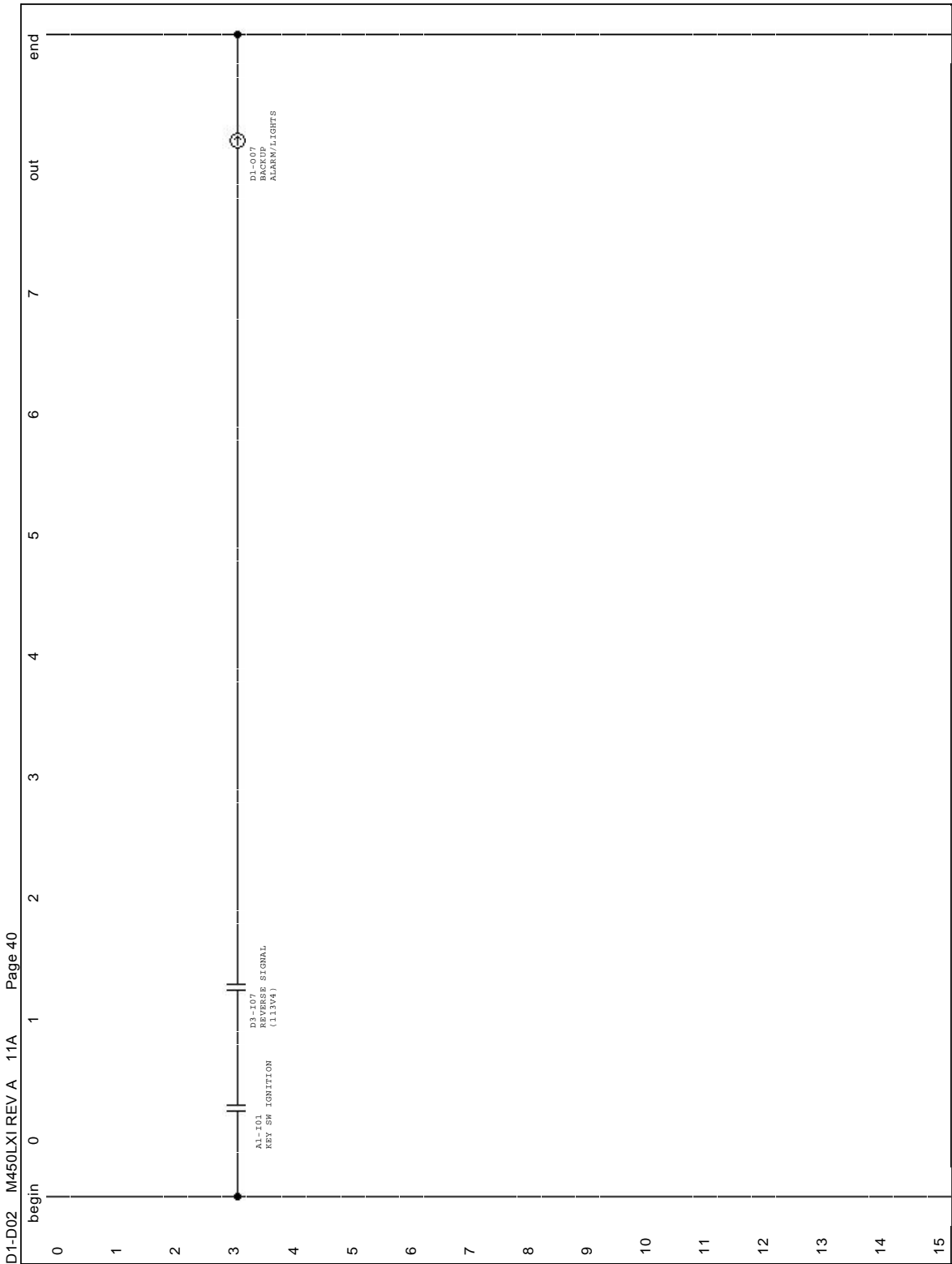


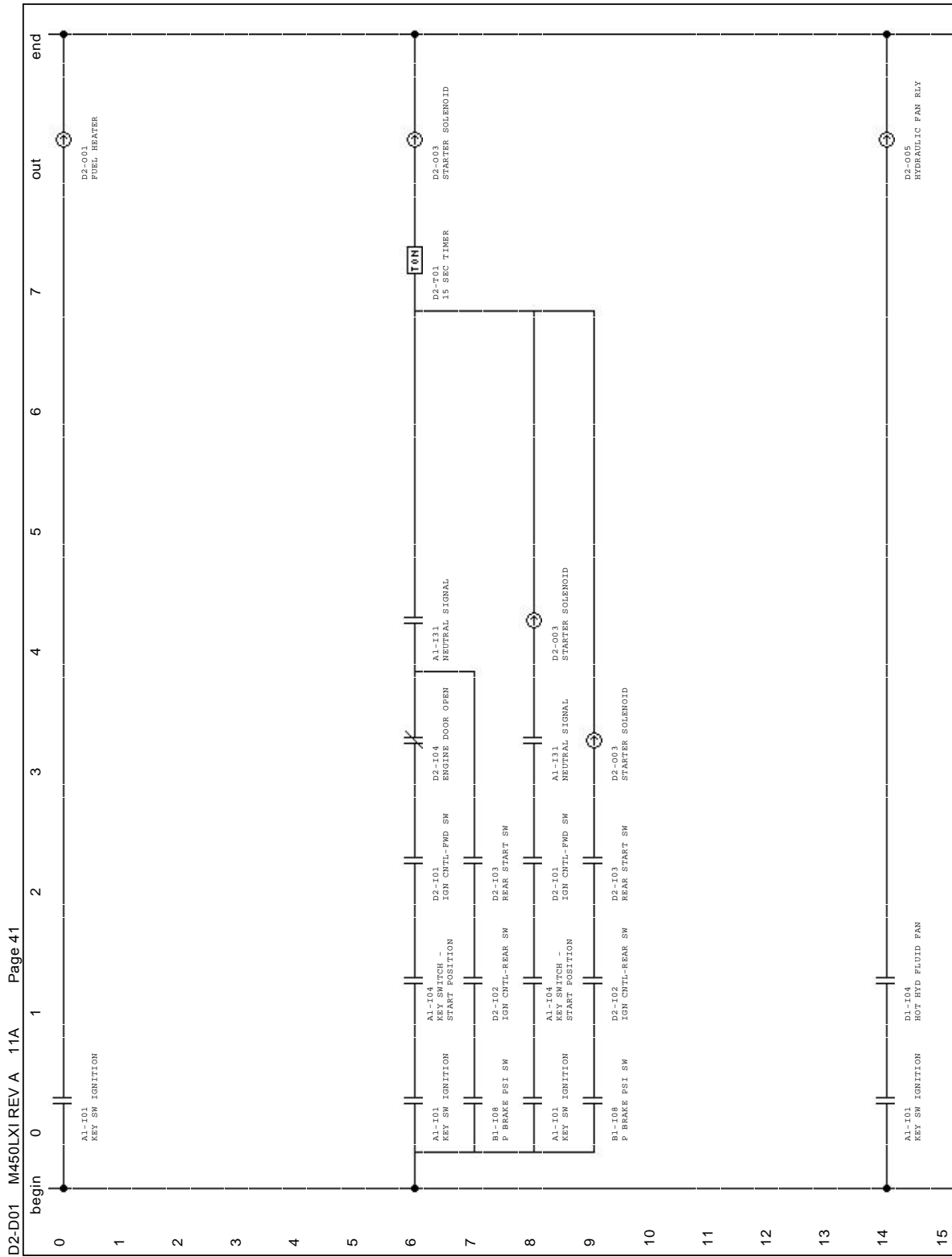


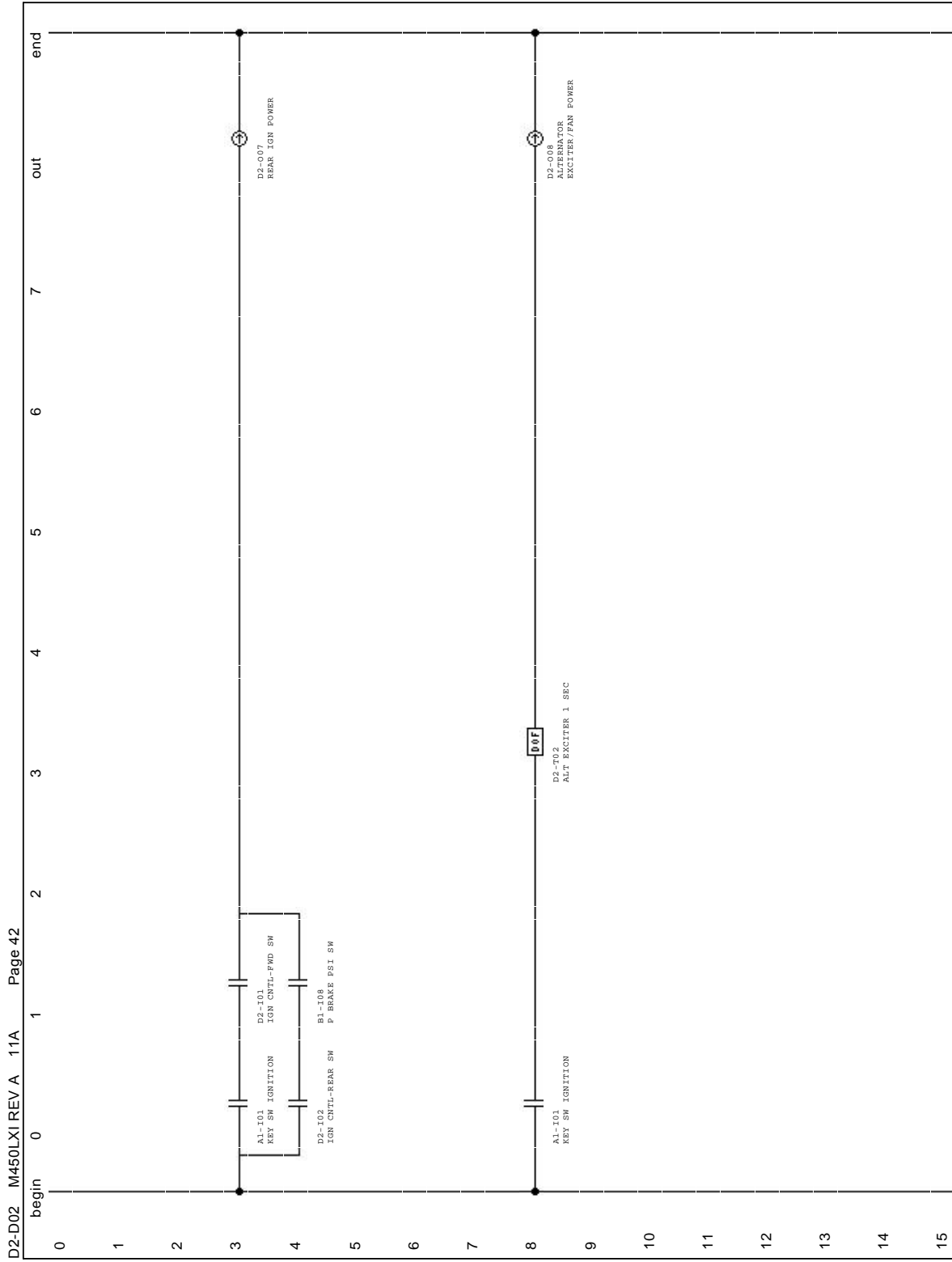


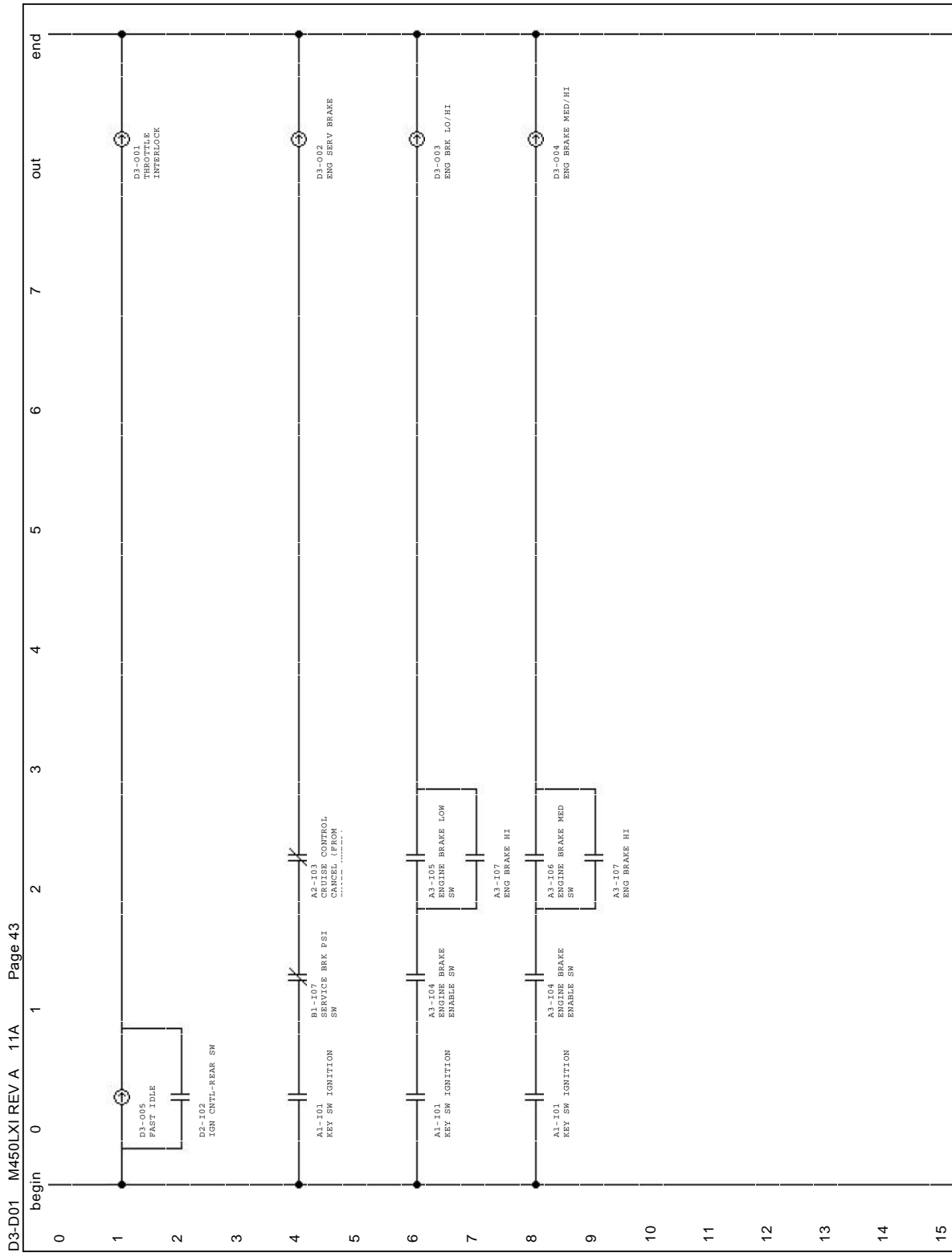


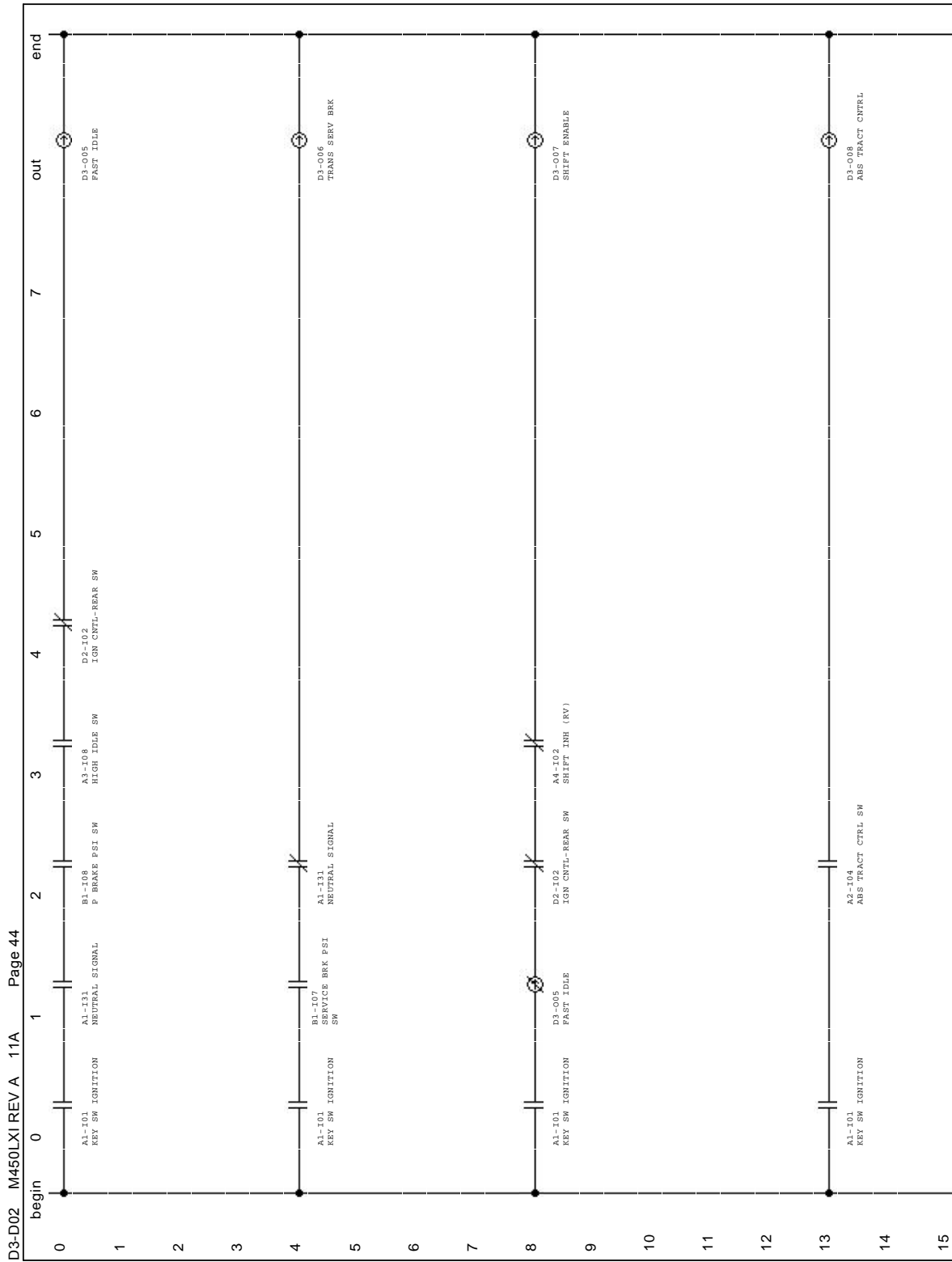


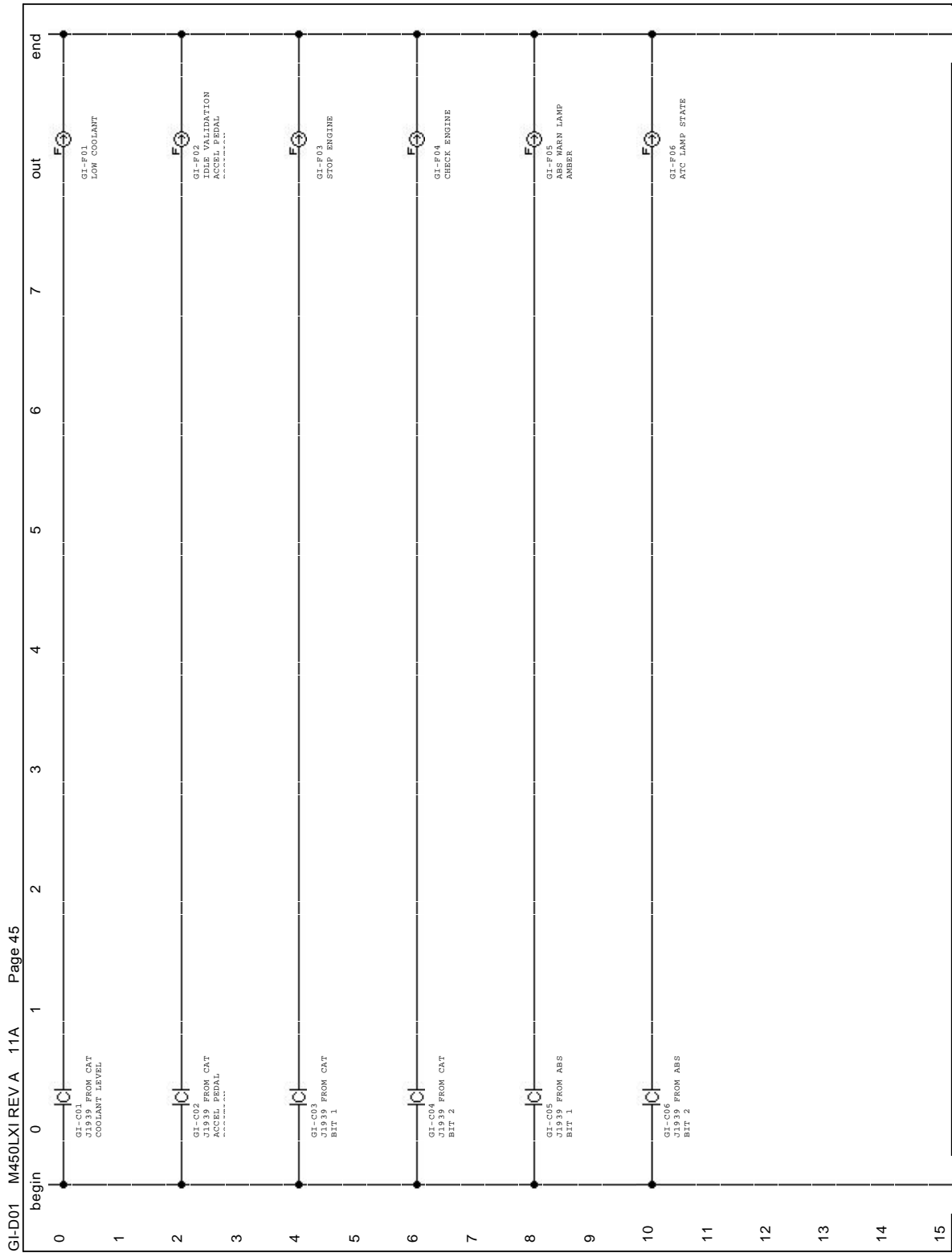


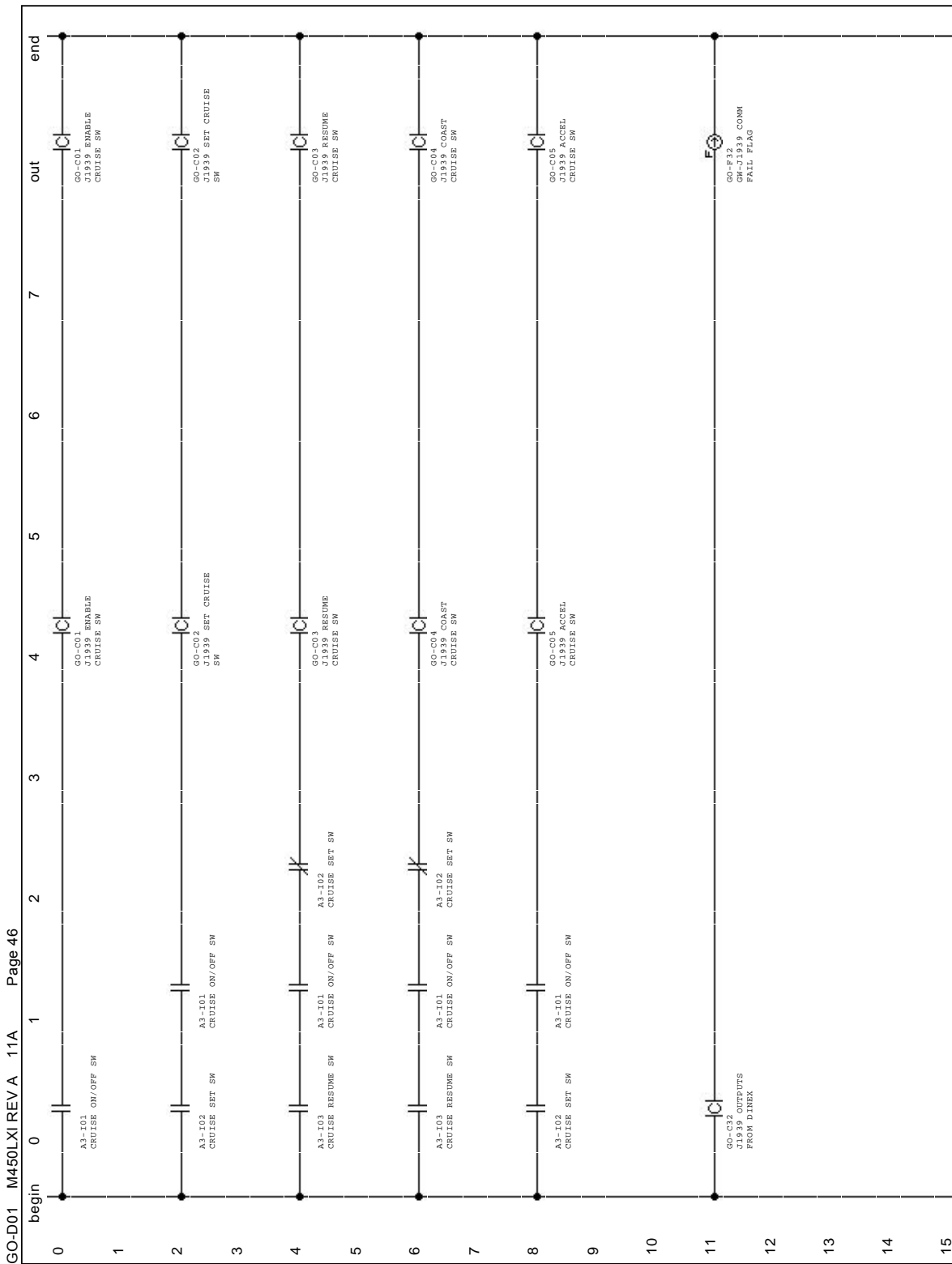


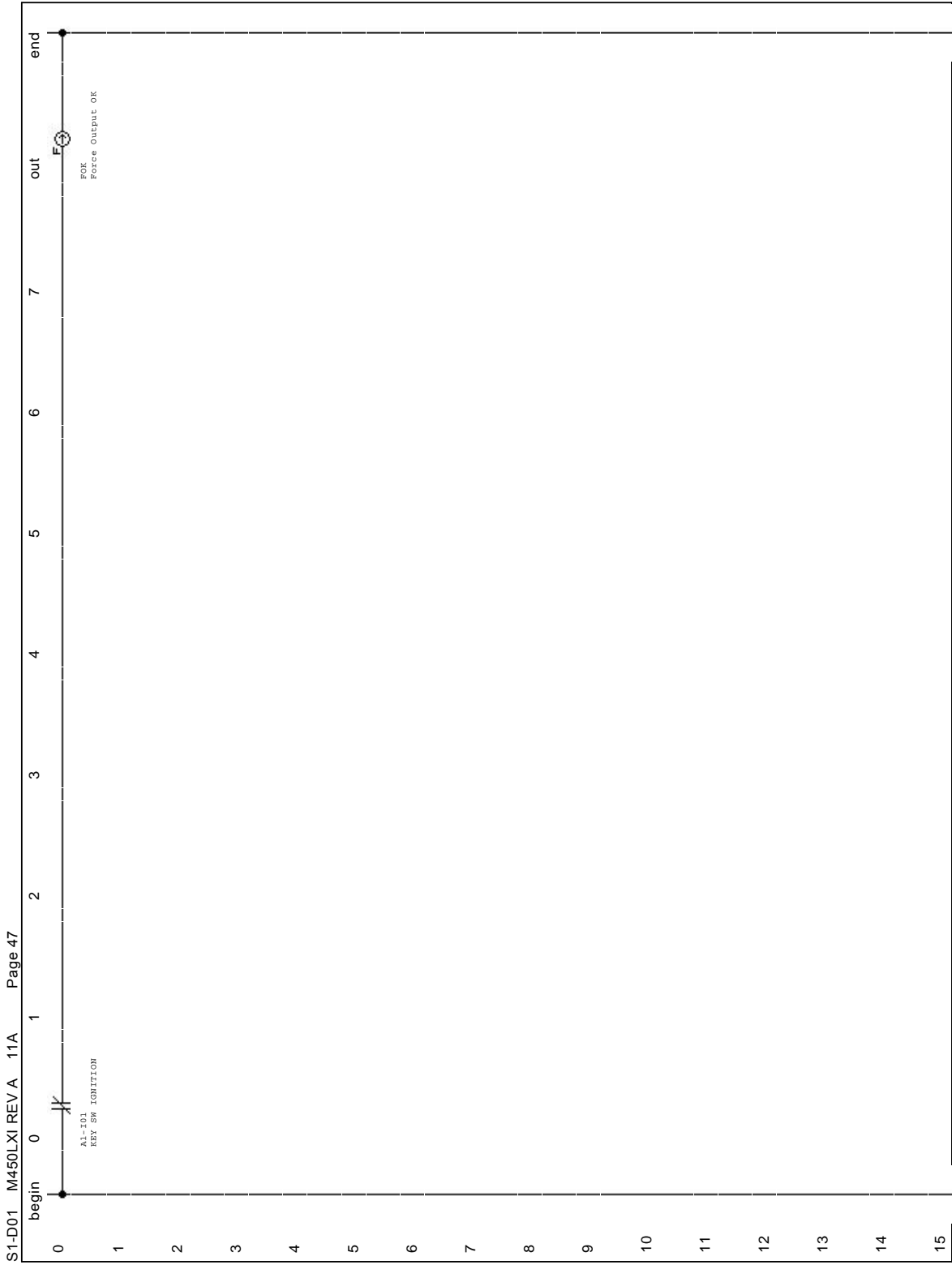












M450LXI REV A ADJ PEDAL UPGRADE By: Paul Boulet Printed: 2/15/2008 Page 48

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
V0	N/A	CLEARANCE LTS SW	N/A	N/A	N/A	N/A	HAZARD SW	N/A	N/A	SPARE	SPARE	SPARE	KEY SWITCH - START POSITION	HEADLIGHTS PARK POSITION	HEADLIGHT SW ON POSITION	KEY SW IGNITION
V1	N/A	A1-115	A1-114	A1-113	A1-112	A1-111	A1-110	A1-109	A1-108	A1-107	A1-106	A1-105	A1-104	A1-103	A1-102	A1-101
		NEUTRAL SIGNAL	N/A	12V DISCONNECT SHUTDOWN				SPARE	ACCESSORY (RV)	HORN SW	SMRT WHL HORN REQ	N/A	N/A	N/A	N/A	N/A
V2	FAIL	A1-131	A1-130	A1-129	A1-128	A1-127	A1-126	A1-125	A1-124	A1-123	A1-122	A1-121	A1-120	A1-119	A1-118	A1-117
	ID=79 COMM FAIL	ID=78 COMM FAIL	ID=77 COMM FAIL	ID=76 COMM FAIL	ID=75 COMM FAIL	ID=74 COMM FAIL	ID=73 COMM FAIL	ID=72 COMM FAIL	ID=71 COMM FAIL	ID=70 COMM FAIL	ID=69 COMM FAIL	ID=68 COMM FAIL	ID=67 COMM FAIL	ID=66 COMM FAIL	ID=65 COMM FAIL	ID=64 COMM FAIL
	GO		A1				B2	B1	D3	D2	D1		A4		A3	A2
V3																
V4	RES. RT MODE	RES. RT MODE	RES. RT MODE		ID Address	ID Address	ID Address	ID Address								
V5																
V6																
V7																
T0	ABS WARN LAMP/AMBER	FLASH FLAG	RT TURN LTS & MIRROR	LFT TURN LTS & MIRROR	FAST IDLE	STARTER SOLENOID	FLASH CODE FLAG	BIST CHIRP FLAG	SLOW BIST FLAG	BIST COMBO FLAG	IDLE VALIDATION ACCEL PEDAL POSITION	LOW COOLANT	ABS NO DATA J1889	CAT NO DATA J1839 FROM ENGINE	GW-J1839 COMM FAIL FLAG	ATS OK TO RUN FLAG
	GI-F05	B1-F01	B1-O04	B1-O03	D3-O05	D2-O03	A1-F05	A1-F04	A1-F03	A1-F02	GI-F02	GI-F01	A1-F07	A1-F06	GO-F32	A1-F01
T1																ATCLAMP STATE

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
T2	ID=95 COMM FAIL	ID=94 COMM FAIL	ID=93 COMM FAIL	ID=92 COMM FAIL	ID=91 COMM FAIL	ID=90 COMM FAIL	ID=89 COMM FAIL	ID=88 COMM FAIL	ID=87 COMM FAIL	ID=86 COMM FAIL	ID=85 COMM FAIL	ID=84 COMM FAIL	ID=83 COMM FAIL	ID=82 COMM FAIL	ID=81 COMM FAIL	GL-F06 ID=80 COMM FAIL
V10	HIGH IDLE SW	ENG BRAKE HI	ENGINE BRAKE MED SW	ENGINE BRAKE LOW SW	ENGINE BRAKE ENABLE SW	CRUISE RESUME SW	CRUISE SET SW	CRUISE ON/OFF SW	HEADLAMP FLASH (SIGNAL FROM SMART)	N/A	N/A	MIRROR HEAT SW	ABS TRACT CTRL SW	CRUISE CONTROL CANCEL (FROM SMART)	HORN SELECT (AIR SW)	HORN SELECT SW (ELECTRIC)
	A3-108	A3-107	A3-106	A3-105	A3-104	A3-103	A3-102	A3-101	A2-108	A2-107	A2-106	A2-105	A2-104	A2-103	A2-102	A2-101
V11	P BRAKE PSI SW	SERVICE BRK PSI SW				RT TURN SW	LFT TURN SW	HIGH BEAM SW			N/A	N/A	MASTER RLY INPUT (RV)	N/A	SHIFT INH (RV)	N/A
	B1-108	B1-107	B1-106	B1-105	B1-104	B1-103	B1-102	B1-101	A4-108	A4-107	A4-106	A4-105	A4-104	A4-103	A4-102	A4-101
V12					HOT HYD FLUID FAN	GEN RUN SIG ALT 2	GEN RUN SIGNAL ALT 1	TEMP DETECTORS			DASH FRT DOOR LOCK SW	FOGLT SW				
	D1-108	D1-107	D1-106	D1-105	D1-104	D1-103	D1-102	D1-101	B2-108	B2-107	B2-106	B2-105	B2-104	B2-103	B2-102	B2-101
V13	HOT RANS SIGNAL (106V19)	REVERSE SIGNAL (113V4)	CHECK TRANS SIGNAL (115S31)				THREE MPH SPEED SIGNAL (167V5)		STOP ENGINE TT	CHECK ENGINE TT	WATER IN FUEL	N/A	ENGINE DOOR OPEN	REAR START SW	IGN CNTL-REAR SW	IGN CNTL-FWD SW
	D3-108	D3-107	D3-106	D3-105	D3-104	D3-103	D3-102	D3-101	D2-108	D2-107	D2-106	D2-105	D2-104	D2-103	D2-102	D2-101
V14																
V15																
V16																
V17	System 1st Scan	Force Output OK														
	FSCAN	FOK														

M450LXI REV A ADJ PEDAL UPGRADE By: Paul Boulet Printed: 2/15/2008 Page 48

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
V20																
V21																
V22																
V23																
V24																
V25																
V26																
V27																



RECORD THIS UNIT INFORMATION FOR
FUTURE REFERENCE:

Model Number _____

Serial Number _____

Date Purchased _____

USA
SERVICE OFFICE
Dometic Corporation
2320 Industrial Parkway
Elkhart, IN 46515
574-294-2511

CANADA
Dometic Distribution
866 Langs Drive
Cambridge, Ontario
CANADA N3H 2N7
519-653-4390

For Service Center
Assistance Call:
800-544-4881



MODEL 620515, 620525, 620526 Roof-Top Air Conditioner 630515, 630516

Roof Top Heat Pump
used with one of following:

3105007 Return Air Cover
3105935 Quick Cool Return Air Cover
3308120 Genesis Air Filtration System
and

3109228.001 Comfort Control Center™

THIS UNIT IS DESIGNED FOR OEM INSTALLATION
ALL INITIAL INSTALLATIONS MUST BE APPROVED BY THE SALES DEPT.

⚠ WARNING

This manual must be read and understood before installation, adjustment, service, or maintenance is performed. This unit must be installed by a qualified service technician. Modification of this product can be extremely hazardous and could result in personal injury or property damage.

⚠ AVERTISSEMENT

Lire et comprendre ce manuel avant de procéder à l'installation, à des réglages, de l'entretien ou des réparations. L'installation de cet appareil doit être effectuée par un réparateur qualifié. Toute modification de cet appareil peut être extrêmement dangereuse et entraîner des blessures ou dommages matériels.

INSTALLATION INSTRUCTIONS

Models

620515.331	620526.336
620515.336	630515.331
620525.331	630515.336
620525.336	630516.331
620526.331	630516.336

REVISION:

Form No. 3309083.016 2/05
(Replaces 3309083.008)
(French 3309084.014)
©2005 Dometic Corporation
LaGrange, IN 46761

Important: These Instructions
must stay with unit.
Owner read carefully.

SAFETY INSTRUCTIONS

This manual has safety information and instructions to help users eliminate or reduce the risk of accidents and injuries.

RECOGNIZE SAFETY INFORMATION



This is the safety-alert symbol. When you see this symbol in this manual, be alert to the potential for personal injury.

Follow recommended precautions and safe operating instructions.

UNDERSTAND SIGNAL WORDS

A signal word, **WARNING** OR **CAUTION** is used with the safety-alert symbol. They give the level of risk for potential injury.

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

! CAUTION indicates a potentially hazardous situation which, if not avoided may result in minor or moderate injury.

CAUTION used without the safety alert symbol indicates, a potentially hazardous situation which, if not avoided may result in property damage.

Read and follow all safety information and instructions.

GENERAL INFORMATION

A. Product features or specifications as described or illustrated are subject to change without notice.

B. This Air Conditioner Is Designed For:

1. Installation on a recreational vehicle during the time the vehicle is manufactured.
2. Mounting on the roof of a recreational vehicle.
3. Roof construction with rafters/joists on minimum of 16 inch centers.
4. Minimum of 2.00 inches and maximum of 5.50 inches distance between roof to ceiling of recreational vehicle. Alternate installation methods will allow for roofs more than 5.50 inches thick.

C. The ability of the air conditioner to maintain the desired inside temperature depends on the heat gain of the RV. Some preventative measures taken by the occupants of the RV can reduce the heat gain and improve the performance of the air conditioner. During extremely high outdoor temperatures, the heat gain of the vehicle may be reduced by:

1. Parking the RV in a shaded area
2. Using window shades (blinds and/or curtains)
3. Keeping windows and doors shut or minimizing use
4. Avoiding the use of heat producing appliances

Operation on High Fan/Cooling mode will give optimum or maximum efficiency in high humidity or high outside temperatures.

Starting the air conditioner early in the morning and giving it a "head start" on the expected high outdoor ambient will greatly improve its ability to maintain the desired indoor temperature.

For a more permanent solution to high heat gain, accessories like A&E outdoor patio and window awnings will reduce heat gain by removing the direct sun. They also add a nice area to enjoy company during the cool of the evening.

D. Condensation

Note: The manufacturer of this air conditioner will not be responsible for damage caused by condensed moisture on ceilings or other surfaces. Air contains moisture and this moisture tends to condense on cold surfaces. When air enters the RV, condensed moisture may appear on the ceiling, windows, metal parts, etc. The air conditioner removes this moisture from the air during normal operation. Keeping doors and windows closed when this air conditioner is in operation will minimize condensed moisture on cold surfaces.

SPECIFICATIONS

Model No.	Nominal Capacity (BTU/HR) Cooling	Electrical Rating Amps	Heater Watts	Compressor Rated Load Amps	Compressor Locked Rotor Amps	Fan Motor Rated Load Amps	Fan Motor Locked Rotor Amps	SCFM-High Speed Max./Min. W. C.	Total Static Max./Min.	Refrigerant R-22 (Oz.)	Minimum Wire Size*	AC Circuit Protection *** User Supplied	Installed Weight (Pounds)	Minimum Generator Size** 1 Unit/2 Units		
620515.331	13,500	120VAC 60Hz 1 Phase	1530	124	600	3.5	10.0	335/250	.012/.065	16.5	12 AWG Copper Up To 24'	20 Amp	95	3.5KW/5.0KW		
620515.336	13,500		1530	124	600	3.5	10.0	335/250	.012/.065	16.5		20 Amp	95	3.5KW/5.0KW		
620525.331	13,500		1530	124	600	3.5	10.0	335/250	.012/.065	16.5		20 Amp	95	3.5KW/5.0KW		
620525.336	13,500		124	600	3.5	10.0	335/250	.012/.065	16.5	20 Amp		95	3.5KW/5.0KW			
620526.331	15,000		120	640	3.3	8.2	380/250	.012/.065	20.0	20.0		20 Amp	95	3.5KW/5.0KW		
620526.336	15,000		120	640	3.3	8.2	380/250	.012/.065	20.0	20.0		20 Amp	95	3.5KW/5.0KW		
630515.331	13,500		124	600	3.5	10.0	335/250	.012/.065	23.5	23.5		20 Amp	95	3.5KW/5.0KW		
630515.336	13,500		124	600	3.5	10.0	335/250	.012/.065	23.5	23.5		20 Amp	95	3.5KW/5.0KW		
630516.331	15,000		120	640	3.3	8.5	335/250	.012/.065	20.0	20.0		20 Amp	95	3.5KW/5.0KW		
630516.336	15,000		120	640	3.3	8.5	335/250	.012/.065	20.0	20.0		20 Amp	95	3.5KW/5.0KW		

* For wire length over 24 ft., consult the National Electric Code for proper sizing.

** Dometic Corporation gives **GENERAL** guidelines for generator requirements. These guidelines come from experiences people have had in actual applications. When sizing the generator, the total power usage of your recreational vehicle must be considered. Keep in mind generators lose power at high altitudes and from lack of maintenance.

*** **CIRCUIT PROTECTION:** Time Delay Fuse or HACR Circuit Breakers Required.

INSTALLATION INSTRUCTIONS

A. Precautions

WARNING

Improper installation may damage equipment, could endanger life, cause serious injury and/or property damage.

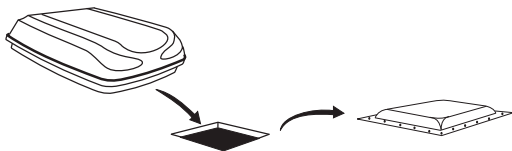
1. Read Installation and Operating Instructions carefully before attempting to start your air conditioner installation.
2. Dometic Corporation will not be liable for any damages or injury incurred due to failure in following these instructions.
3. Installation must comply with the National Electrical Code ANSI/NFPA-70 and CSA Standard C22.1 (latest edition and any State or Local Codes or regulations).
4. **DO NOT** add any devices or accessories to this air conditioner except those specifically authorized by Dometic.
5. This equipment must be serviced by qualified personnel and some states require these people to be licensed.

B. Choosing Proper Location For The Air Conditioner

This air conditioner is specifically designed for installation on the roof of a recreational vehicle (RV). When determining your cooling requirements, the following should be considered:

- Size of RV;
 - Window area (increases heat gain);
 - Amount of insulation in walls and roof;
 - Geographical location where the RV will be used;
 - Personal comfort level required.
1. Normal Location-The air conditioner is designed to fit over an existing roof vent opening.

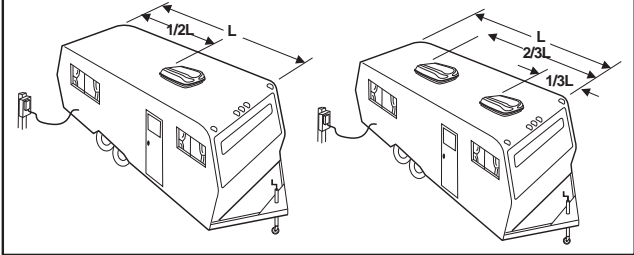
FIG. 1



2. Other Locations-When no roof vent is available or another location is desired, the following is recommended:
 - a. For one unit installation: The air conditioner should be mounted slightly forward of center (front to back) and centered from side to side.

- b. For two unit installations: Install one Air Conditioner 1/3 and one Air Conditioner 2/3's from front of RV and centered from side to side.

FIG. 2



It is preferred that the air conditioner be installed on a relatively **flat and level** roof section measured with the RV parked on a level surface.

Note: A 8° slant to **either** side, or front to back, is acceptable for all units.

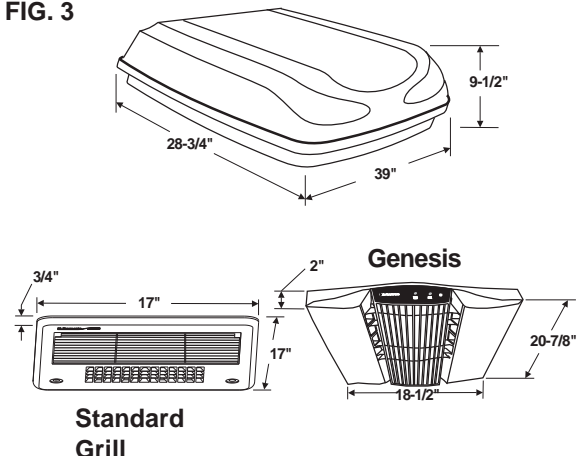
3. After Location Has Been Selected:
 - a. Check for obstructions in the area where air conditioner will be installed. See FIG. 4.
 - b. The roof must be designed to support 130 pounds when the RV is in motion. Normally a 200 lb. static load design will meet this requirement.

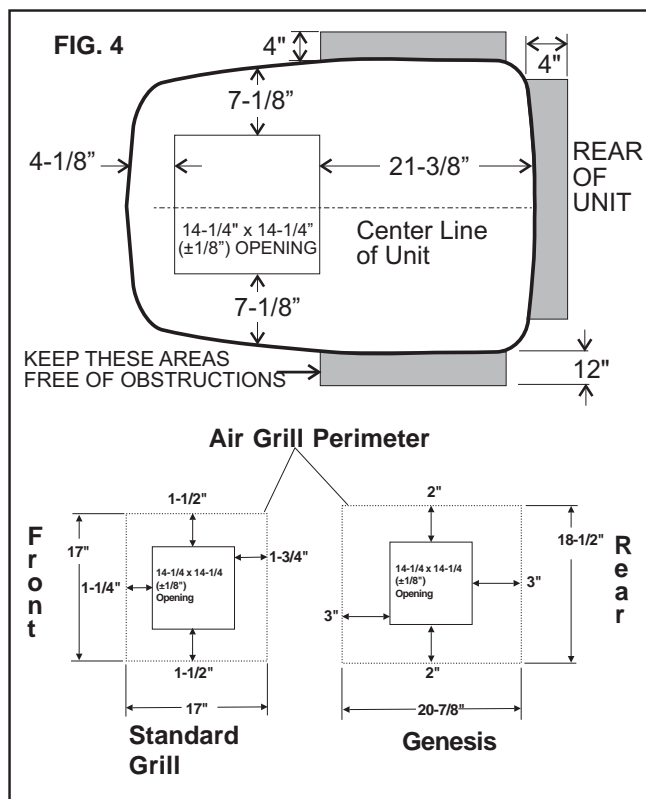
CAUTION

It is the responsibility of the installer of this air conditioner system to ensure structural integrity of the RV roof. **Never create a low spot on the roof where water will collect. Water standing around the air conditioner may leak into the interior causing damage to the product and the RV.**

- c. Check inside the RV for return air kit obstructions (i.e. door openings, room dividers, curtains, ceiling fixtures, etc.) See FIG. 3 & 4.

FIG. 3





C. Roof Preparation

1. Opening Requirements - Before preparing the ceiling opening, the type of system options must be decided upon. Read all of the following instructions before beginning the installation.

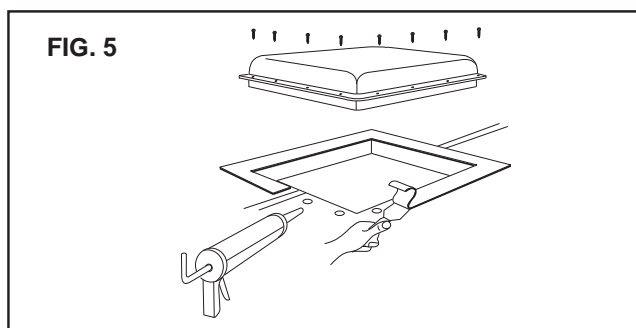
If a roof vent opening will not be used a 14-1/4" x 14-1/4" (±1/8") opening must be cut through the roof and ceiling of the RV. This opening must be located between the roof reinforcing members.

⚠ WARNING

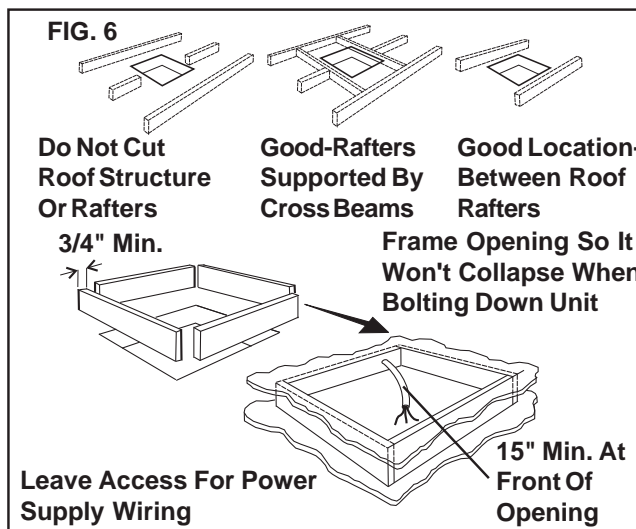
There may be electrical wiring between the roof and the ceiling. Disconnect 120 volt AC power cord and the positive (+) 12 volt DC terminal at the supply battery. Failure to follow this instruction may create a shock hazard causing death or severe personal injury.

The 14-1/4" x 14-1/4" (±1/8") opening is part of the return air system of the Air Conditioner and must be finished in accordance with NFPA Standard 501C Section 2.7.2.

2. Roof Vent Removal
 - a. Unscrew and remove the roof vent.
 - b. Remove all caulking compound around opening.
 - c. Seal all screw holes and seams where the roof gasket is located. Use a good grade of all weather sealant. See FIG. 5.



- d. If the opening exceeds 14-3/8" x 14-3/8", it will be necessary to re-size the opening to 14-1/4" x 14-1/4" (±1/8").
 - e. If the opening is less than 14-1/8" x 14-1/8", it must be enlarged.
3. New Opening- (Installation Other Than Vent Opening)
 - a. Mark a 14-1/4" x 14-1/4" (±1/8") square on the roof and carefully cut the opening.
 - b. Using the roof opening as a guide, cut the matching hole in the ceiling.
 - c. The opening created must be framed to provide adequate support and prevent air from being drawn from the roof cavity. Lumber 3/4" or more in thickness must be used. Remember to provide an entrance hole for power supplies, furnace wiring and a seven-conductor cable, 18 to 22 AWG is to be used for analog thermostat connections.



CAUTION

It is the responsibility of the installer of this air conditioner system to ensure structural integrity of the RV roof. Never create a low spot on the roof where water will collect. Water standing around the air conditioner may leak into the interior causing damage to the product and the RV.

4. Air Distribution System Sizing & Design

CAUTION

It is the responsibility of the installer to insure the ductwork will not collapse or bend during and after the installation. Dometic Corporation will not be liable for roof structural or ceiling damage due to improperly insulated, sealed or collapsed ductwork.

The Installer of this air conditioner system must design the air distribution system for their particular application. Several requirements for this system **MUST** be met for the air conditioner to operate properly. These requirements are as follows:

- a. The duct material must meet or exceed any agency or RVIA Standard that may be in existence at the time the RV is produced.
- b. All discharge air ducts must be properly insulated to prevent condensation from forming on their surfaces or adjacent surfaces during operation of the air conditioner. This insulation must be R-7 minimum.

- c. Ducts and their joints must be sealed to prevent condensation from forming on adjacent surfaces during operation of the air conditioner.
- d. Return air openings must have 40 square inches minimum free area including the filter.
- e. Return air to the air conditioner must be filtered to prevent dirt accumulation on air conditioner cooling surface.

5. Air Distribution System Installation

- a. Dometic Corporation recommends the basic configuration shown on page 7, for installing this air conditioner system. We have found by testing, that this configuration works best in most applications of this air conditioner system. It is the responsibility of the Installer of this system to review each RV floor plan and determine the following:
 - Duct size
 - Duct layout
 - Register size
 - Register location
 - Thermostat location

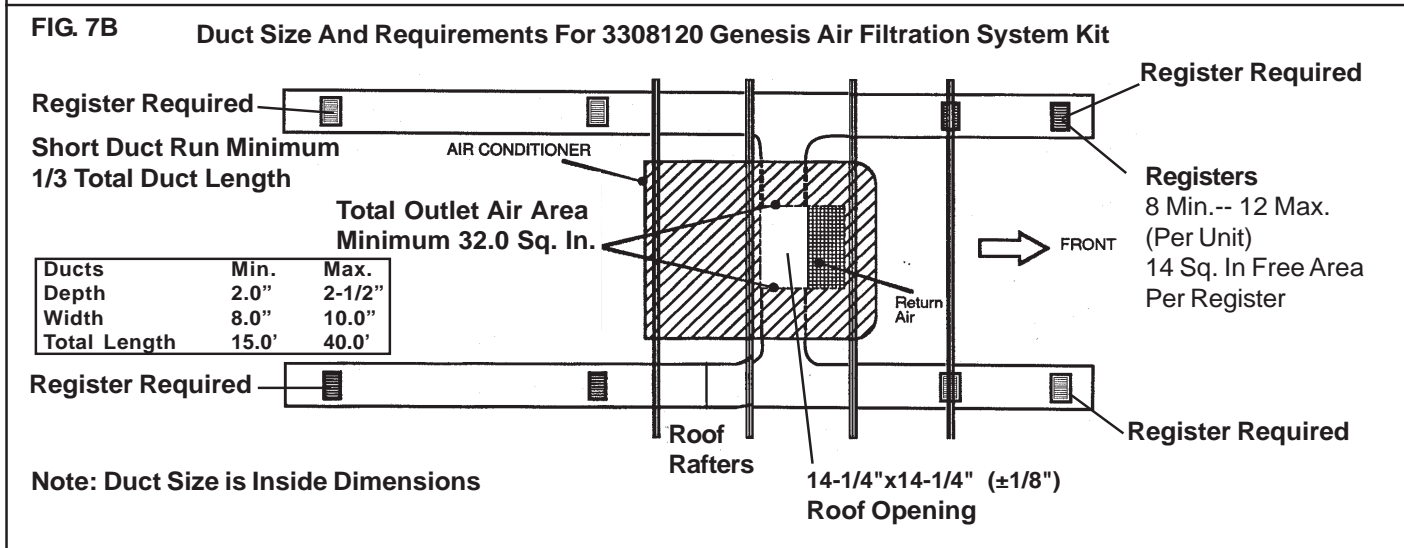
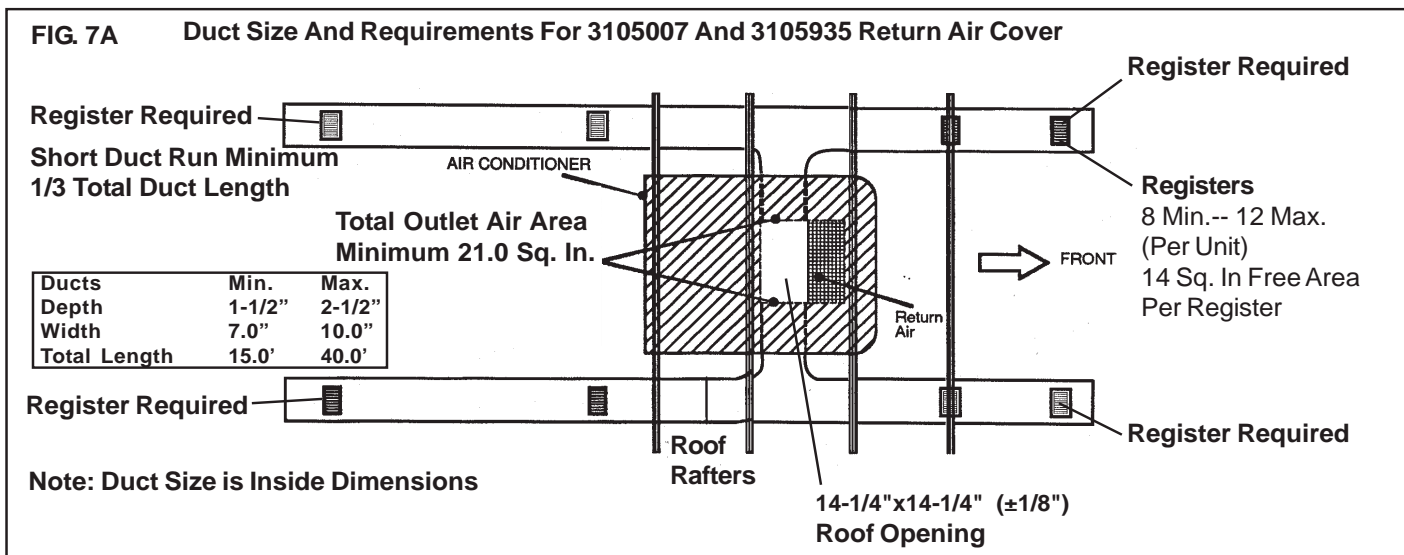
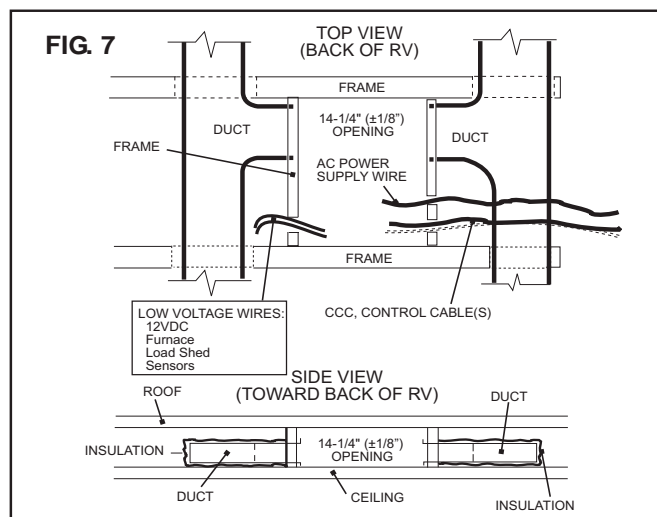
AIR DISTRIBUTION DUCT SIZING & DESIGN CHART

Return Air Cover Model	3105007 3105935	3308120 Genesis Air Filtration System
Roof Cavity Depth	2.0 In. Min. - 5-1/2 In. Max.	2.0 In. Min. - 5-1/2 In. Max.
Duct Cross Sectional Area	21.0 Sq. In. Min.	32.0 Sq. In. Min.
Duct Size Depth Width Total Duct Length Duct Length (short run)	1-1/2 In. Min. - 2-1/2 In. Max. 7.0 In. Min. - 10.0 In. Max. 15.0 Ft. Min. - 40.0 Ft. Max. 1/3 Total Duct Length	2.0 In. Min. - 2-1/2 In. Max. 8.0 In. Min. - 10.0 In. Max. 15.0 Ft. Min. - 40.0 Ft. Max. 1/3 Total Duct Length
Center Duct System (Only) Depth Width Total Duct Length Duct Length (Short Run)		2.0" In. Min. - 2.0" Max. 8.0 In. Min. - 8.0 In. Max. 15.0 Ft Min. - 40 Ft. Max. 1/3 Total Length
Register Requirements Number Required Per Run Register Free Air Area Distance From Duct End Distance From Elbow	4 Min. 14.0 Sq. In. 5.0 In. Min. - 8.0 In. Max. 15.0 In.	4 Min. 14.0 Sq. In. 5.0 In. Min. - 8.0 In. Max. 15.0 In.
Duct Static Blower at High Speed, Filter & Grill In Place	0.12 - 0.65 In. W.C.	0.12 - 0.65 In. W.C.

Note: Duct sizes listed are inside dimensions.

These items must be determined in conjunction with the Air Distribution System and Sizing and Design Requirements listed in the chart on page 6. Terminate the start of the duct at the back edge of the 14-1/4" x 14-1/4" (±1/8") (±1/8"). See FIG. 7, 7A, and 7B.

Important: Alternate configurations and methods may be used which still allow the air conditioner to operate properly; however, these alternate configurations and methods must be approved by the Dometic Corporation in writing. The following instructions are based upon the use of 3105007 Dometic Return Air Kit, 3105935 Dometic Return Air Kit or 3308120 Genesis Air Filtration System and a 3109228.001 Comfort Control Center™.



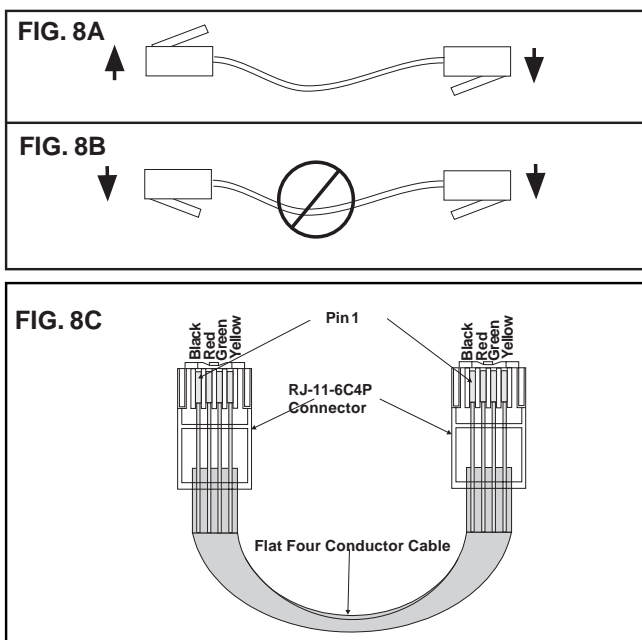
D. Wiring Requirements

1. 120 VAC Supply Line
Route a copper 12 AWG, with ground, 120 VAC supply line from the time delay fuse or circuit breaker box to the roof opening.
 - a. This supply line must be located in the front portion of the 14-1/4" x 14-1/4" ($\pm 1/8$ ") opening.
 - b. The power **MUST** be on a separate 20 Amp time delay fuse or HACR circuit breaker.
 - c. Make sure that at least 15" of supply wire extends into the roof opening. This ensures and easy connection at the junction box.
 - d. Wiring must comply with all National, State and Local Wiring Codes.
 - e. Use a steel sleeve and a grommet or equivalent methods to protect the wire where it passes into the opening.
2. Route a dedicated 12 VDC supply line (18-22 AWG) from the RV's converter(filtered terminals) or battery to the roof opening.
 - a. This supply line must be located in the front portion of the 14-1/4" x 14-1/4" ($\pm 1/8$ ") opening.
 - b. Make sure that at least 15" of supply wire extends into the roof opening.
 - c. **In a multiple zone installation, this wiring is required in only one of the 14-1/4" x 14-1/4" ($\pm 1/8$ ") openings.**
3. If a Remote Temperature Sensor is used, the connector end must be routed from the sensor location to the roof opening of the system which it will control. Make sure that at least 15" of the sensor cable extends into the roof opening. Refer to the Remote Sensor Instructions for details of the installation.
4. If a furnace is to be controlled by the system, the two furnace thermostat leads must be routed to the roof opening of the air conditioner that will control it. Make sure that at least 15" of the furnace thermostat wires extend into the roof opening.
5. If an Energy Management System (load shed feature) is to be used with the control, two wires must be routed to the roof opening of the zone to be managed. The signal required for this function is normally open relay contact. When the EMS calls for the compressor to shut off, the relay contacts should close. Make sure at least 15" of the EMS wires extend into the roof opening.
6. Route a 4-conductor control cable from the **Comfort Control Center™** mounting position into the 14-1/4" x 14-1/4" ($\pm 1/8$ ") roof opening. Make sure that at least 15" of the wire extends into the roof opening and 6" extend from the wall at the mounting position of the **Comfort Control Center™**. See Section E-2.
7. In the event that other Air Conditioners are installed (additional zones) an additional 4-conductor control cable must be routed to the other Air Conditioners. Make sure that at least 15" of the wire extends into the roof opening. See FIG. 27.

8. If an automatic generator start kit (AGS) will be installed, a 4-conductor control cable must be routed from the last air conditioner to location of AGS kit. Follow AGS kit instructions for installation.

E. Dometic Comfort Control Center™ & Cable Installation

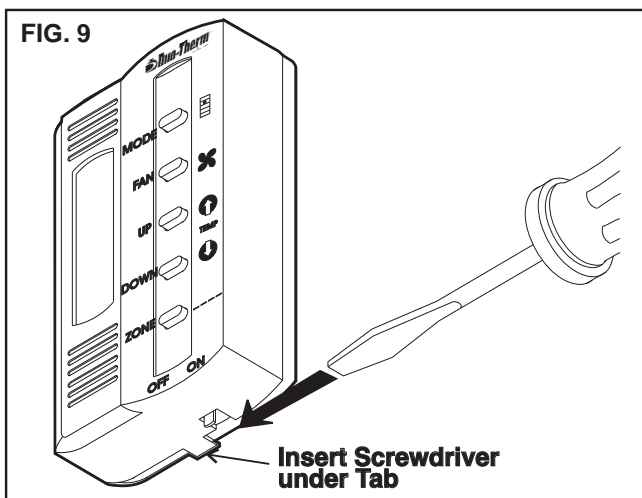
1. Location
 - a. If the system is to be used **WITHOUT** a **Remote Temperature Sensor**, the proper location of the **Comfort Control Center™** is very important to ensure that it will provide a comfortable RV temperature. Observe the following rules when selecting a location:
 - Locate the **Comfort Control Center™ 54"** above the floor.
 - Install the **Comfort Control Center™** on a partition, not on an outside wall.
 - **NEVER** expose it to direct heat from lamps, sun or other heat producing items.
 - Avoid locations close to doors that lead outside, windows or adjoining outside walls.
 - Avoid locations close to supply registers and the air from them.
 - b. If the system is to be used **WITH** a **Remote Temperature Sensor** in **ALL** zones, the **Comfort Control Center™** may be mounted anywhere that is convenient in the coach. Try to avoid hard to reach and hard to see areas.
 - Refer to the instructions provided with the **Remote Temperature Sensor** for details of installation.
 - c. A 3/8" diameter hole will be needed to route the cable through the wall. See Section D-3.
2. Control Cable Installation
A 4-conductor control cable must be routed from the roof opening to the **Comfort Control Center™**.
 - a. Choose the shortest, most direct route from the 14-1/4" x 14-1/4" ($\pm 1/8$ ") opening to the **Comfort Control Center™** location selected. Leave 6" of cable extending through the wall. See Section D-6.
 - b. The control cable that should be used is a flat, 4-conductor telephone cable.
 - c. The control cable must be terminated with two (2) RJ-11-6C4P telephone connectors. Refer to the crimp tool manufacture for crimping instructions. See FIG. 8A, 8B and 8C.



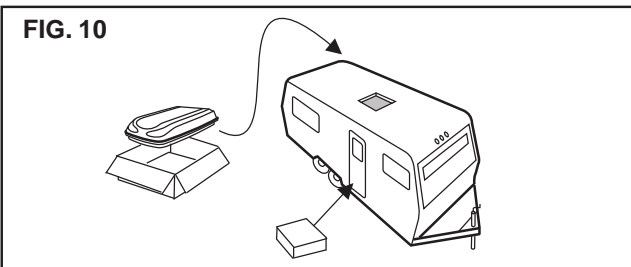
Important: RJ-11-6C4P connectors must be installed as shown in FIG. 8A, 8B & 8C.

3. Comfort Control Center™ Installation

- Carefully remove the base plate from the **Comfort Control Center™**. This may be accomplished by inserting a small screwdriver under the tab on the bottom edge of the front cover and gently prying. See FIG. 9.
- Insert the control cable through the hole in the base plate and mount the plate to the wall with two (2) screws provided. Check the alignment to ensure level installation.
- Install the control cable RJ-11-6C4P connector into the back of the **Comfort Control Center™** and snap onto the base plate. See FIG. 9.



F. Placing Air Conditioner On The Roof



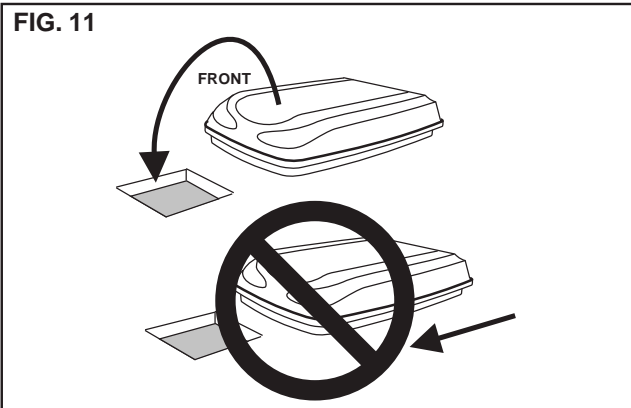
⚠ CAUTION

This unit weighs approximately 100 pounds. To prevent back injury, use a mechanical hoist to place Air Conditioner on roof.

- Remove the air conditioner from the carton and discard carton. See FIG. 10.
- Place the air conditioner on the roof.

CAUTION

Do not slide the unit. This may damage the roof gasket attached to the bottom and may create a leaky installation.

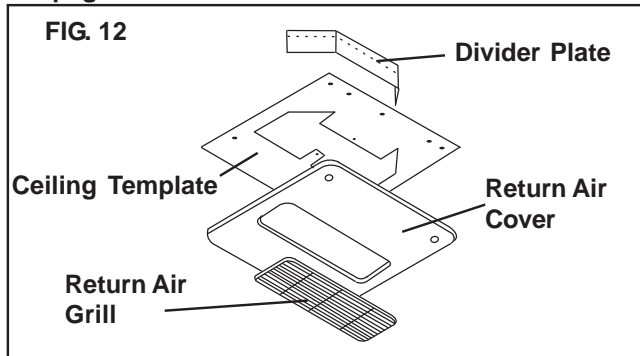


- Lift and place the unit over the prepared opening using the gasket on the unit as a guide. See FIG. 11.
- Place the Return Air Kit inside the RV. This box contains mounting hardware for the air conditioner and will be used inside the RV.

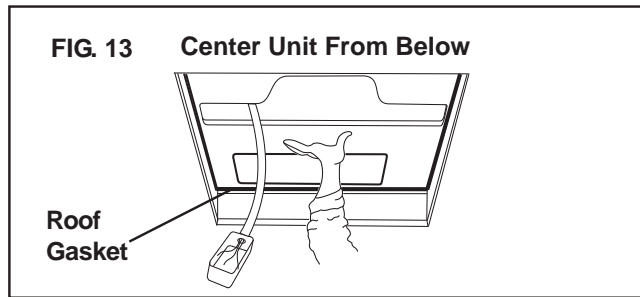
This completes the outside work. Minor adjustments can be done from the inside of the RV if required.

G. Installing The Air Conditioner

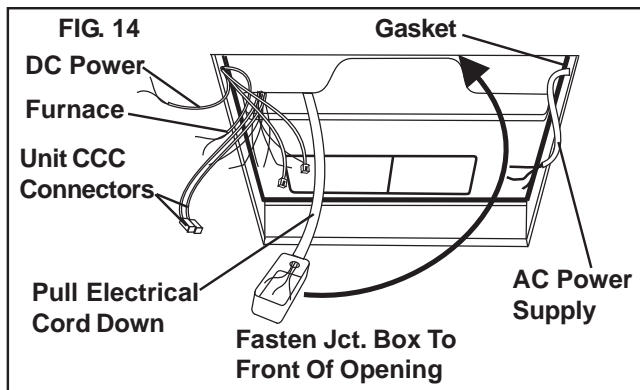
- Installing Unit with 3105007 or 3105935 Return Air Kit. For unit with Genesis Air Filtration System, see page 11.



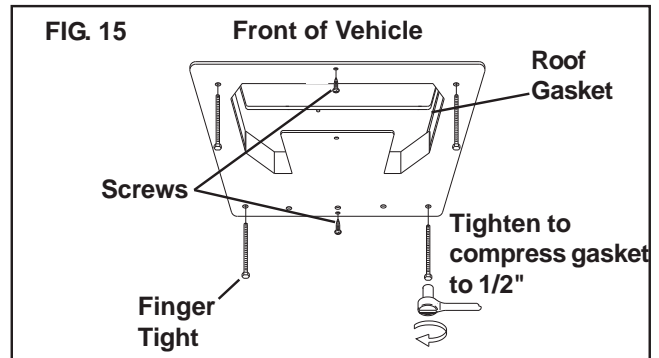
1. Installation Of Ceiling Template
 - a. Check gasket alignment of the air conditioner over the roof opening and adjust if necessary. Unit may be moved from below by slightly lifting and moving. See FIG. 13.



- b. Remove return air cover and ceiling template from the 3105007 or 3105935 carton.
- c. Locate the four (8" x 1/4- 20) unit mounting bolts, junction box cover and Romex connector in the 3107180 bolt kit.
- d. Pull down the unit's electrical cord and fasten the junction box with screws to the framing in the front of the 14-1/4" x 14-1/4" ($\pm 1/8$ ") opening. See FIG. 14.



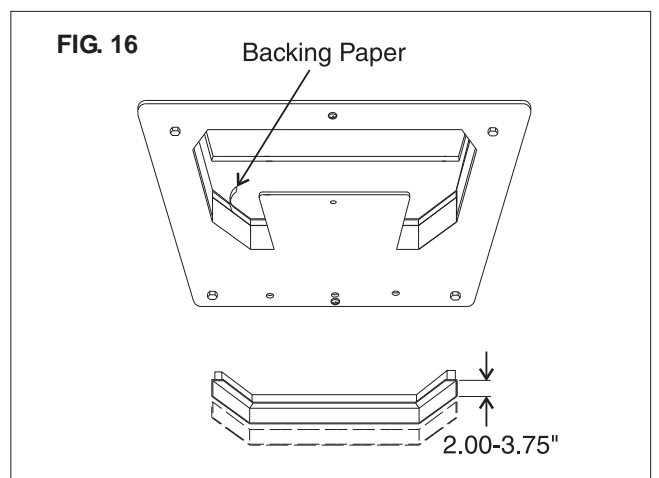
- e. Install the Romex connector in the junction box.
- f. Hold the ceiling template up to the 14-1/4" x 14-1/4" ($\pm 1/8$ ") opening. Be sure the large plate faces the rear of the RV.
- g. Start each mounting bolt through the ceiling template and up into the unit base pan by hand. Install wood screw in each end of the ceiling template. This insures a tight fit of the return air cover to ceiling. See FIG. 14. **Evenly tighten mounting bolts to compress gasket to 1/2"** this will be a torque of 40 - 50 inch pounds. The bolts are self locking so over tightening is not necessary. See FIG. 15.



CAUTION

If bolts are left loose there may not be adequate roof seal or if over tightened, damage may occur to the air conditioner base or ceiling template. Tighten to specifications listed in this manual.

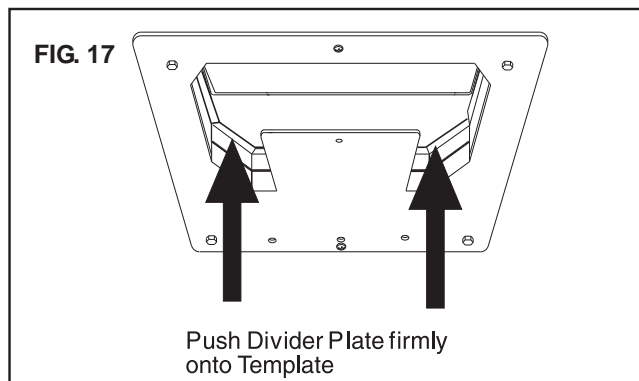
2. Installation of Divider Plate
 - a. Measure the ceiling to roof thickness:
 - If distance is 2.0" - 3-3/4", remove perforated tab from divider plate.
 - If distance is 3-3/4" - 5-1/2", remove no tabs.
 - b. Remove the backing paper from double sided tape located on ceiling template. See FIG. 16.



- c. Place divider plate up to bottom of air conditioner base pan firmly. The foam tape on the divider plate must seal to bottom of base pan. See FIG. 17.

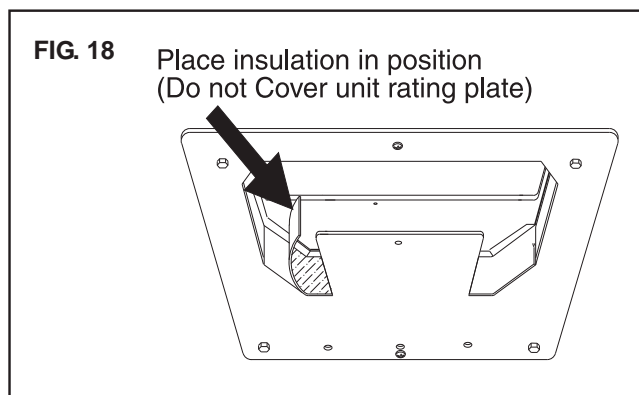
CAUTION

Improper installation and sealing of divider plate will cause the compressor to quick cycle on the cold control. This may result in fuse or circuit breaker opening and/or lack of cooling.



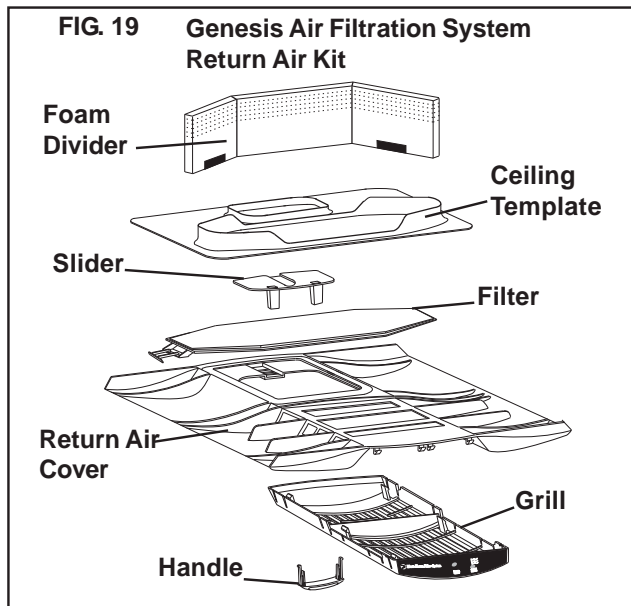
Note: The adhesive on the insulation is extremely sticky. Be sure the part is located where desired before pressing into place.

- d. With slight pressure then push the divider plate against the double sided tape on the ceiling template.
- e. Locate the 1/8" x 7" x 18" self-adhesive insulation supplied with the return air kit. Remove the backing paper from the insulation and carefully stick onto the ceiling template divider panel. See FIG. 18.



- Excess width is intended to seal the divider plate to the sides of the 14-1/4" x 14-1/4" ($\pm 1/8$ ") opening. This is to help prevent cold air discharge from circulating into the air conditioner return air opening.
- If the insulation is too high, stick excess height of insulation to the air conditioner base pan. Do not cover up unit rating plate.

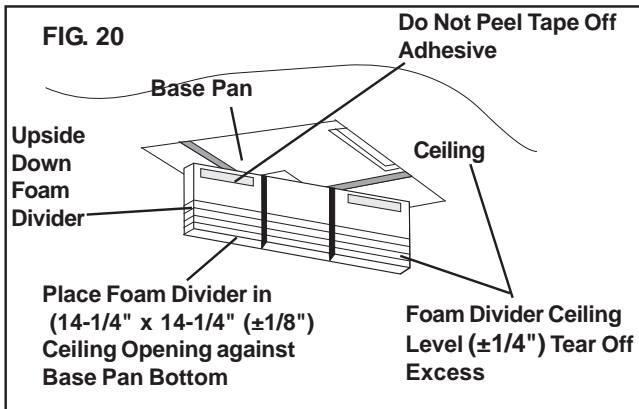
- Installing unit with 3308120 Genesis Air Filtration System Return Air Kit. For unit with 3105007 or 3105935 Return Air Kit, see page 9.



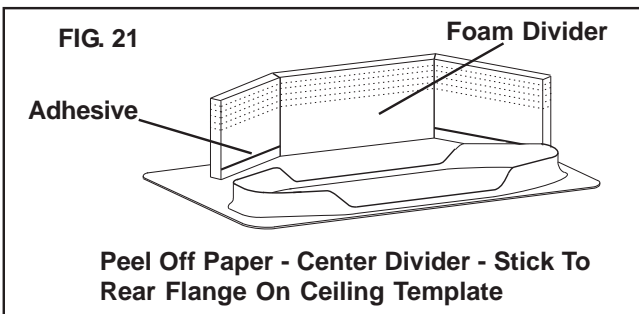
1. All Non-Center Duct Installations

Note: The Genesis Air Filtration System can be installed on units that use a center discharge duct through the 14-1/4" x 14-1/4" ($\pm 1/8$ ") opening. Installing units with the center discharge duct go to Section 1. "Center Discharge Duct Application Installation", on page 6.

- a. Check gasket alignment of the air conditioner over the roof opening and adjust if necessary. Unit may be moved from below by slightly lifting and moving. See FIG. 13.
- Remove return air cover, ceiling template, foam divider and air filter from the 3308120 carton.
 - Locate the four (8" x 1/4-20) unit mounting bolts, junction box cover and Romex connector in the 3107180 bolt kit.
 - Pull down the unit's electrical cord and fasten the junction box with screws to the framing in the front of the 14-1/4" x 14-1/4" ($\pm 1/8$ ") opening. See FIG. 14.
- b. Installing Foam Divider
- Locate the foam divider and insert it corner to corner in the 14-1/4" x 14-1/4" ($\pm 1/8$ ") opening with the adhesive tape up (Do not remove paper to expose adhesive). The foam divider should be level with the ceiling ($\pm 1/4$ "). Tear off the excess at the pre-cut perforations in divider. See FIG. 20.



- c. Install Ceiling Template
- Peel the paper off of the foam divider and stick it in place on the center of the rear flange of the return air opening on the ceiling template. See FIG. 21.

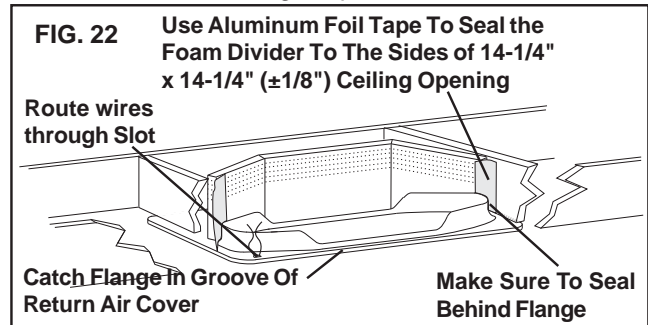


- d. Start each mounting bolt through the ceiling template and up into the unit base pan by hand. **EVENLY** tighten the three bolts to a torque of 40 to 50 inch pounds. This will compress the roof gasket to approximately 1/2". The bolts are self locking so over tightening is not necessary.

CAUTION

If bolts are left loose there may not be adequate roof seal or if over tightened, damage may occur to the air conditioner base or ceiling template. Tighten to specifications listed in this manual.

- e. Use Aluminum foil tape (not supplied) to seal the ends of the foam divider to the sides of the opening. Make sure the area behind the flange on the ceiling template is sealed. See FIG. 22.



CAUTION

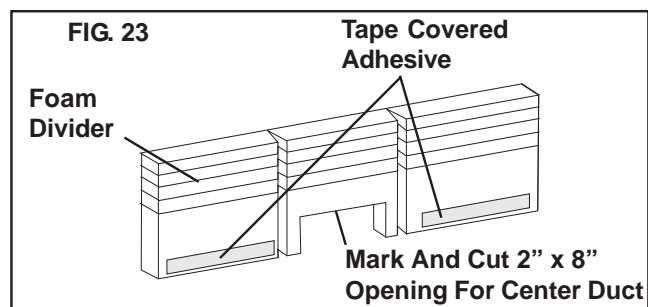
Improper installation and sealing of foam divider will cause the compressor to quick cycle on the cold control. This may result in fuse or circuit breaker opening and/or lack of cooling.

2. Center Discharge Duct Application Installation

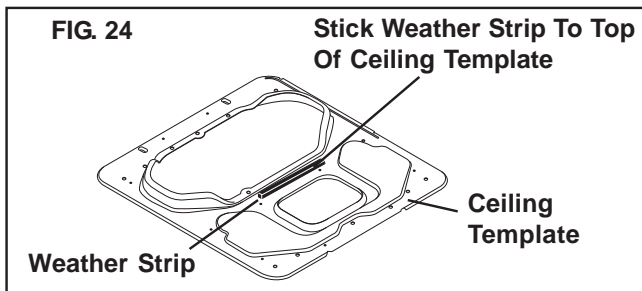
Note: If using non-center duct installation, go to Section 1. "All Non-Center Duct Installations", on page 11.

Important: A duct adapter (not supplied) must be installed between the unit discharge and the customer installed center duct. This duct adapter must be approved by Dometic.

- a. Check gasket alignment of the air conditioner over the roof opening and adjust if necessary. Unit may be moved from below by slightly lifting and moving. See FIG. 13.
- Remove return air cover, ceiling template, foam divider and air filter from the 3308120 carton.
 - Locate the four (8" x 1/4-20) unit mounting bolts, junction box cover and Romex connector in the 3107180 bolt kit.
 - Pull down the unit's electrical cord and fasten the junction box with screws to the framing in the front of the 14-1/4" x 14-1/4" ($\pm 1/8$ ") opening. See FIG. 14.
- b. Installing Foam Divider
- Cut notch in the center section of the foam divider to fit (approximately 2 x 8 inches) snugly around duct. See FIG. 23.



- Place the foam divider in the return air opening above the center duct before installing ceiling template.
- c. Install Ceiling Template
 - Apply a piece of foam weather stripping (not supplied) to the upper side of ceiling template to make a seal between it and the duct. Use a soft piece of foam weather strip 1 x 3/4 x 10 inches. See FIG. 24.



- d. Start each mounting bolt through the ceiling template and up into the unit base pan by hand. **EVENLY tighten the three bolts to a torque of 40 to 50 inch pounds. This will compress the roof gasket to approximately 1/2". The bolts are self locking so over tightening is not necessary.**

CAUTION

If bolts are left loose there may not be adequate roof seal or if over tightened, damage may occur to the air conditioner base or ceiling template. Tighten to specifications listed in this manual.

- e. Use Aluminum foil tape (not supplied) to seal the ends of the foam divider to the sides of the opening. Make sure the area behind the flange on the ceiling template is sealed. See FIG. 22.

CAUTION

Improper installation and sealing of foam divider will cause the compressor to quick cycle on the cold control. This may result in fuse or circuit breaker opening and/or lack of cooling.

- f. Cut the opening in the center duct using the discharge opening in the ceiling template for a pattern. Seal the center duct to the ceiling template using foil tape, foam insulation or silicon sealant.

H. Wiring The System

Reach up into the return air opening and pull the remaining wires down.

1. Connection Of Low Voltage Wires

CAUTION

Disconnect the positive (+) 12 volt DC terminal at the supply battery. Damage to equipment could occur if the 12 volt DC is not shut off.

Note: If solar panel is installed see instructions packaged with solar panel option.

Note: If using the Genesis Air Filtration System step "b" is to be completed when installing the decorative cover.

- a. Route **Remote Temperature Sensor** cable, if applicable, and attach it to the connector that matches its color in the control box.
- b. Connect the previously run 12 VDC to the red and black wires protruding from the control box. (In multiple zone installations, this needs to be done at only one zone.) Connect +12 VDC to the red wire; -12 VDC to the black wire.
- c. Connect the previously run furnace thermostat wires (if applicable) to the blue wires protruding from the control box. The polarity of these connections does not matter.
- d. Connect the previously run Energy Management System wires (if applicable) to the yellow wires protruding from the control box. The polarity of these connections does not matter.
- e. Terminate the 4-conductor control cable(s) protruding into the 14-1/4" x 14-1/4" (±1/8") roof opening. The cable(s) must be terminated with a telephone RJ-11-6C4P connector. Refer to the crimp tool manufacturer for crimping instructions.

Important: RJ-11-6C4P connectors must be installed as shown in FIG. 8A, 8B & 8C.

- f. Plug the control cable(s) into the telephone jack(s) on the control box. (It does not matter which one.)
- g. Locate the ambient sensor plug coming from the unit, and attach it to the connector that matches its color in the control box.

2. Connection Of 120 Volt Power Supply

WARNING

Disconnect 120 volt AC. Failure to follow these instructions could create a shock hazard causing death or severe personal injury.

- a. Route power supply line through Romex connector into junction box on side away from the ceiling template. Tighten connector, being careful not to pinch or short wires.
- b. Connect white to white; black to black; and green to green or bare copper wire using appropriate sized twist connectors.

⚠ WARNING

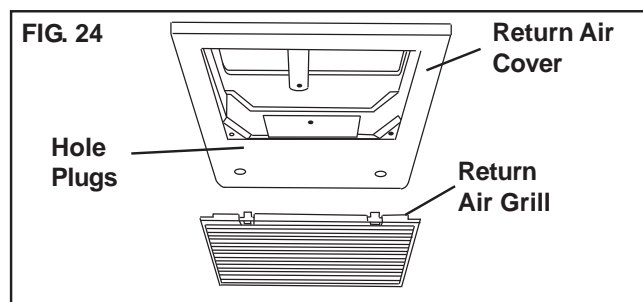
This product is equipped with a 3-wire (grounded) system for protection against shock hazard. Make sure that the appliance is wired into a properly grounded 120 volt AC circuit and the polarity is correct. Failure to do so could result in death, personal injury or damage to the equipment.

- c. Tape the twist wire connectors to the supply wire to assure they don't vibrate off.
- d. Push the wires into the box.
- e. Install the cover onto the junction box.

I. Installing Decorative Inside Cover

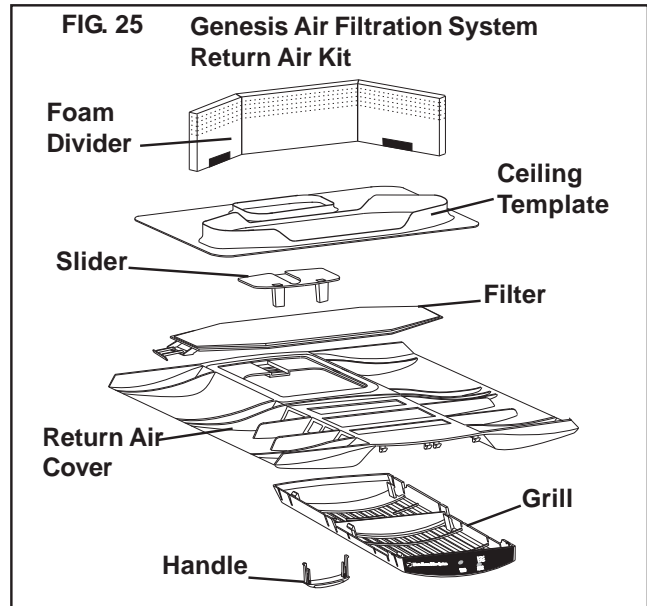
■ Installing unit with 3105007 or 3105935 Return Air Cover. For Genesis Air Filtration System Return Air Kit, see page 14.

1. Remove the return air grill from the return air cover.
2. Place the return air cover up to the ceiling template.
3. Install cover to template with #8 x 3/8" blunt point Phillips head screws provided (6 required).
4. Reinstall filter return air grill into return air cover. Align tabs with mating notches and snap into place.
5. Install two hole plugs into screw holes in back of return air cover. See FIG. 24.



6. This completes the installation of the air conditioner. We recommend that power be supplied to the air conditioner and check for proper operation. Refer to Operating Manual or Users Guide for a description of the air conditioner operation.

■ Installing unit with 3308120 Genesis Air Filtration System Return Air Kit. For 3105007 or 3105935 Return Air Kit, see page 14.



1. Install the slider in the return air cover and raise it to the ceiling template. Route the filter indicator wires from the return air cover through the template slot leaving about 3" between. Place the front of the return air cover against the ceiling and slide towards the rear. The flange on the ceiling template will catch in the groove on the return cover. Adjust the position (right to left) and install the front two screws. Start and tighten the remaining screws to hold it in place. Connect together the wires from the thermostat, unit and filter indicator.

Note: If solar panel is installed see instructions packaged with solar panel option.

- a. Connect the red wire from the unit, the red wire from the filter indicator light with the red DC positive power lead. See FIG. 21.
- b. Connect the black (-12V) wire from the unit, the black wire from the filter indicator light with the black (-12V) power lead.

Note: Number 10 cabinet screw can be used to replace the two front screws when the ceiling material is hard.

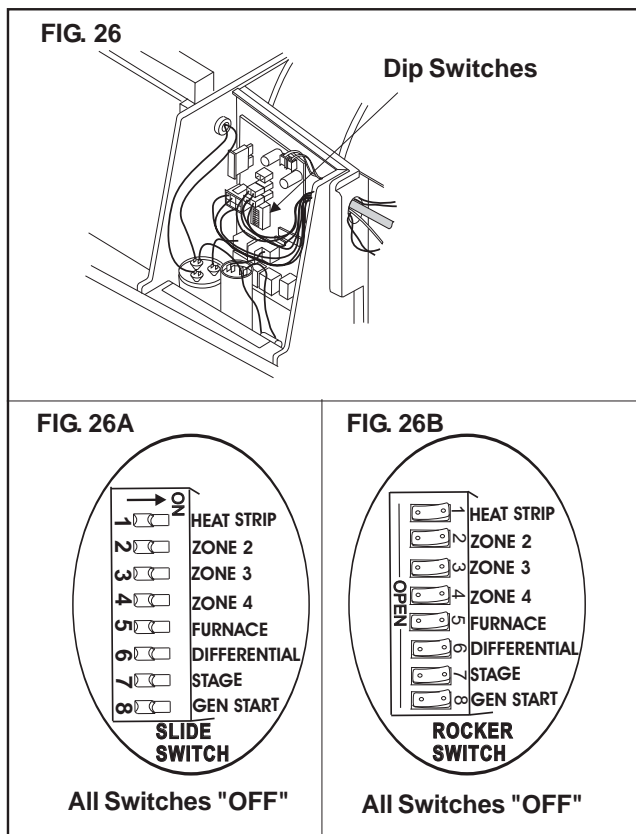
2. Tighten the screws holding the return air cover. Slide the filter from the right side (looking toward the RV front) over the wires. Make sure the wires are above the filter and are out of its way.
3. Place grill on return air cover and snap in place, and install decal on end over circuit board.
4. Place slide handle through slots in grill into the slide posts. Handle will fit in either direction.
5. This completes the installation of the air conditioner. We recommend that power be supplied to the air conditioner and check for proper operation. Refer to Operating Manual or User's Guide for a description of the air conditioner operation.

J. System Configuration, Reset & Check Out

Now that the system is installed, it is necessary to check all operations and then configure the electronics. Refer to the Operating manual for a description of the air conditioner operation.

1. Electronic Control Kit Configuration

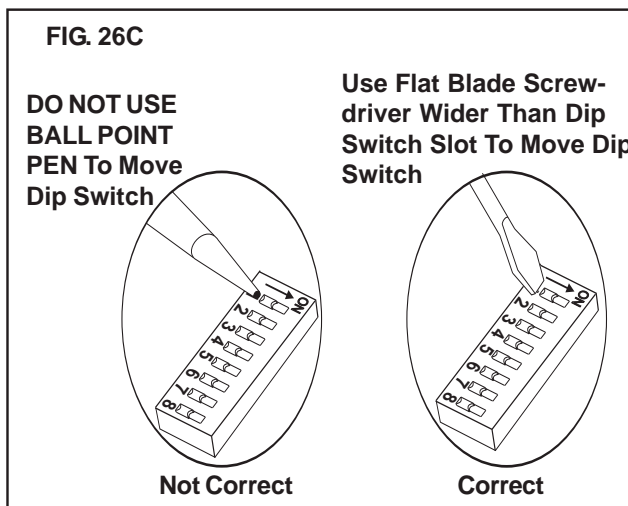
Depending on the equipment options installed by the recreational vehicle manufacturer, the appropriate dip switches will need to be switched to the "ON" position. Placing the switch in the "ON" position selects that option. See FIGS. 26, 26A & 26B.



Note: Dip switches are in the "OFF" position when shipped from the factory. The dip switches are visible through the opening in the ceiling template into the control box. Dip switches can be either a rocker or sliding style of a switch. See FIGS. 26, 26A & 26B.

Important: Dip switch damage will occur if they are not set in the proper manner. A ball point pen or similar object that will slip in the switch slot, can damage the switch causing loss of connection. Use only a small flat blade screw driver (wider than the dip switch slot) to move the dip switch. See FIG. 26C.

- b. Heat strip selection: Units with a heat strip, the #1 dip switch will be in the "ON" position.
- c. Furnace selection - when a furnace has been connected to a zone, place the furnace dip switch "ON" for that zone.



- d. Differential - differential is the temperature difference between the "ON/OFF" cycle of the thermostat in the furnace mode. The normal differential is preset in the circuit board with the dip switch set to the "OFF" position. In some situations, it may be necessary to decrease the differential. The location of the thermostat may create a condition where the normal differential will not maintain your comfort zone. If this occurs, the differential can be shortened by placing the differential dip switch to the "ON" position.

Note: Setting the differential dip switch should only be required when installation conditions are less than desirable and is not covered under the limited warranty.

- e. Stage selection - stage is not used on these units. Leave in the "OFF" position.
- f. Gen start selection - leave in the "OFF" position.
- g. Replace the unit electrical box cover.
- h. Repeat this procedure for each additional zone.

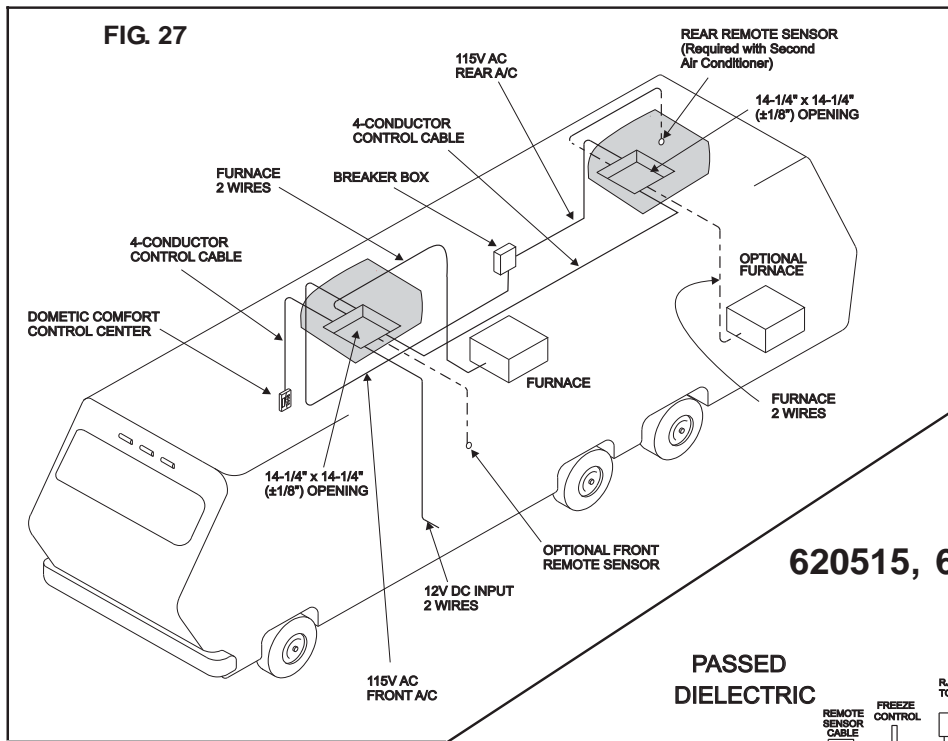
2. System Reset

After setting the dip switches in the electronic control kit, do a system reset.

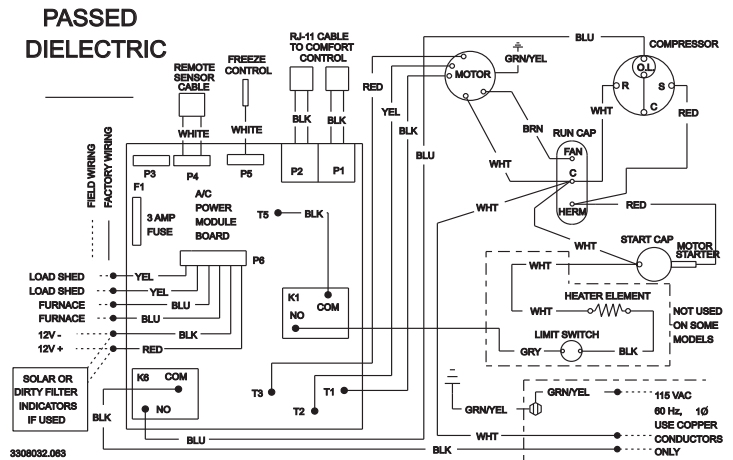
- a. Turn the ON/OFF switch to the "OFF" position.
- b. Simultaneously depress and hold the MODE and ZONE push-buttons while turning the ON/OFF switch to "ON". FF should appear in LCD display until the mode and zone push-buttons are released.
- c. When a dip switch is turned on after initial configuration, a system reset will need to be done before the **Comfort Control Center™** will recognize the updated selection.

3. System Checkout

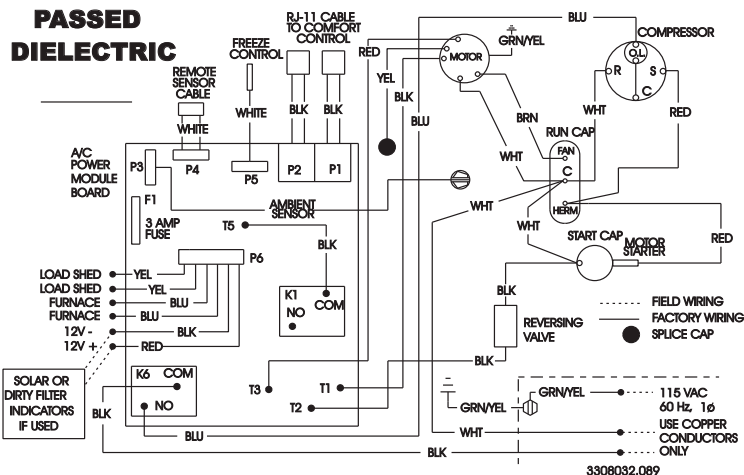
Verify that all features of the installed system work. Check fan speeds, cooling mode, heat pump mode, furnace (if connected) and heat strip. If the features do not work, check all wiring and confirm that the correct options have been selected on the Electronic Control Box. See **Comfort Control Center™** Operating Instructions.



620515, 620525 & 620526 WIRING DIAGRAM

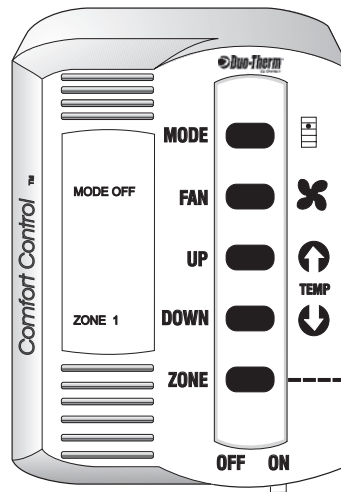


630515 & 630516 WIRING DIAGRAM





COMFORT CONTROL CENTER™ Part No. 3109228.001



USA
SERVICE OFFICE
The Dometic Corp.
509 So. Poplar St.
LaGrange, IN 46761
(219) 463-4858

CANADA
Dometic Dist.
866 Langs Dr.
Cambridge, Ontario
CANADA N3H 2N7
(519) 653-4390

**For Service Center
Assistance Call:**
800-544-4881



This Comfort Control Center will provide your cooling and heating requirements regardless of your vehicle size.

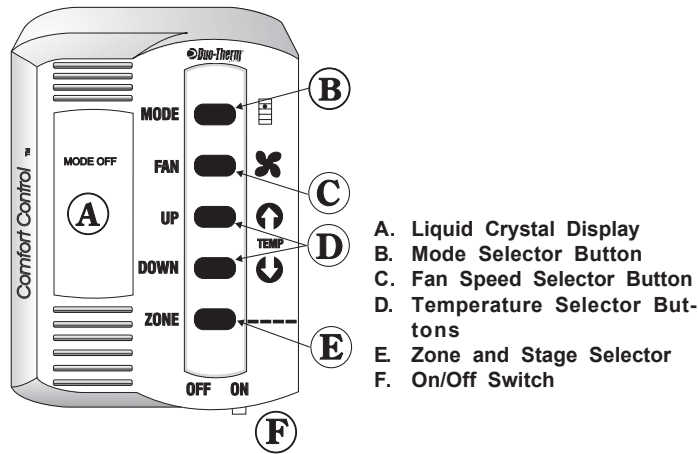
OPERATING INSTRUCTIONS

**Comfort
Control Center™**
Part No. 3109228.001

REVISION
Form No. 3108664.032 1/01
(Replaces 3108664.024)
(French 3109564.024)
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LaGrange, IN 46761

Your recreational vehicle manufacturer has equipped your vehicle with Duo-Therm's Comfort Control Center™. The Comfort Control Center has been designed for you to easily operate all the air conditioning and gas heating appliances found in your vehicle from one location.

In order to familiarize yourself with the operation of the Comfort Control Center, the following diagram along with the accompanying text will explain all the functional characteristics of the system.



- A. Liquid Crystal Display
- B. Mode Selector Button
- C. Fan Speed Selector Button
- D. Temperature Selector Buttons
- E. Zone and Stage Selector
- F. On/Off Switch

- A. **LIQUID CRYSTAL DISPLAY** – Your Comfort Control Center is equipped with a liquid crystal display (LCD) that identifies the mode of operation, the temperature set-point, the zone identification and the fan speed. The Comfort Control Center is designed to accept and control many varied air conditioning and gas heating appliances. When you begin to first operate your Comfort Control Center, you will see that the LCD readout will only show the options available based on the appliances installed on your vehicle. An incandescent light will illuminate the LCD area when a selector button is pushed for easy reading at all times.
- B. **MODE SELECTOR BUTTON** – Modes of operation available are: **OFF, FAN ONLY, COOL, HEAT PUMP, FURNACE, HEAT STRIP and AUX. HEAT.** Remember, your LCD readout will only show the options available based on the appliances installed on your vehicle. To select the mode of operation, momentarily depress the **MODE** push-button. You will need to continue to depress and release the button until the desired mode is shown in the LCD readout area on the Comfort Control Center.

To determine the Comfort Control Center options available to you, depress and release the **MODE** push-button until it goes through all selections.

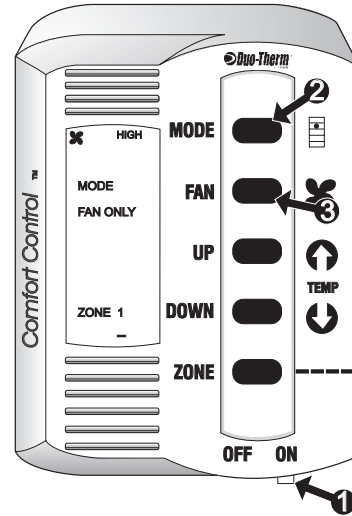
- C. **FAN SPEEDS** – Possible available fan speeds are: **LOW, MEDIUM, HIGH** and **AUTO.** To select the desired fan speed, momentarily depress the **FAN** push button. You will need to continue to depress and release the **FAN** button until the desired fan speed is shown in the LCD readout area of the Comfort Control Center.
- D. **TEMPERATURE SELECTOR BUTTONS** – The temperature Set-point range is from 40° to 99° Fahrenheit or 4° to 37° Celsius. Determination of Fahrenheit or Celsius standard is done at the time of your manufacturer's installation of the Climate Control Center. To set the temperature at your comfort level, simply depress and release the **UP** or **DOWN** push-button until the desired temperature is shown in the LCD readout area of the Comfort Control Center.
- E. **ZONE SELECTOR BUTTON** – A **ZONE** is also established at the time of installation of your Comfort Control Center. If you have one air conditioner, you will have one **ZONE.** If your vehicle has more than one cooling system, depending on the manufacturing installation, you may have 2, 3 or 4 **ZONES.** Zones are defined and preset by your manufacturer. A zone is an area of cooling/heating which is controlled independently within that area, and regulated at the Comfort Control Center. A typical example of a two zone application would be a vehicle with two air conditioning systems, one in the front area (living room, kitchen) and one in the back section (bedroom and bath). The front area could be established as **ZONE 1** and the back section **ZONE 2.** You can select the desired temperature and fan speeds for each zone independently, thereby keeping your bedroom cooler than the front portion of the vehicle. To determine the number of established zones in your vehicle, depress the **ZONE** push-button. **ZONE 1** will be the first **ZONE** to appear in the LCD readout. The **ZONE** number selected will begin to flash and will flash for approximately 30 seconds or until another **ZONE** has been selected. Continue to depress and release the **ZONE** button until you see **ZONE 1** reappear.
- F. **ON/OFF SWITCH** – The ON/OFF switch is located on the lower right hand edge of the Comfort Control Center. Move the lever from side to side to change status.

OPERATING YOUR DUO-THERM COMFORT CONTROL CENTER

The Comfort Control Center allows you the freedom of controlling your vehicle's temperature to provide you with a comfortable environment to enjoy your life-style. With just a few simple steps, you can control which mode of operation you will use, the vehicle temperature and the fan speeds.

A. FAN ONLY MODE OF OPERATION

1. Begin by placing the power switch on the lower right hand edge of the Control Center on the **ON** position. To do this, simply move the lever to the right.
2. Momentarily depress and release the **MODE** push-button until the **FAN ONLY** indicator on the Liquid Crystal Display (LCD) is illuminated.
3. Momentarily depress and release the **FAN** push-button until the desired fan speed indicator (**LOW, MED, HIGH, AUTO**) is illuminated. If your vehicle is equipped with a heat pump or a dual basement air conditioning system, your selection choice will be **LOW, HIGH** or **AUTO**.
4. After approximately 5 seconds, the selected fan speed will come on. The **MODE** and **FAN** speed you have selected will remain shown in the LCD area of the Control Center until you change your selection.
5. If your vehicle contains more than one **ZONE**, depress the **ZONE** push-button to select **ZONE 2**, and repeat procedures from step two above. Repeat entire procedure for each additional zone.

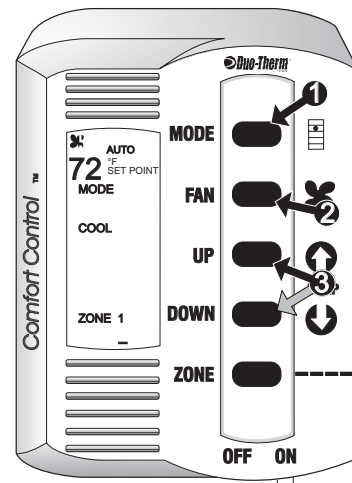


B. COOLING MODE OPERATION

(To set cooling temperatures and fan speeds on Duo-Therm Air Conditioners & the cooling mode of Duo-Therm Heat Pumps)

1. Momentarily depress and release the **MODE** push-button until the **COOL** indicator on the LCD is illuminated.
2. Depress and release the **FAN** push-button to select your desired fan speed (**LOW, MEDIUM, HIGH** or **AUTO**). If your vehicle is equipped with a heat pump or a dual basement air conditioner system, your selection choice will be **LOW, HIGH** or **AUTO**.
3. Depress and release the **UP** push-button to increase the temperature or the **DOWN** push-button to decrease the desired temperature. The final selected **SET-POINT** will be displayed in the LCD area of the Comfort Control Center.
4. After a delay of approximately 2 minutes the air conditioner's compressor will come on and the cooling process will begin. Once the room temperature reaches the selected **SET-POINT**, the compressor will cycle off. Once the Comfort Control Center senses the need for cooling, the compressor will restart in approximately two minutes. At this point, the fan will either:
 - a. continue to operate in the single selected fan speed or,
 - b. cycle **OFF** and **ON** with the compressor if the **AUTO** fan speed has been selected.

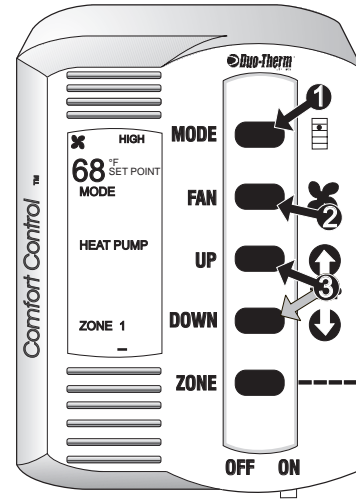
5. If your vehicle contains more than one **ZONE**, depress the **ZONE** push-button to select **ZONE 2**, and repeat procedures from Step 1. Repeat entire procedure for each additional zone.



C. HEAT PUMP OPERATION

(To set heating temperatures for vehicles equipped with a Duo-Therm rooftop or basement heat pump. To operate cooling mode with a heat pump, see "B. Cooling Mode Operation", Page 3.)

1. Momentarily depress and release the **MODE** push-button until the **HEAT PUMP** indicator on the LCD is illuminated.
2. If you have not previously set your fan speed, you may do so by depressing and releasing the **FAN** push-button to select the desired fan speed.
3. Depress and release the **UP** push-button to increase the temperature or the **DOWN** push-button to decrease the desired temperature. The final selected **SET-POINT** will be displayed in the LCD area of the Comfort Control Center.
4. After a delay of approximately 2 minutes the heat pump's compressor will come on and the heating process will begin. Once the room temperature reaches the selected **SET-POINT**, the compressor will cycle off. Once the Comfort Control Center senses the need for heating, the compressor will restart in approximately two minutes. At this point, the fan will either:
 - a. continue to operate in the single selected fan speed or,
 - b. cycle **OFF** and **ON** with the compressor if the **AUTO** fan speed has been selected.
5. If your vehicle contains more than one **ZONE**, depress the **ZONE** push-button to select **ZONE 2**, and repeat procedures from Step 1 above. Repeat entire procedure for each additional zone.

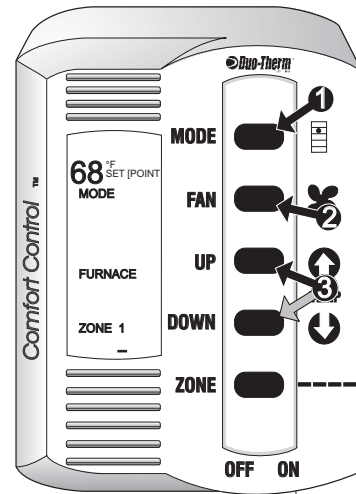


NOTE:
See Page 7, Items F & G for additional Special Heat Pump Features.

D. FURNACE MODE OPERATION

(If your vehicle is equipped with a gas furnace connected to the Comfort Control Center)

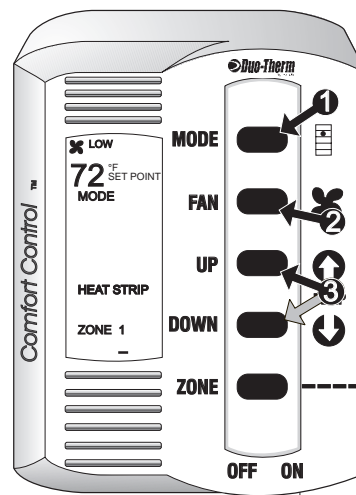
1. Momentarily depress and release the **MODE** push-button until the **FURNACE** indicator on the LCD is illuminated.
2. The A/C fan does not operate in the **FURNACE** mode.
3. Depress and release the **UP** push-button to increase the temperature or the **DOWN** push-button to decrease the desired temperature. The final selected **SET-POINT** will be displayed in the LCD area of the Comfort Control Center.
4. Your Duo-Therm air conditioning system will not operate when the Comfort Control System is in the **FURNACE** mode. For cooling, change the **MODE** to **COOL**.
5. If your vehicle contains more than one **ZONE**, depress the **ZONE** push-button to select **ZONE 2**, and repeat procedures from Step 1 above. Repeat entire procedure for each additional zone.



E. HEAT STRIP MODE OPERATION

(For Duo-Therm air conditioners with an electric heat strip)

1. Momentarily depress and release the **MODE** push-button until the **HEAT STRIP** indicator on the LCD is illuminated.
2. The fan will operate in **LOW**, **MED** or **AUTO**. You will not be able to select **HIGH** speed when in the **HEAT STRIP** mode. Depress and release the **FAN** push-button to select desired speed. If your vehicle is equipped with a heat pump or a dual basement air conditioner system, your selection choice will be **LOW** and **AUTO**.
3. Depress and release the **UP** push-button to increase the temperature or the **DOWN** push-button to decrease the temperature. The final selected **SET-POINT** will be displayed in the LCD area of the Comfort Control Center.
4. The electric heat strip will cycle **ON** and **OFF** per the temperature **SET-POINT** displayed. The fan will either:
 - a. continue to operate in the selected fan speed or,
 - b. cycle **OFF** and **ON** with the heat strip if the **AUTO** fan speed has been selected.
5. If your vehicle contains more than one **ZONE**, depress the **ZONE** push-button to select **ZONE 2**, and repeat procedures from Step 1 above. Repeat entire procedure for each additional zone.



COMFORT CONTROL CENTER SPECIAL CONTROL FEATURES

A. AUTO FAN

When **AUTO FAN** is selected, the fan speed will be determined by the mode you are in.

1. **COOL MODE** – In the **COOL** mode, which is the air conditioning mode, the fan will automatically select the speed depending upon the difference between the temperature **SET-POINT** and the room temperature. When that difference is:

8° or more	The fan will operate on HIGH
4° to 8°	The fan will operate on MED
4° or below	The fan will operate on LOW
2. **COOL MODE (Heat Pump and Basement units)** – If your vehicle is equipped with a Duo-Therm Heat Pump or Basement unit, the fan will automatically select the fan speed depending upon the difference between the temperature **SET-POINT** and the room temperature. When the difference is:

8° or more	– The fan operates on HIGH
Less than 8°	– The fan operates on LOW
3. **HEAT PUMP MODE** – When **HEAT PUMP** mode is selected, the fan will start running in the **LOW** speed.

4. **HEAT STRIP MODE** – When **HEAT STRIP** mode is selected, the fan will start running in the **LOW** speed.
5. **FAN ONLY MODE** – In the **FAN ONLY** mode, the fan will start running in the **LOW** speed.

B. REFRIGERANT COMPRESSOR TIME DELAY

A time delay of approximately two minutes occurs after the time the compressor is required to begin the cooling or heat pump cycle.

C. POWER INTERRUPTION

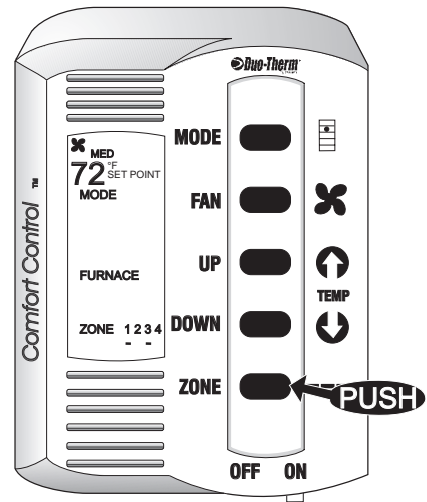
In the event that power to the air conditioner or control is interrupted, the system will restart with the same settings you have previously set.

D. ZONE CONTROL

Your Duo-Therm Control Center will operate cooling and heating appliances which your vehicle manufacturer has designed to heat or cool different areas (**ZONES**) of your RV. The Comfort Control Center will advise you if your vehicle has multiple **ZONES**, by showing **ZONE 1, 2, 3** etc.

(D. Zone Control continued)

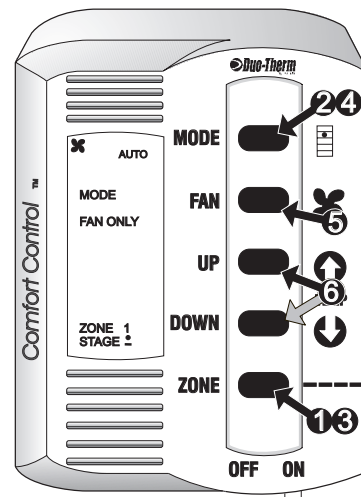
4 illuminated in the LCD readout. In the event your vehicle has multiple zones designed, you have the freedom of selecting the **MODE** of operation for each zone independently. To change from one zone to another, depress the **ZONE** push-button. Each time you depress and release this push-button, the indicator will change the zone data displayed. The zone number flashing indicates zone being programmed. The zone number will flash for approximately 30 seconds unless another zone is selected or programming has been completed. At this time the number will stop flashing and the display light will go out. When all zones have been programmed, the zones in operation will be underlined. To program each zone, simply repeat the programming steps shown in the operation section of this manual. Please note: The Comfort Control Center will prevent operating **FURNACE** and **COOL** or **FURNACE** and **HEAT PUMP** at the same time.



E. STAGE CONTROL OPERATION

If your vehicle is equipped with a Duo-Therm Dual Basement Air Conditioner or a Dual Basement Heat Pump, you have an air conditioning system that is designed to optimize comfort and running efficiencies. (Two units within one compartment). This is accomplished as long as the required electrical power is available, by providing an on-demand secondary stage of operation. (NOTE: The primary stage will continue to operate even if there isn't enough electrical power available to run the second stage.) The Comfort Control Center simplifies this operation and allows you to set the primary temperature set-point while the differential temperature set-point which activates the secondary stage is preset. After turning on your Comfort Control Center, perform the following steps to set and activate the stage control operation.

- 1) Momentarily depress the **ZONE** push-button to select stage in the zone desired
- 2) Momentarily depress the **MODE** push-button to select "ON".
- 3) Momentarily depress the **ZONE** push-button to select the zone where stage was selected in Step 1.
- 4) Momentarily depress the **MODE** push-button until the desired mode of operation is selected (**FAN ONLY**, **COOL** or **HEAT PUMP**).
- 5) Momentarily depress the **FAN** push-button until the desired fan speed is displayed (**LOW**, **HIGH** or **AUTO**).
- 6) Momentarily depress the **UP** and **DOWN** push-button until the desired room temperature set-point is displayed.

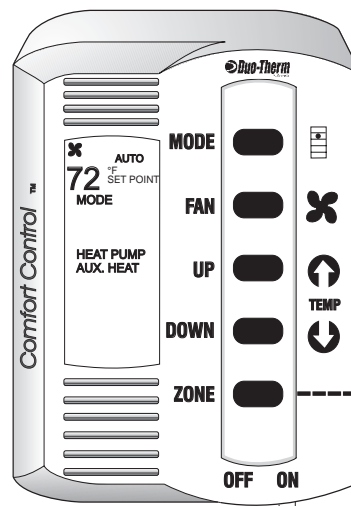


F. AUX. HEAT

When in the **HEAT PUMP** mode, if the outside ambient temperature is measured to be below 30°F and the vehicle is equipped with a furnace connected to the Comfort Control Center, the control will automatically select the **FURNACE** operation and the **HEAT PUMP** will shut down.

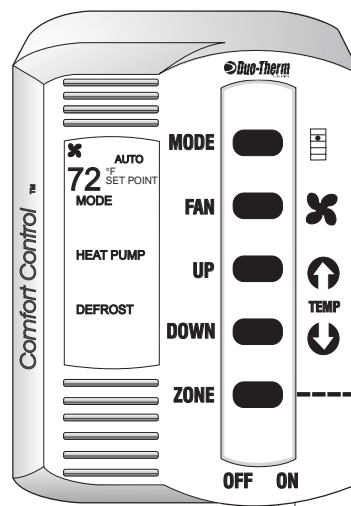
Important: If vehicle is not equipped with a furnace no heat will be available below 30°F. If vehicle is equipped with a furnace and it is connected to its own thermostat, it must be manually turned ON and OFF for operation.

When this happens, the **AUX. HEAT** and the **HEAT PUMP** indicators on the LCD will illuminate. Once the outside ambient temperature is measured above 38°F, the control will return to the **HEAT PUMP** operation and shut down the furnace if it is connected to the Comfort Control Center. If furnace is not connected to the Comfort Control Center, the furnace thermostat must be manually turned off.



G. DEFROST CYCLE

This cycle is active during **HEAT PUMP** operation and allows the heat pump to operate down to 30°F. When the outside ambient temperature is less than 42°F and greater than 30°F, a defrost timing cycle will begin. The defrost timing cycle will allow operation of the heat pump for 25 minutes. The fan will then be shut off, the refrigerant flow reversed and run for 4-1/2 minutes, this is the **DEFROST** cycle. The refrigerant flow will then be returned to normal and, after a 30 second delay will continue until the temperature is greater than 42°F or until the temperature becomes less than 30°F, at which time the furnace will activate. (See **AUX. HEAT**). During the defrost cycle, the **DEFROST** indicator on the LCD shall be illuminated.

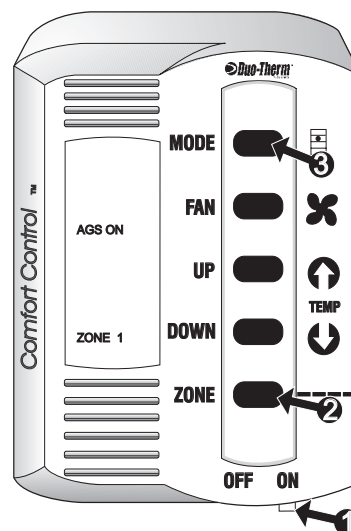


H. OPTIONAL AUTOMATIC GENERATOR START (AGS)

On vehicles equipped with an optional AGS kit the vehicle generator will automatically start when any zone calls for cooling and will shut off when all zones reach set point.

1. Put the power switch in the ON position.
2. Momentarily depress and release the ZONE push-button until AGS indicator appears on the LCD.
3. Momentarily depress and release the MODE push-button to select AGS status.

Important: When shore power is available, AGS must be switched to the off position.



GENERAL INFORMATION

A. The ability of the air conditioner to maintain the desired inside temperature depends on the heat gain of the RV. Some preventative measures taken by the occupants of the RV can reduce the heat gain and improve the performance of the air conditioner. During extremely high outdoor temperatures, the heat gain of the vehicle may be reduced by:

1. Parking the RV in a shaded area.
2. Using window shades (blinds and/or curtains).
3. Keeping windows and doors shut or minimizing usage.
4. Avoiding the use of heat producing appliances.

Starting the air conditioner early in the morning and giving it a "head start" on the expected high outdoor ambient will greatly improve its ability to maintain the desired indoor temperature.

B. The manufacturer of this air conditioner will not be

responsible for damage caused by condensed moisture on ceilings or other surfaces. Air contains moisture and this moisture tends to condense on cold surfaces. When air enters the RV, condensed moisture may appear on the ceiling, windows, metal parts, etc. The air conditioner removes this moisture from the air during normal operation. Keeping doors and windows closed when this air conditioner is in operation will minimize condensed moisture on cold surfaces.

C. This equipment must be serviced by qualified personnel and some states require these people to be licensed.

MAINTENANCE

AIR FILTER: Periodically remove the return air filter. Wash the filter with soap and warm water; let dry and then reinstall or replace as required.

Note: Never run the air conditioner without the return air filter in place. This may plug the unit evaporator coil with dirt and may substantially affect the performance of the unit.

Comfort Control Center™: Clean the Comfort Control

Center™ with a moist, soft cloth. **DO NOT** use solvents for cleaning.

SERVICE

If your unit fails to operate or operates improperly, check the following before calling your service center.

- A. If your RV is connected to a motor generator, check to be sure the motor generator is running and producing power.
- B. If the RV is connected to a power supply by a land line, check to be sure the line is sized properly to run air conditioner load and it is plugged into the power supply.
- C. Check your 115VAC fuse or circuit breaker to see if it is open.
- D. Check your 12VDC fuse or circuit breaker to see if it is open.
- E. After the above checks, call your local service center for further help. This unit must be serviced by qualified service personnel only.

When calling for service, always give the following:

- A. Air Conditioner Model Number and Serial Number found on Rating Plate located on the Base Pan of the air conditioner.
- B. Electronic Control Kit Part Number and Serial Number found on Rating Plate located on the side of the Kit.

RETURN AIR GRILLE MUST BE REMOVED FROM THE RETURN AIR COVER TO VIEW THESE RATING PLATES.

**MICROFLUSH® Half Gallon Toilets
Air Operated**



Model LF-210

Model LF-219

**Installation/Service Manual
P/N 24563**

THANK YOU FOR PURCHASING A MICROPHOR PRODUCT!

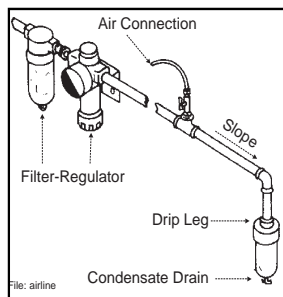
Your Microflush® toilet is designed to provide you with years of reliable service while using only two quarts of water per flush. Please read this Owner's Manual completely prior to installation of your Microflush toilet. This will familiarize you with all of the proper installation and operation requirements.

CUSTOMER SERVICE

Please contact your local Microphor dealer for parts and service. For a list of dealers, please contact Microphor at 1-800-358-8280 or visit our website at www.microphor.com.

AIR SYSTEM

Filter-regulators are available in a variety of sizes and types. Their purpose is to remove water, oil and other foreign matter from the air line and to maintain a constant pressure **at the toilet of 60-65 PSI**. The following steps must be observed to assure moisture will be removed from the airline:



1. Drain air compressor receiver regularly. Most water tends to accumulate at this point.
2. Install drip legs with condensate drains at all low points in air piping.
3. Whenever possible, grade all airlines back to the air receiver or drip leg assembly and drain regularly.
4. The air supply to your Microflush toilet must be taken from the top of the main or branch air line.

AIR COMPRESSOR

Be certain compressor crankcase has proper oil levels. Locate the compressor in a clean, dry, well ventilated location. Size compressor according to separate Air Compressor Specifications Sheet.

PRE-INSTALLATION

The following procedures apply to all Microflush models unless otherwise noted. Remove your toilet from box carefully. Integral Models - Install toilet seat and flush handle before mounting Microflush to floor. Seat is not included. Bolt caps and closet screws are provided.

1. AIR LINES

If used in Marine applications, all piping supplied by customer is to conform to U.S.C.G. requirements relating

to water tight decks and bulkhead (46CFR56.69)

Be sure airline from compressor is of sufficient size, based on length of pipe run to head. We suggest 3/8" air line up to 40', 1/2" air line up to 75', and 3/4" air line for over 75'.

Install a filter-regulator assembly in incoming airline. Place the filter-regulator as close as possible to the first Microflush toilet and in an accessible location.

Set filter-regulator so that **60-65 PSI constant is available at the toilet**. Install Microphor combination filter/regulator/dryer, P/N 94036.

Assemble the Air Connecting Kit provided and connect to incoming air line with shut-off valve between bulkhead and toilet. For LF-210 Models, use Air Connecting Kit P/N 93086, and for LF-219 Integral Models use Air Connecting Kit P/N 95172. The plastic airline provided goes from the air supply to the Flush Activator. On integral models, the plastic air line enters the Microflush through the back wall or up through the floor under the unit. Make sure air is OFF at air compressor. **DO NOT CONNECT TO FLUSH ACTIVATOR YET!**

2. WATER LINES

Use a 1/2" water line and install a water shut-off valve (angle stop) between bulkhead and toilet. **Water at the toilet must be regulated at an even pressure between 20 to 50 PSI** for Microflush to operate properly. Optimum pressure is 35 PSI. **DO NOT CONNECT WATER LINE TO MICROFLUSH YET!**

INSTALLATION PROCEDURES

3. DRAIN CONNECTION - See Rough-In Dimensions

FOR ALL INSTALLATIONS:

LF-210 Downward Discharge Model: Rest Microflush on its back on a padded surface (e.g. shipping box). Center wax ring over Hopper Flange. Turn Microflush toilet over, lift up, and center it with the horn of the wax ring into standard floor flange. Compress the wax ring by applying weight to your Microflush toilet. A second standard wax ring may be added if floor is uneven. If Hopper Flange hits floor flange, grind it down for added clearance, as any contact will break seal between Hopper and Toilet Bowl and cause leaking.

Note: Discharge on toilet is 13.25 (+/- 0.5") from back. See rough in dimensions.

All Rear Discharge Models: Install inverted P-Trap supplied with Microflush toilet. Do not glue or connect fittings until fitting alignment has been checked.

Caution: Outlet is 3/4" off centerline. Make sure toilet discharge and waste line are in line, not off set.

LF-219 Model: For downward discharge, use molded P-Trap hose supplied. For rear discharge, use inverted P-Trap. See page 8 for part numbers.

Remote Models: Position and mount the Remote Valve Assembly making sure the Vacuum Breaker is at least 6" above the rim of the Microflush toilet bowl. Measure air and water lines to make sure Remote Valve is mounted within connection distance to Microflush toilet. Run water and the three air lines from the Remote Valve Assembly to Microflush.

Caution: For Remote Flush Activators, make sure inside wall thickness does not exceed 1/2" or large mounting nut will restrict movement of flush handle.

Mount toilet bowl to floor with 1/4" closet bolts provided. Screw on bolt caps to mounting screws.

When using a 1-1/2" (38.1 mm) discharge line, each toilet must go individually to the Marine Sanitation Device or holding tank. Do not connect more than one toilet to a 1-1/2" (38.1 mm) discharge line.

If a vertical rise is required, the vertical rise must be at the toilet. The maximum vertical rise is 36". Vertical rise is not recommended for high use applications. The maximum horizontal run is 30 feet (9.14 meters) and must slope a minimum of 1/8" per foot (1 in 100) towards the Marine Sanitation Device or holding tank. For 1-1/2" lines, reduce horizontal pipe run 2 feet (.68 meters) per 90° elbow. Use long sweep elbows.

Note: The use of regular 90° elbows will significantly decrease the horizontal run.

When multiple toilets are installed, a vented 3" gravity collection line is to be used with not more than 4 toilets per 3" line. Manifold the 1-1/2" lines into the 3" collection line and provide a grade of at least 1/4" per foot towards the Marine Sanitation Device or holding tank. Vent 3" line at the manifold point.

Caution: Do not apply stress to align Microflush rear or downward discharge outlet to waste line. This may result in eventual damage to seal between Hopper and Toilet Bowl and cause leaking.

FOR MARINE INSTALLATIONS:

For direct overboard discharge, contact Microflush your dealer.

4. WATER CONNECTION

Never install a check valve on the inlet side of the Microflush toilet.

Integral Models - Connect incoming water from a stop to water connector. Make sure WATER IS OFF at angle stop.

LF-210 Models - Water supply connector is made of nylon-plastic; be careful not to cross threads.

LF-219 Models - If integral model is connected to potable water source, the unit requires installer to install a Back Flow/Cross Contamination Prevention device. Please check applicable jurisdiction for requirements before installation.

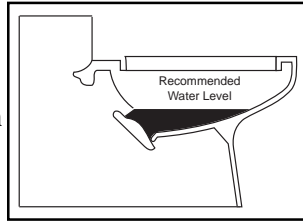
Remote Models - Connect incoming water from a stop to Microflush Hose Barb on the Remote Valve Assembly. Connect the water line from Remote Valve Assembly to the Flush Rim Spud Assembly. Make sure WATER IS OFF at angle stop.

START UP

1. Turn ON air supply at compressor.
2. Turn air ON at air shut-off cock (near but not connected to Flush Activator) to blow out airlines a few seconds. This procedure should remove any debris or contaminants from the airline. Turn OFF at shut-off valve.
3. Connect airline to Flush Activator. Make sure shut-off valve is installed next to Flush Activator not over-tighten fittings.
4. Turn ON air shut-off cock. Check total installation for air leaks using soapy water.
5. Turn ON water. Check for water leaks.
6. Flush your Microflush toilet four times, waiting twenty seconds between flushes to get water through system and operating regularly. To flush properly hold down Flush Activator Handle or Button until flapper opens.

DOUBLE CHECK

1. Air pressure at Microflush toilet is at least 60-65 PSI.
2. Water Pressure at Microflush toilet is between 20-50 PSI, 35 PSI optimal.
3. Water level in bowl should be at top edge of flapper opening.
4. If your Microflush does not operate correctly, refer to troubleshooting sections.



FLUSH CYCLE ACTIVATORS

There are two types of Flush Activators:

Standard - hold handle or button down for 1 second.

Positive - barely push handle or button to activate.

CLEANING BLEED-OFF PLUG ASSEMBLY

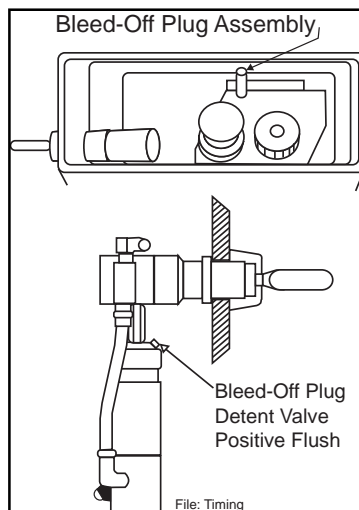
Standard Flush:

Remove plug and clean with solvent; air blow dry.

Positive Flush:

Remove plug and clean with solvent; air blow dry; remove and clean plug on Detent Valve.

Note: Use 5/32" or 4mm Allen wrench to remove plugs.



Note: Bleed-Off plugs on Air & Water Sequence Valves and Detent Valves are different sizes that are not interchangeable.

MAINTENANCE/CLEANING/CLEARING/WINTERIZING

ROUTINE MAINTENANCE

Your Microflush toilet has an air-operated Air/Water Sequence Valve which requires periodic lubrication with a silicone based lubricant.

USAGE	LUBRICATE
Light	Every 5 years
Medium	Every 2-3 years
Heavy	Every year

Check your application at right to determine how often to lubricate your Air/Water Sequence Valve. The Air Cylinder should be serviced if you have to take up your Microflush toilet for any reason. **The air system must be free of moisture. Drain air receiver regularly to remove moisture.**

CLEANING

Use Micro-Clean Organic Spray Cleaner, P/N 24542. **Sanitizers like Lysol, Pine-Sol, Hexol, ammonia base products, caustic drain openers or non-biodegradable cleaners should never be used if the plumbing system is connected to a Microphor Marine Sanitation Device.**

1. While depressing the Flush Activator, turn OFF the water. Allow the bowl cleaner to flow into the lower chamber. Keep the Flushing Activator depressed.
2. Insert bowl brush into lower chamber and agitate mixture carefully. Remove the bowl brush and release the flush activator.
3. Turn the water ON and flush twice to rinse thoroughly.

Use MicroScrub, P/N 24827, to clean the hopper.

1. Turn off water and depress flush activator.
2. Dispense 1/2 bottle of MicroScrub into the hopper.
3. Turn on water and allow MicroScrub to stay in the hopper as long as possible before flushing.

CLEARING YOUR MICROFLUSH TOILET

If your Microflush toilet becomes plugged, shut off the water supply, press the flush handle and hold. The flapper will remain open until flush handle is released. Check to see if the restriction can be removed from lower portion of Microflush toilet with a hooked wire, being careful not to damage the rubber seal on the flapper or the mating surface on the hopper. If obstruction cannot be picked out with a hook or tongs, use plunger by pushing in slowly and pulling out quickly to pull object back into the hopper. If necessary, turn air off and use a snake inserted through a short plastic pipe placed in hopper. Pipe will protect flapper seal. If valve will not operate with water off, hold flush lever down and turn water on and off quickly to free valve action. When the

passage becomes clear, turn on water and press flush handle to start flush cycle.

WINTERIZING (Out-of-Service Winter Storage)

Shut OFF water to Microflush toilet. Flush Microflush toilet three times or until water no longer flows into the bowl. Unhook water supply at angle stop. Empty water in line into receptacle. Shut OFF air supply to your Microflush toilet. The unit is now prepared for freezing temperatures. OPEN petcocks on drip legs and air receiver drain after shutting down air compressor and isolating airlines.

WARNINGS

- *Do not use any petroleum based lubricants (Vaseline) on any rubber parts or o-rings as damage will occur. Use only silicone based lubricants.*
- *Do not use any 'Loctite' brand adhesives on any plastic or Delrin components as fumes will cause damage.*
- *Do not use Teflon tape on any air fittings as clogging may occur.*

PATENTS

Microflush® Toilets are covered by one or more of the following U.S. patents: 5245710; 4918764; 1280554; 169471 and related foreign patents.

DESIGN CHANGES

Continuing a policy of research and development, Microphor reserves the right of price, product or design change without notice or obligation.

WANDERLODGE MAINTENANCE MANUAL

TROUBLESHOOTING

Your Microflush® toilet is designed to give you years of trouble-free operation. Please check the following before beginning any service or repair:

Water supply:

1. Is the water turned on?
2. Is the water pressure between 20 and 50 PSI at the toilet for pressure water system?

Fluctuating or high water pressure can cause intermittent problems with the toilet operation. Check the water pressure at different times of the day (i.e., early morning, noon, evening) to determine if you have fluctuating or high water pressure. A pressure-reducing valve installed on the incoming water line will assure you have even pressure. Make sure no check valve is installed before the Air/Water Sequence Valve.

*Note: Water seal of flapper does not require complete submersion as flapper seal gasket provides complete hopper seal.

Air system:

1. Is the air turned on?
2. Is the air pressure set at a constant 60-65 PSI at the toilet?
3. Do you have any air leaks or kinks in the air system?
4. Do you have water in the air system? This usually causes irregular timing.

Drain the compressor tank and check the filter regulator and drip leg(s) for water. To check for water in Air/Water Sequence Valve, remove Bleed Off Plug, put finger over screw opening and flush. If water is present, it will squirt from sides of valve body. If water is detected, then the air cylinder and airlines must also be drained.

Cycle time:

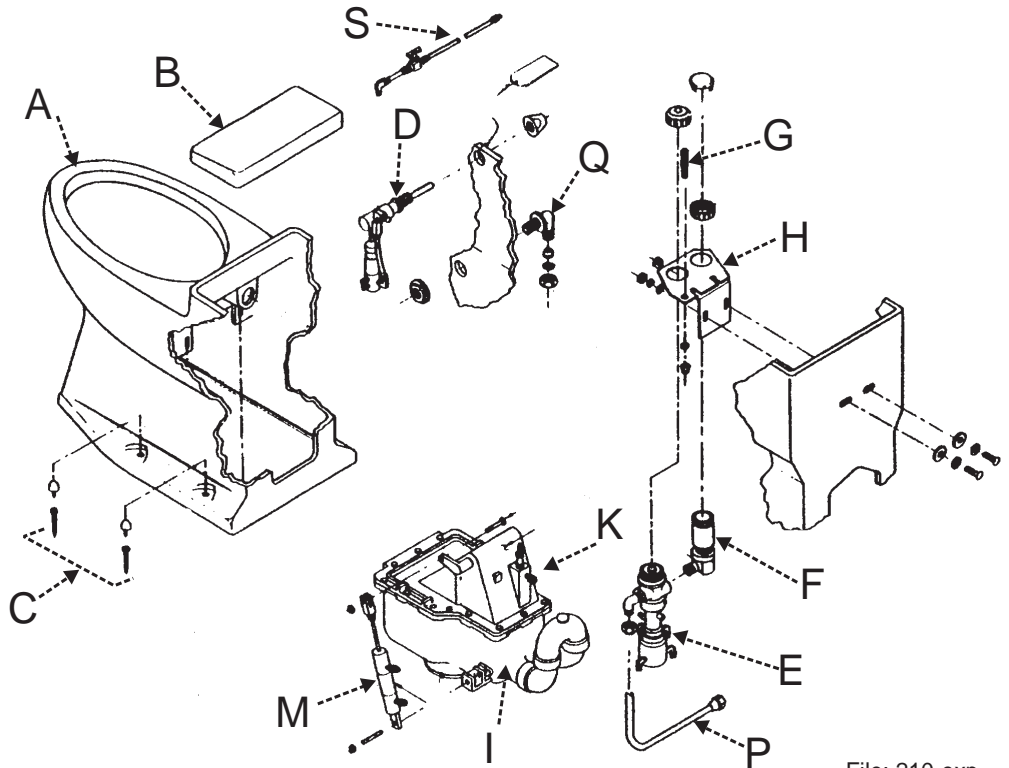
1. Is the flapper cycle time set correctly at 4-7 seconds?
2. Is the bleed off plug blocked? Remove, clean and reinstall or replace.

Trouble	Possible Causes	Correction
Flapper does not open. Water does not flow. Nothing happens.	1. No air supply to toilet 2. Water has accumulated in Air/Water Sequence Valve	1. Supply compressed air at 60-65 PSI at the toilet 2. See 'Check Air System' above
Flapper opens and closes 4-7 seconds after handle is released, but no water enters bowl	1. No water supply to toilet 2. Water turned off	1. Supply water at 20-50 PSI 2. Open angle stop (shut-off valve)
Flapper opens when flushed, and closes immediately when activator is released	1. Excessively high water pressure 2. Debris in check valve at base of Air/Water Sequence Valve	1. Install water pressure regulating valve, set at 20-50 PSI 2. Clean Air/Water Sequence Valve
Flapper opens and will not close	Bleed Off plug blocked	Remove, clean or replace, reinstall
Water continues to run when toilet is not in use	Foreign object is under water seal in Air/Water Sequence Valve	Clean, replace or rebuild Air/Water Sequence Valve
Water splashes when flushed	Water is too high in bowl	Reduce incoming water via angle stop (shut-off valve)
Flush cycle is too long	Bleed-Off Plug blocked	Remove, clean or replace, reinstall
Flush cycle is too short	Air line leakage	Check for air leakage at all connections

If other problems are encountered, please contact Microphor toll-free at 1-800-358-8280.

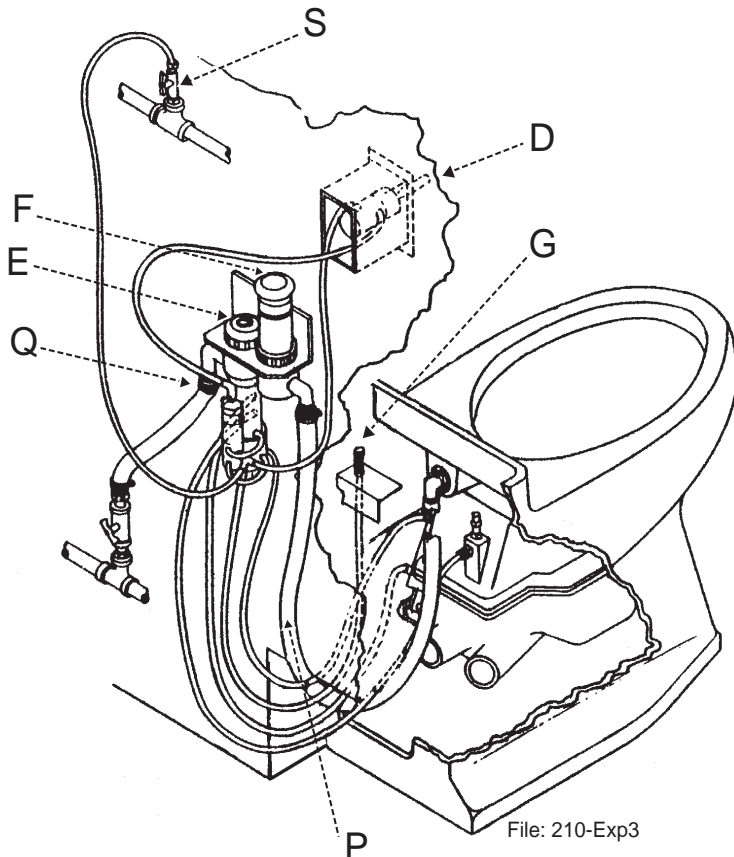
EXPLODED VIEWS

- A Toilet Shell
- B Toilet Lid
- C Closet Screws
- D Flush Activator
- E Air/Water Seq. Valve
- F Vacuum Breaker
- G Bleed Off Plug
- H Valve Bracket
- I Hopper Assembly
- J P-Trap, Rear Discharge
- K Hopper Bleed Valve
- L Hopper Screws
- M Air Cylinder
- N Flapper Assembly
- O Crank Assembly
- P Water Supply Tube
- Q Water Connection
- R Hopper Gasket
- S Air Supply Kit
- T Pressure Relief Valve



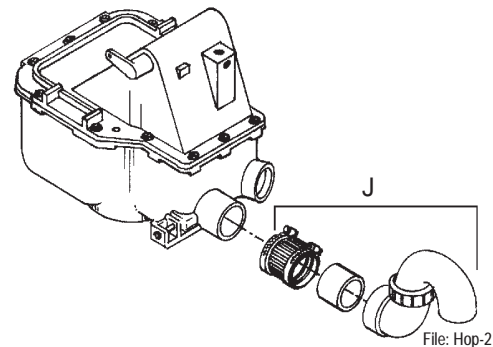
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Typical Remote Assembly



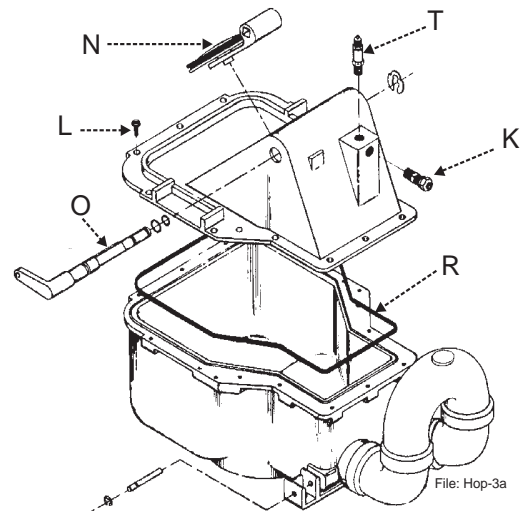
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Rear Discharge Hopper



File: Hop-2

Downward Discharge Hopper



File: Hop-3a

WANDERLODGE MAINTENANCE MANUAL

PARTS CHART

		LF-210 Round	LF-210 Elongated	LF-219 Round	
				Integral	Remote
A	Toilet Shell	White 93734	93732	93682	93683
	Biscuit	93734-3	93732-3	93682-3	93683-3
	Black	93734-5	93732-5	93682-5	93683-5
	Gray	93734-7	93732-7	93682-7	93683-7
B	Toilet Lid	White 94537		Not Applicable	
	Biscuit	94537-3			
	Black	94537-5			
	Gray	94537-7			
C	Closet Screws & Bolt Caps	White 93972			
	Biscuit	44370			
	Black	44369			
	Gray	44377			
D	Flush Activator	95002-Standard		95183-3 White	95152
		95054-Positive		95183-5 Biscuit	
				95183-7 Black	
				95183-11 Gray	
E	Air/Water Sequence Valve	39014			
F	Vacuum Breaker	39034		33421	39034
				Check valve	
G	Bleed-Off Assembly	94598			
H	Valve Bracket	94533		20137	20003
I	Hopper	90067-Rear Discharge		90057-Rear	90067-Rear
		90065-Down Discharge		90077-Down	90065-Down
J	P-Trap, Rear Discharge	96029-Rear			
		90008-Bottom			
K	Hopper Bleed Valve	37548			
L	Hopper Screws	00064 (14 ea.)			
M	Air Cylinder	94540			
N	Flapper Assembly	90048			
O	Crank Assembly	90042			
P	Water Supply Tube	96012		96012-7	39033
Q	Water Connection	96387		N/A	
R	Hopper Gasket	27272			
S	Air Supply Kit	93086			
T	Pressure Relief Valve	37518			

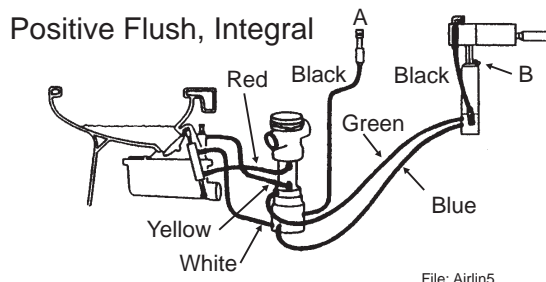
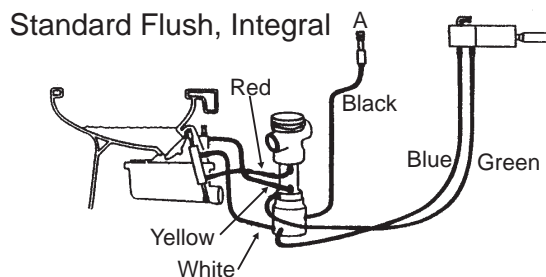
AIRLINE CONNECTIONS - SERVICE KITS - AIR/WATER SEQUENCE VALVE COMPONENTS

AIRLINE CONNECTIONS

From Air/Water Sequence Valve	To	Part Number
Red	Air Cylinder, bottom fitting	35383
White	Air Cylinder, top fitting	35385
Black	Bleed Off Plug	35419
Green	Flush Activator, front fitting	35381
Blue	Flush Activator, back fitting	35382
Yellow	Hopper	35384

SERVICE KITS

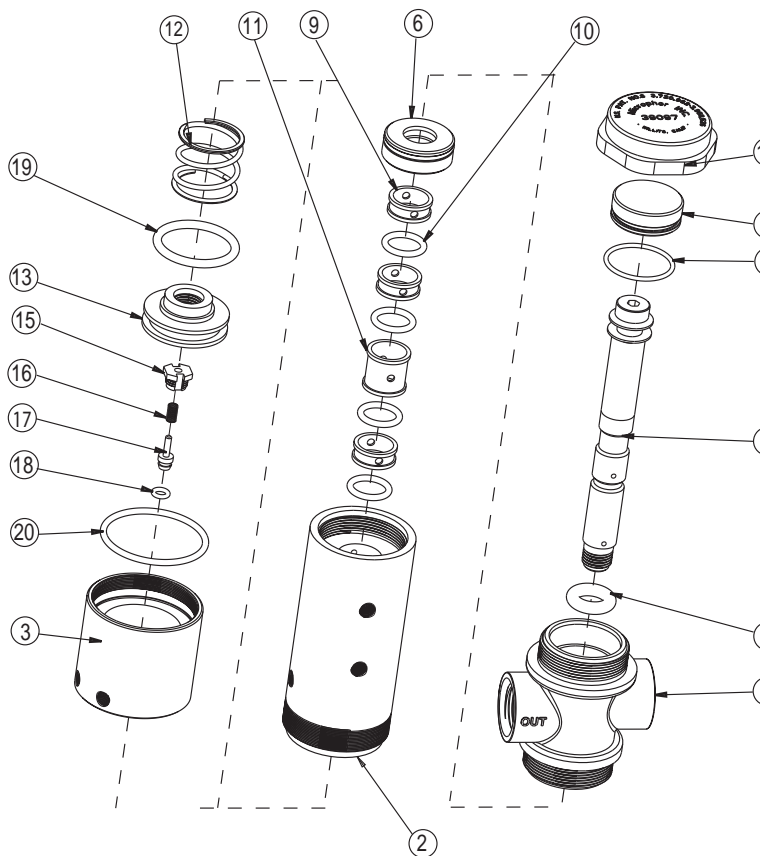
Description	Part Number
Master Service Kit	93100
Air/Water Sequence Valve	95187
Air Cylinder	94502
Flush Activator Pilot Valve (standard)	95020
Vacuum Breaker	95037
Positive Flush (Detent) Valve	95081
Flapper Replacement Kit	90066



File: Airlin5

AIR/WATER SEQUENCE VALVE COMPONENTS

	Part Number	Description
1	39389	Water Body, A/W Sequence Valve
2	39388	Body, Main Valve
3	39096	Cap, Machined Bottom
4	39099	Insert, Top
5	27214	O-Ring, 2-023
6	95173-3	Insert Assembly
7	39394	Main Spool
8	27242	O-Ring, 2-039
9	39061	Main Spool Separator
10	27250	O-Ring, 2-113
11	39062	Secondary Spool Separator
12	10888	Spring, SS
13	39510	Blind Cylinder Piston
14	39097	Thread Cap Nut
15	39088	Check Valve Nut
16	10886	Spring, Bronze
17	39087	Check Valve System
18	27251	O-Ring, 2-008
19	27253	O-Ring, 2-217
20	27244	O-Ring, 2-130
21	26013	Lubricant, O-Ring



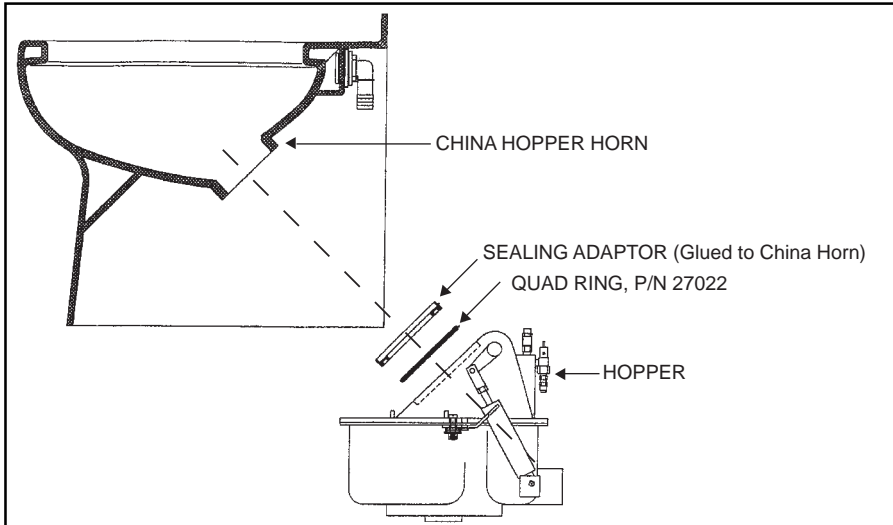
Items in **bold** are included in the Air/Water Sequence Valve Kit.

WANDERLODGE MAINTENANCE MANUAL

HOPPER REPLACEMENT

CAUTION: Read this entire procedure before beginning work!

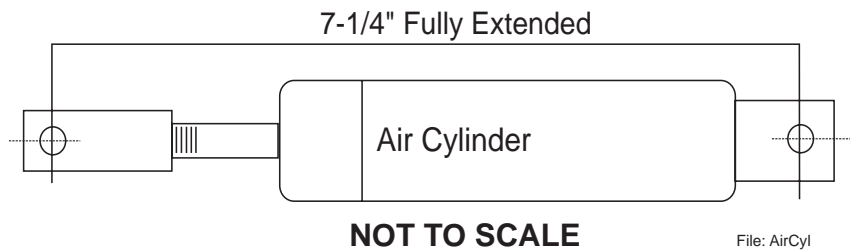
1. Remove toilet from floor. Place toilet upside down on a sheet of cardboard or other padded material.
2. Remove two (2) screws from either side of hopper and lift hopper from sealing adaptor.
3. Remove o-ring between hopper and seal adaptor. Check that o-ring is not damaged, replace if necessary.
4. Re-assemble in reverse order.



Note: The air cylinder on the hopper sub-assembly should be cleaned, lubricated and checked for adjustment whenever the toilet assembly is removed for servicing.

AIR CYLINDER ADJUSTMENT

1. Remove Hopper (see Hopper Replacement on page 9).
2. Remove the clevis pin retaining ring. Remove the clevis pin.
3. Inspect the crank arm, clevis and clevis pin for wear. Replace if required.
4. Hold the crank arm in the UP position (flapper closed).
5. Fully extend the air cylinder and note the position of the holes in the crank arm and the clevis.
The clevis hole should extend half its diameter past the crank arm hole.
6. Adjust as necessary by loosening the locknut and extend or retract the clevis as required.
7. Re-install Hopper.

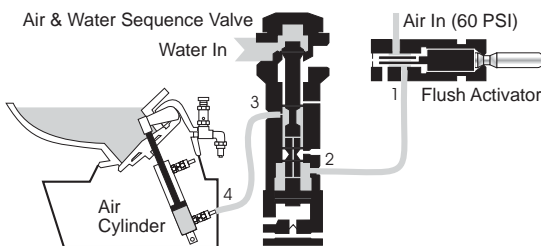


TO CHANGE FLAPPER GASKET:

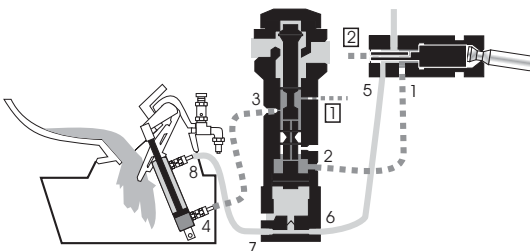
1. Turn water and air off.
2. Reach behind flapper to grasp gasket tails.
3. Pull tails out of slots to remove old gasket.
4. Installation is the reverse of removal.
5. Tails must be pulled all the way through to ensure smooth surface.

AIR/WATER SEQUENCE VALVE OPERATION

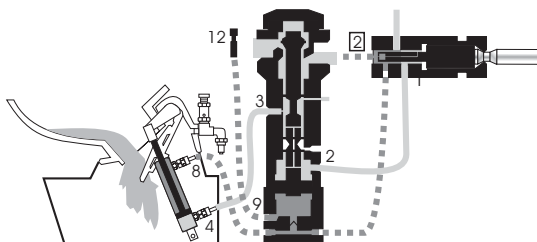
1. In the normal rest position, pressurized air enters the Flush Activator and goes from Flush Activator Port 1 (Green tube) to Air/Water Sequence Valve Port 2, through Port 3 (Red tube) to Air Cylinder Port 4 holding the Flapper closed, sealing the water in the bowl and maintaining a proper water surface area.



2. When the Flush Activator is pressed, air is shifted to Port 5 (Blue Tube) to A/W-Seq. Valve Port 6 and on to Air Cylinder Port 8 (White Tube). The air in the base of the Air Cylinder is bled off through Port 4 (Red Tube) to Port 3 and out Vent [1], allowing the Air Cylinder to retract, opening the Flapper. Simultaneously, pressurized air in the base of the A/W-Seq. Valve pushes the piston and spool assembly up to open the water passage, allowing water to enter and rinse the bowl. The air on the top of the piston is bled off through Port 1 and out Vent [2].



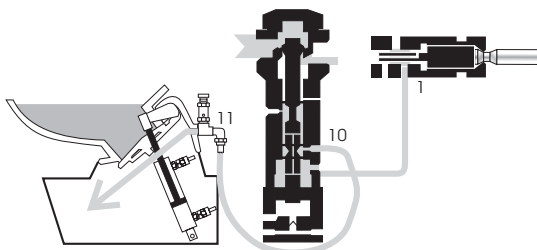
3. As the Flush Lever is released, the Flush Activator returns to the normal rest position redirecting pressurized air to Port 2, Port 3 and Port 4. The Bleed-Off Plug [12] bleeds off the air (Black Tube) under the piston, causing the spool to move downward, gradually closing the water passageway. The air having been bled off the top of the Air Cylinder Port 8 (White Tube) through the end of the Flush Activator Vent [2] (Blue Tube), allows the Air Cylinder to close the Flapper allowing water to accumulate in the bowl, restoring a proper water surface area.



4. Near the bottom of the piston stroke, the air passageway from Port 10 (Yellow Tube) to the Hopper Port 11 is unblocked for 4-11 seconds to pressurize the hopper and expel the waste contents over the trap and into the waste line.

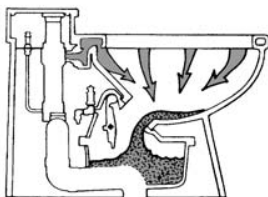
5. As the A/W-Seq. Spool reaches the bottom position, the water supply is shut off, completing the flush cycle.

In the event of air supply failure, the spring in the Air/Water Sequence Valve maintains the valve in the closed position, blocking the water passageway. The flapper will open and allow water in the bowl to flow into the hopper forming a water seal.

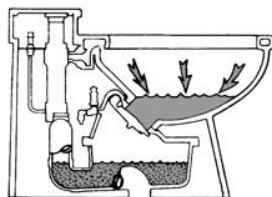


BASIC TOILET OPERATION

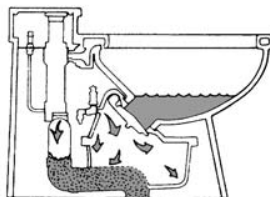
File: AWS-bw



When the flush activator is pressed the flapper opens, allowing wastewater to flow into the hopper. Clean water enters the bowl from the rim to thoroughly wash the bowl.



After 4-8 seconds, the flapper closes. Clean water continues to flow into the bowl where it remains until the next flush.



When the flapper has closed, compressed air enters the hopper, pushing the waste over the trap and into the wasteline.

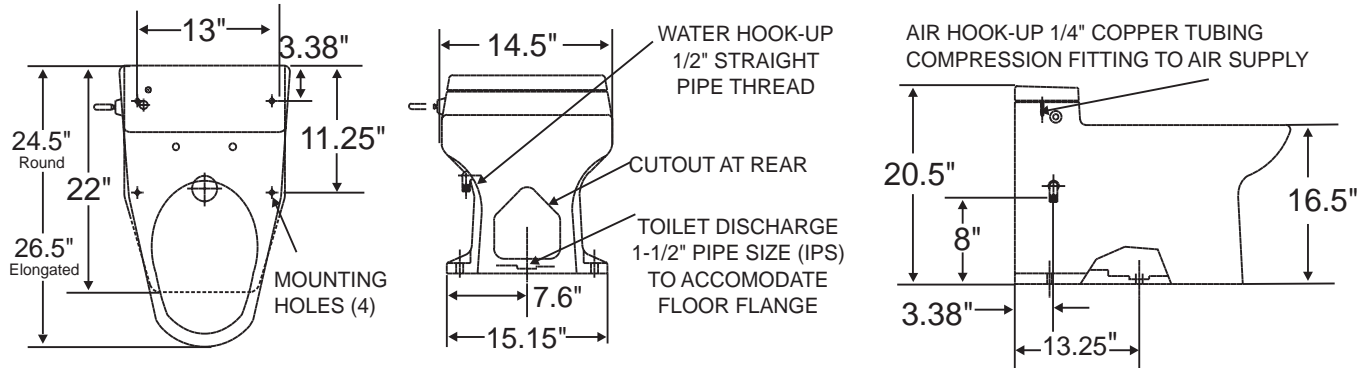
File: 210-op

WANDERLODGE MAINTENANCE MANUAL

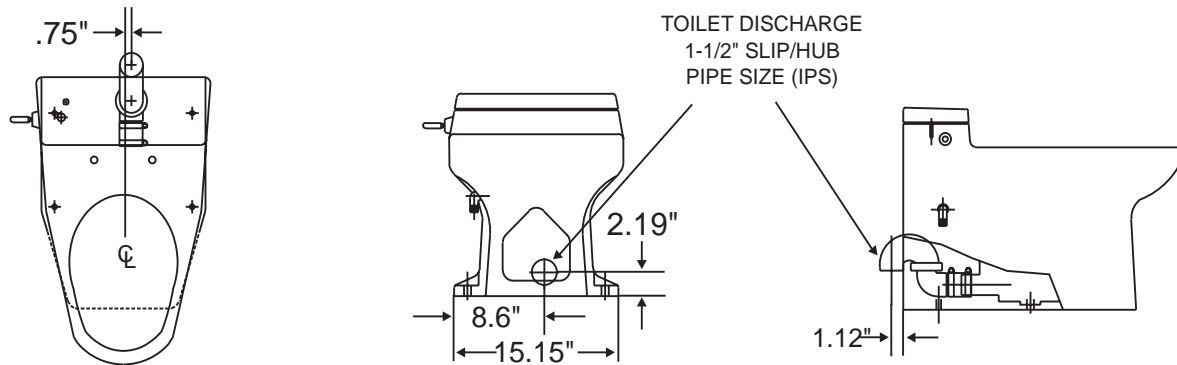
LF-210 ROUGH-IN DIMENSIONS

NOTE: All dimensions may vary 1/2" ±

Downward Discharge

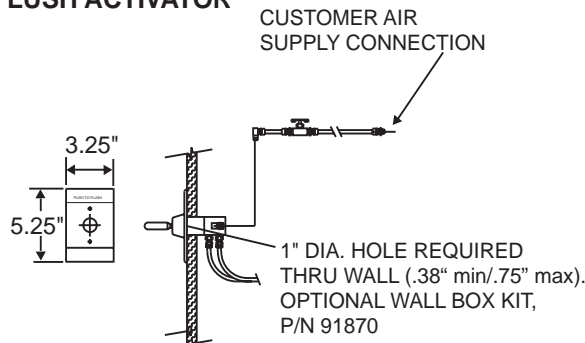


Rear Discharge

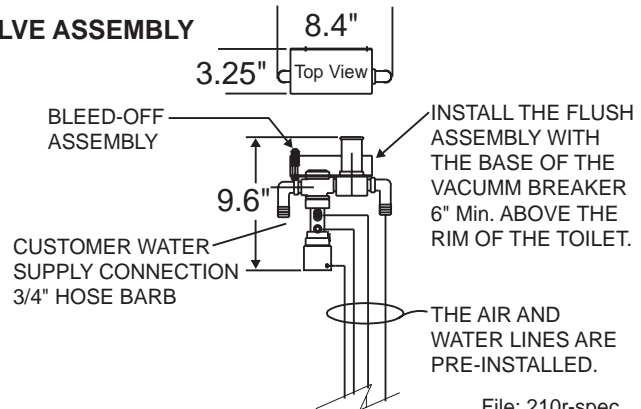


Remote Flush Rough-In

FLUSH ACTIVATOR



VALVE ASSEMBLY



File: 210r-spec

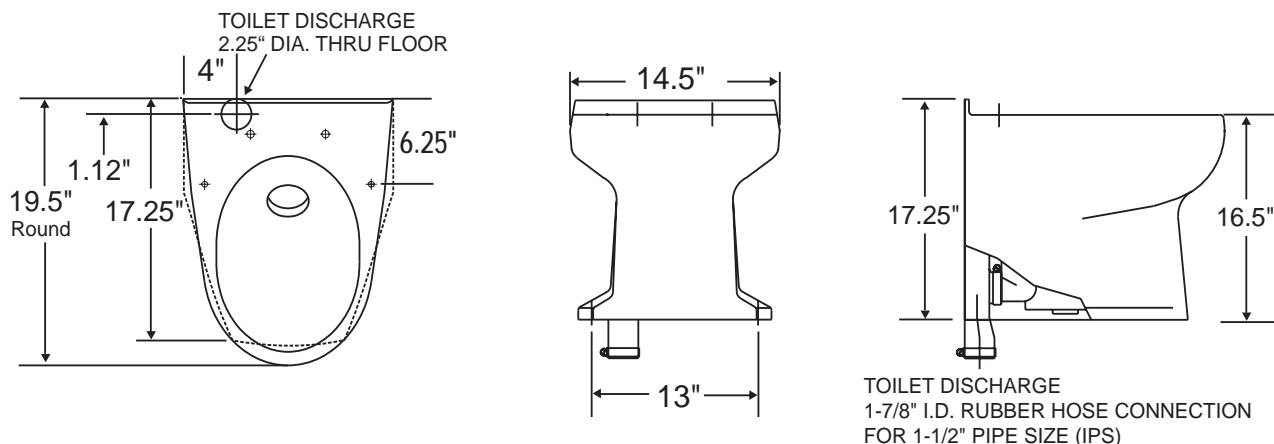
THE MAXIMUM WATER LINE DISTANCE BETWEEN THE TOILET AND THE REMOTE FLUSH ASSY IS SIX (6) FEET.

LF-219 ROUGH-IN DIMENSIONS

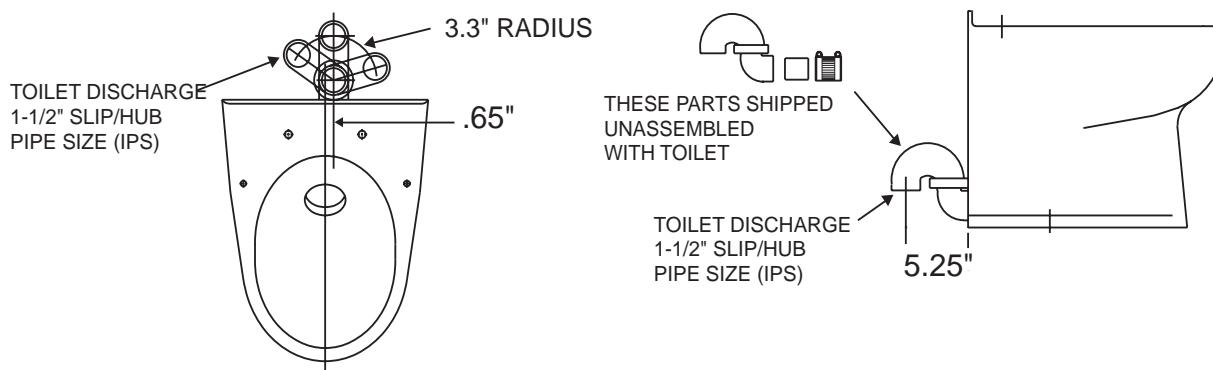
NOTE: All dimensions may vary 1/2"

NOTE: Do NOT use P-Trap in vertical rise waste line applications.

Downward Discharge

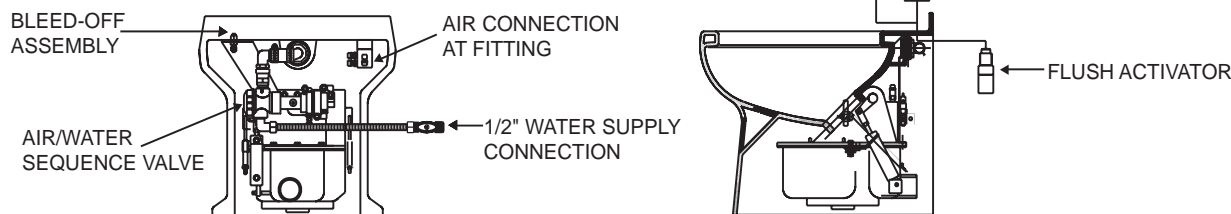


Rear Discharge



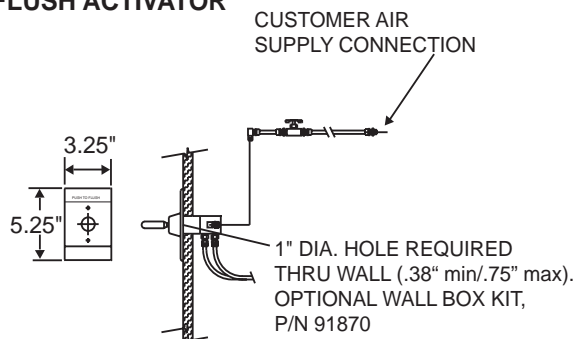
Integral Flush

Integral Check Valve - No Vacuum Breaker - Check Local Code for Approval.

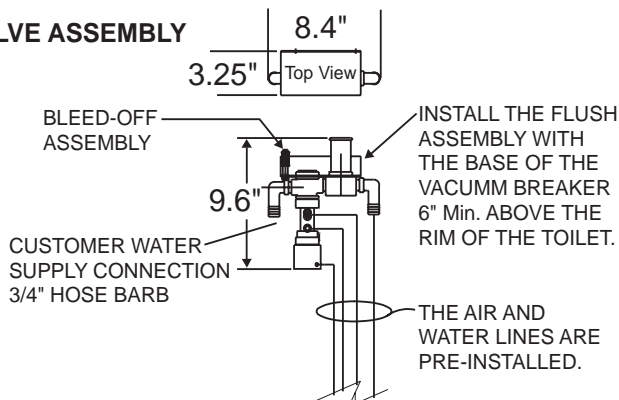


Remote Flush Rough-In

FLUSH ACTIVATOR



VALVE ASSEMBLY



THE MAXIMUM WATER LINE DISTANCE BETWEEN THE TOILET AND THE REMOTE FLUSH ASSY IS SIX (6) FEET.

File: 219-Spec

WANDERLODGE MAINTENANCE MANUAL

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