Operators Manual

Operation, Maintenance and Service Instructions

ECO System
For EcoloAir Units

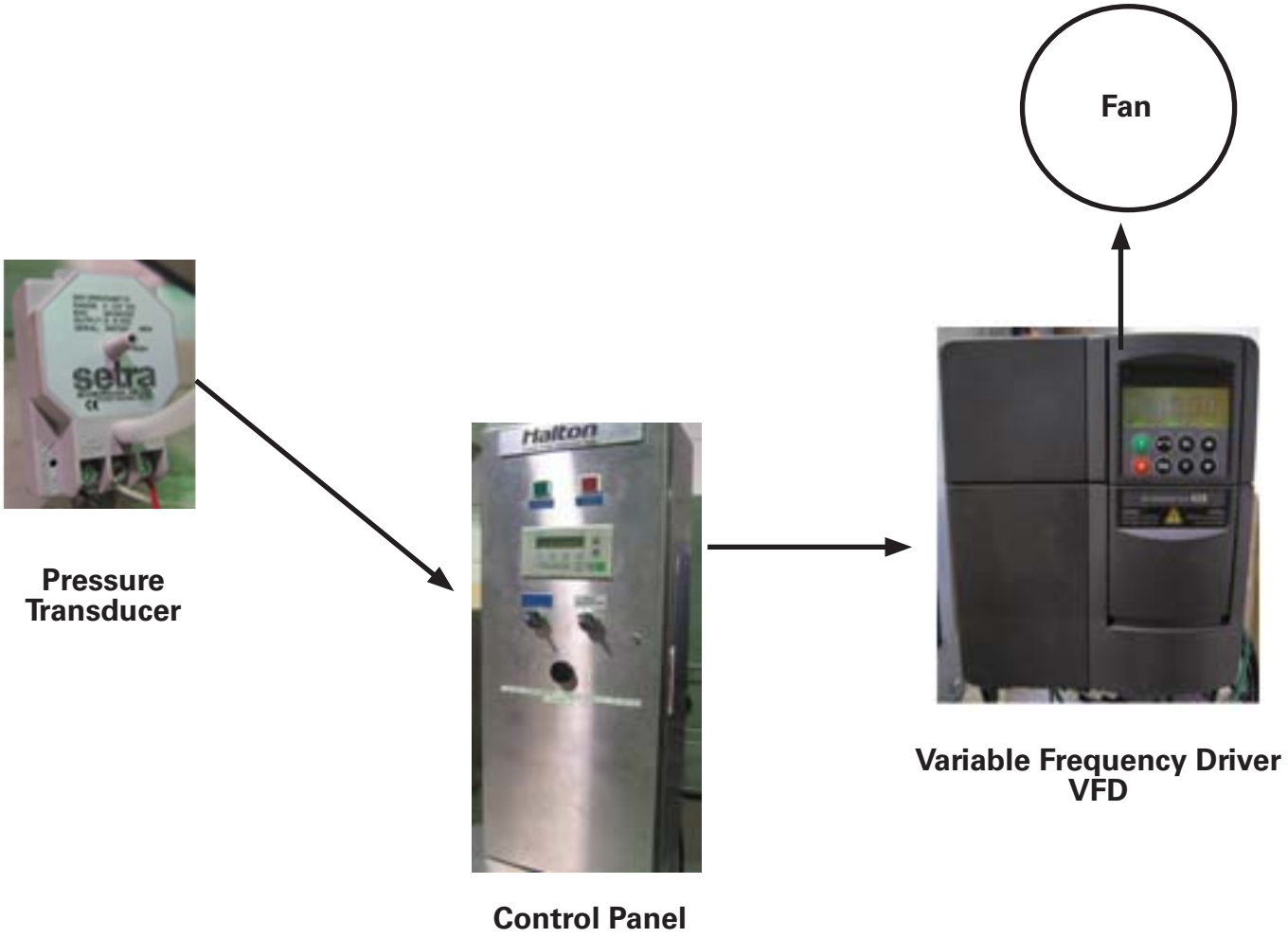
Halton
CARE FOR INDOOR AIR

GENERAL INFORMATION

The ECO system is designed to be installed as on option on ventilation systems equipped with Ecoloair filtrations system. It monitors the pressure in a hood and accordingly adjusts the exhaust fan speed to maintain constant air flow in the system regardless of filters condition. Significant energy savings are achieved by maintaining the air flow at design level without the need of over exhausting conditioned air from the kitchen when filters are clean.

MAJOR COMPONENTS OF THE ECO SYSTEM

- **Pressure transducer** – mounted on a hood, provides real time pressure signal sent to microprocessor (PLC) in control panel.
- **Control panel with PLC** – The PLC analyzes the pressure signal from the transducer by comparing it with the preset value and based on the results controls the speed of exhaust fan.
- **Variable Frequency Drive (VFD)** – controls the speed of the exhaust fan to maintain constant air flow in the system regardless of filters condition. The VFD type and size is individually selected for each exhaust fan.



Halton CARE FOR INDOOR AIR

ECOSYS/012009/rev1/EN

FIELD CONNECTION

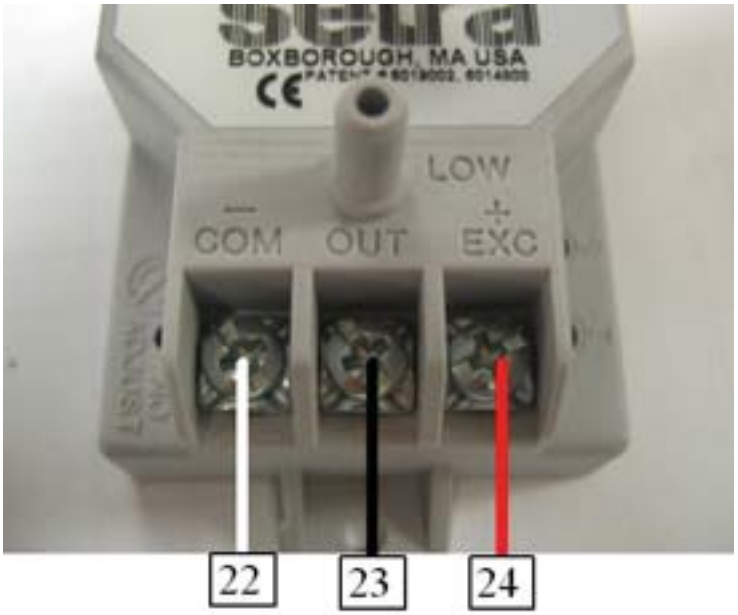
Read carefully all warnings and instructions before proceeding with wiring!

WARNING!
The inverter must always be grounded. If the inverter is not grounded correctly, extremely dangerous conditions may arise within the inverter, which could prove potentially fatal.

- To ensure the safe operation of the equipment, it must be installed and commissioned by qualified personnel in full compliance with the warnings laid down in these operating instructions.
- Take particular note of the general and regional installation and safety regulations regarding work on dangerous voltage installations (e.g. EN 50178), as well as the relevant regulations regarding the correct use of tools and personal protective gear.
- Never use high voltage insulation test equipment on cables connected to the inverter.
- The mains input, DC and motor terminals, can carry dangerous voltages even if the inverter is inoperative; wait 5 minutes to allow the unit to discharge after switching off before carrying out any installation work.

CAUTION
- The control, power supply and motor leads must be laid separately. Do not feed them through the same cable conduit/trunking.

a. Pressure Transducer Connection.
The pressure transducer is mounted in a junction box on the hood closest to the control panel. Three terminals of the transducer have to be connected to terminal blocks in the Ecoloair control panel with a shielded cable BELDEN Mod.8772



Transducer terminal "-COM" connected to terminal 22 in control panel with WHITE wire.
Transducer terminal "OUT" connected to terminal 23 in control panel with BLACK wire.
Transducer terminal "+EXC" connected to terminal 24 in control panel with RED wire.

b. Power and exhaust fan motor connections.

The pressure transducer is mounted in a junction box on the hood closest to the control panel. Three terminals of the transducer have to be connected to terminal blocks in the Ecoloair control panel with a shielded cable BELDEN Mod.8772

WARNING

The inverter must always be grounded.

- Isolate the mains electrical supply before making or changing connections to the unit.
- Ensure that the motor is configured for the correct supply voltage: single / three-phase 230 V MICROMASTERS must not be connected to a 400 V three-phase supply.

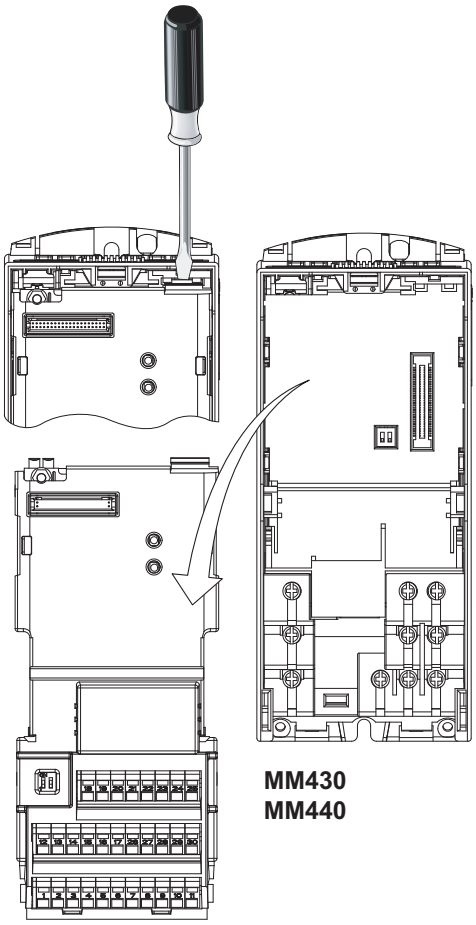
CAUTION

- After connecting the power and motor cables to the proper terminals, make sure that the covers have been replaced properly before supplying power to the unit!
- The control, power supply and motor leads must be laid separately. Do not feed them through the same cable conduit/trunking.
- Make sure that any control equipment (such as a PLC) connected to the inverter is connected to the same ground or star point as the inverter via a short thick link.

Power for the exhaust fan motor has to be connected to terminals L1, L2 and L3 in the VFD compartment. If the VFD compartment is attached to the fan cabinet, the output terminals U, V, W are factory pre wired to the fan motor terminals. For remote location of the VFD compartment the output terminals U, V and W have to be wired to fan motor terminals with cable sized according to electrical codes. For access to the power and control terminals of the VFD refer to the next pages.

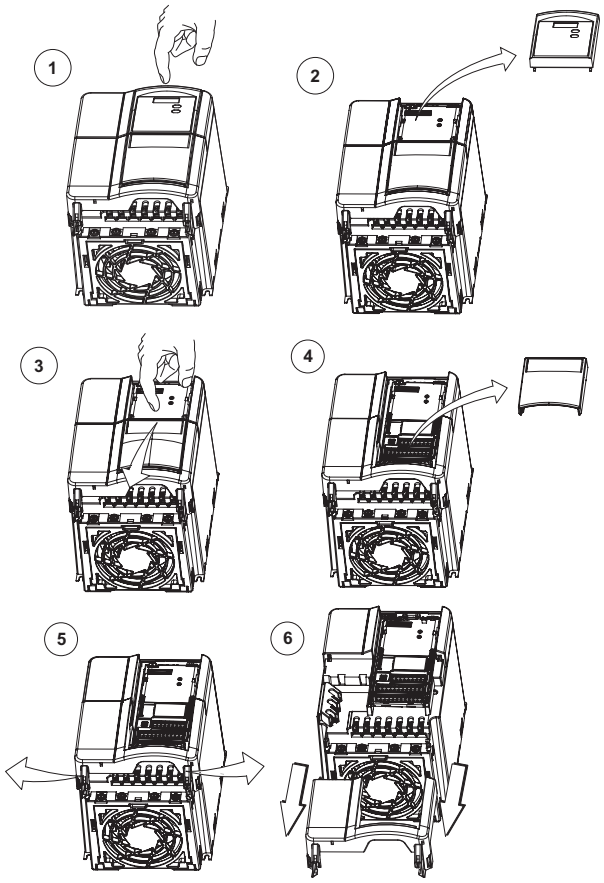
Connecting Power Terminals

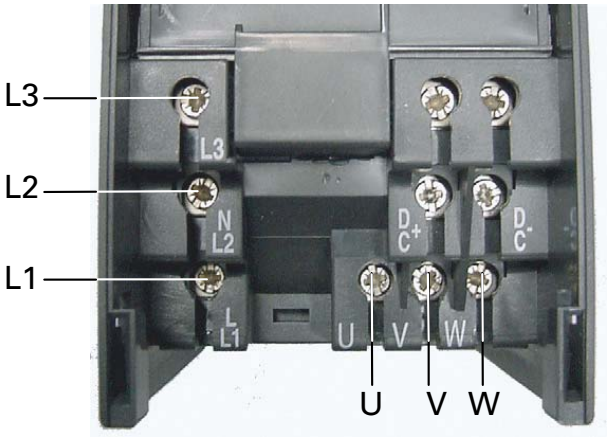
Frame Size A

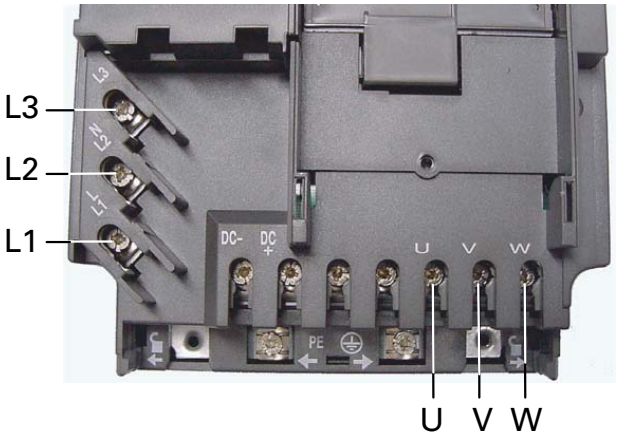


MM430
MM440

Frame Size B, C

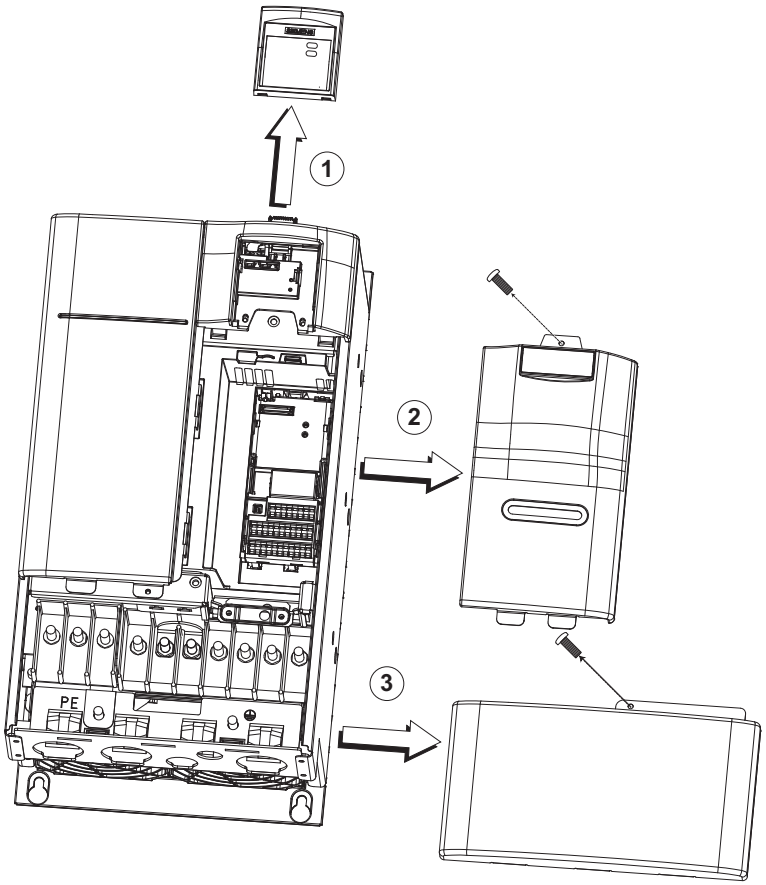




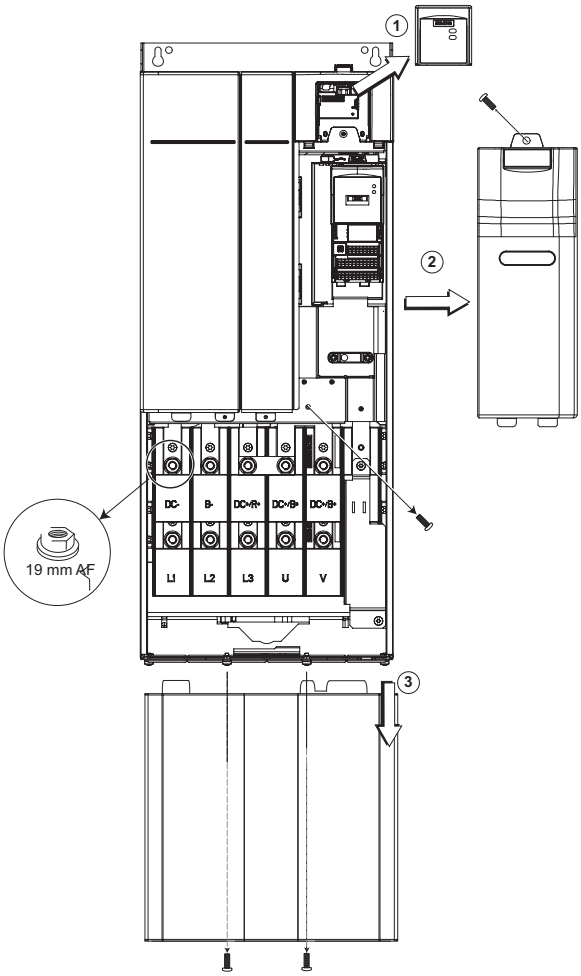


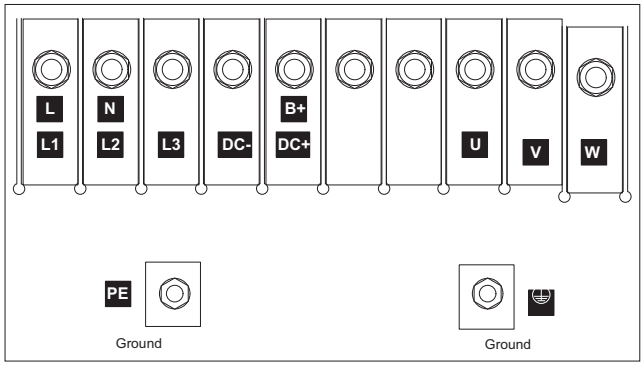
MICROMASTER 420/430/440, Getting Started Guide 07/05

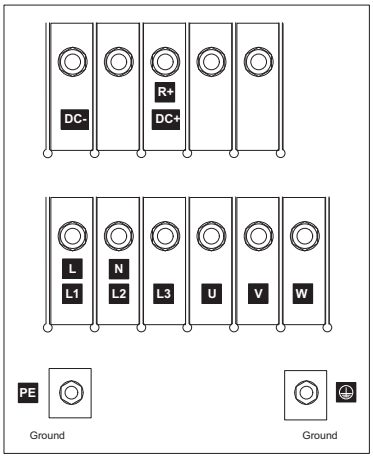
Frame Sizes D, E



Frame Size F







MICROMASTER 420/430/440, Getting Started Guide 07/05

Halton
CARE FOR INDOOR AIR

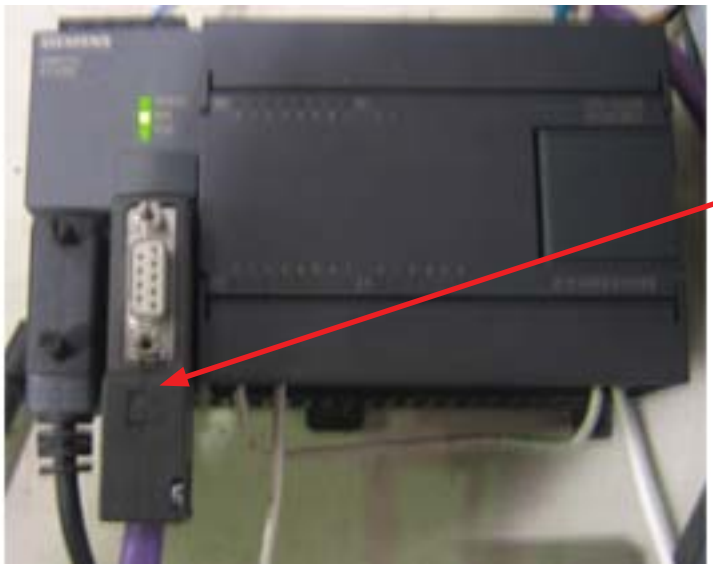
ECOSYS/012009/rev1/EN

c. PLC to VFD communication.

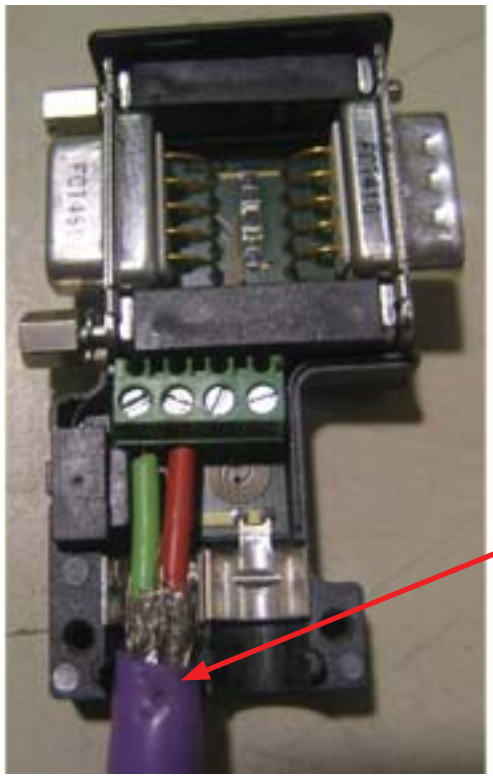
CAUTION

- Make sure that the PLC in control panel connected to the inverter is connected to the same ground or star point as the inverter via a short thick link.

The communication terminals of the VFD have to be connected to the PLC in Ecoloair control panel with Profibus cable. One end of the cable plugs into the serial port 0 on the PLC.



Profibus connector plugged into port 0 of the PLC.



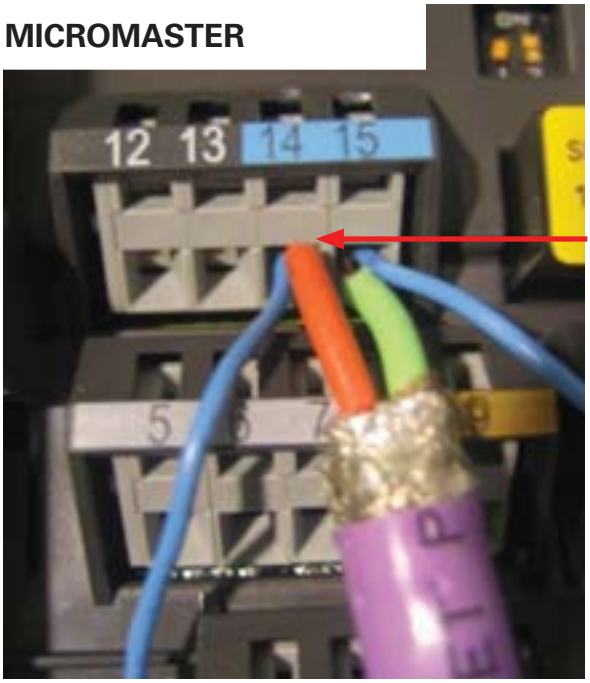
Profibus Connector

Shield

Two wires on the other end of the Profibus cable (green and red) are connected to RS-485 terminals of the VFD unit.

- If your system is equipped with VFD Micromaster 420, the red wire connects to terminal 14 and the green wire to terminal 15. See picture below.

MICROMASTER



Profibus cable connected to VFD communication

- For MICROMASER 440 VFD the RS485 terminals are 29 for red wire and 30 for green wire.

MICROMASTER 440

Halton CARE FOR INDOOR AIR

ECOSYS/012009/rev1/EN

COMMISSIONING

a. Temporary disconnect the pressure switch P4 in Ecology Filter Cabinet. To avoid "Filter overall" alarm during the commissioning process, the pressure switch P4 in Ecology filter cabinet unit has to be disconnected. It can be done by either disconnecting one of two wires directly from the pressure switch P4 terminals or the filed wire from terminal number 15 in the Ecology control panel.

b. Turn system ON. After all connections are made turn the system ON by turning the ON/OFF switch on the control panel to ON position, the exhaust fan starts. At this point make sure the fan is rotating in the right direction. Reverse any two lines of the power supply cable between terminals U, V, W or the VFD drive and the motor terminals if the direction of rotation has to be changed.

c. Air flow balancing. When the system is turned on for the very first time it runs at the factory preset value of airflow. The system has to be balanced to the design value of air flow by adjusting the speed of exhaust fan.

- Press the "SHIFT" button on the text display unit on the control panel. Letter "S" appears in the lower, right corner of the display.
- Press the "Ecolo Time OFF" push button once. Currently preset value of the set point is displayed (DC volts from the pressure transducer).
- Measure the air flow in the system and use the up ▲ and down ▼ arrow keys on the display unit to increase or decrease the air flow in the system to design value.
- Press ENTER to save the new set point. The system will maintain the new set value of airflow regardless of ecology filters condition.

d. Reconnect pressure switch P4 in Ecology filter cabinet.

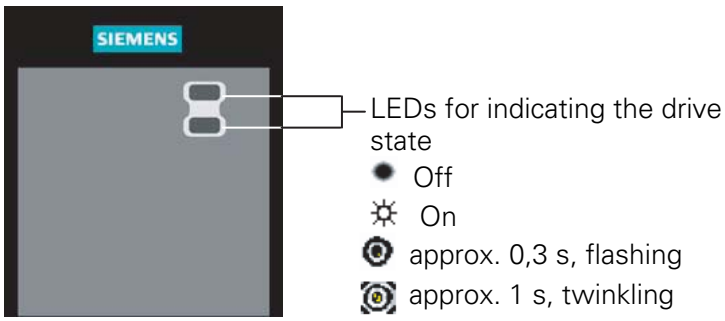
e. Refer to EcoloAir manual for pressure switches adjustment in the Ecology cabinet.

TROUBLESHOOTING

The VFD unit can be equipped with either two LEDs user interface Status Display Panel (SDP) or Basic Operator Panel (BOP) with LCD text display.

Using your type of user interface on the VFD unit, follow the guidance below to identify the problem.

a. SDP Interface.



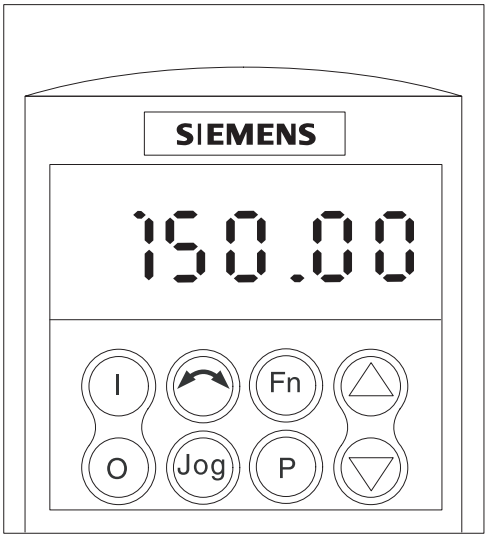
● ●	Mains not present
☼ ☼	Ready to run
● ☼	Inverter fault - other than the ones listed below
☼ ●	Inverter running
● ◎	Fault overcurrent
◎ ●	Fault overvoltage
◎ ☼	Fault motor overtemperature

☼ ◎	Fault inverter temperature
◎ ◎	Warning current limit - both LEDs twinkling **same time**
◎ ◎	Other warnings - both LEDs twinkling **alternatively**
◎ ◎	Undervoltage trip / undervoltage warning
◎ ◎	Drive is not in ready state
◎ ◎	ROM failure - Both LEDs flashing **same time**
◎ ◎	RAM failure - Both LEDs flashing **alternatively**

Halton CARE FOR INDOOR AIR

ECOSYS/012009/rev1/EN

a. BOP Interface.



Fault messages

In the event of a failure, the inverter switches off and a fault code appears on the display.
NOTE
To reset the fault code, one of three methods listed below can be used:
1. Cycle the power to the drive.

2. Press the Fn button on the BOP or AOP.

F0001 OverCurrent STOP II

Quit
Remove fault and reset fault memory by disconnecting the
- drive converter from the line supply and powering-up again
- Press the Fn key on the BOP or AOP

Cause
- Short circuit at the output
- Earth faults
- Excessively large motor

Diagnosis & Remedy
Check the following:
- Cable length limits must not be exceeded.
- Motor cable and motor must have no short-circuits or earth faults
- Motor parameters must match the motor in use
- Motor must not be obstructed or overloaded
- Increase the ramp time

F0002 Over Voltage STOP II
Quit
Refer to F0001

Cause
- DC-link voltage (r0026) exceeds the overvoltage threshold (refer to parameter r0026)
- Ground fault

Diagnosis & Remedy
Check the following:
- Supply voltage (P0210) must lie within limits indicated on rating plate .
- DC-link voltage controller must be enabled (P1240) and parameterized properly.
- Extend the deceleration ramps (ramp-down time P1121, P1135)
- Remove the ground fault

F0003 Under Voltage STOP II
Quit
Refer to F0001

Cause
- Main supply failed.
- Shock load outside specified limits.

Diagnosis & Remedy
Check the following:
- Supply voltage (P0210) must lie within limits indicated on rating plate.
- Supply must not be susceptible to temporary failures or voltage reductions.

F0004 Inverter Over Temperature STOP II
Quit
Refer to F0001

Cause
- Ventilation inadequate
- Ambient temperature is too high.
- Actual drive converter temperature r0037 exceeds the over temperature threshold (refer to P0292)

Diagnosis & Remedy
Check the following:
- Fan must turn when inverter is running
- Pulse frequency must be set to default value
- Ambient temperature could be higher than specified for the inverter
- Reduce the load and / or ensure adequate cooling

Additional meaning for frame sizes FX and GX:
- P949 = 1: Rectifier over temperature
- P949 = 2: Ambient over temperature
- P949 = 3: EBOX over temperature

F0005 Inverter I2T STOP II
Quit
Refer to F0001

Cause
- Inverter overloaded.
- Duty cycle too demanding.
- Motor power (P0307) exceeds inverter power capability (r0206).
- 100 % overload reached (refer to utilization r0036)

Diagnosis & Remedy
Check the following:
- Load duty cycle must lie within specified limits.
- Motor power (P0307) must match inverter power (r0206)

F0011 Motor Over Temperature STOP II
Quit
Refer to F0001

Cause
Motor overloaded

Diagnosis & Remedy
Check the following:
- Load duty cycle must be correct
- Motor nominal over temperatures (P0626-P0628) must be correct
- Motor temperature warning level (P0604) must match
- Voltage boost (increase) too high and / or frequency set point too low?
- Adapt the motor cooling to the application

F0020 Mains Phase Missing STOP II
Quit
Refer to F0001

Cause
Fault occurs if one of the three input phases are missed and the pulses are enabled and drive is loaded

Diagnosis & Remedy
check the input wiring of the mains phases

F0023 Output fault STOP II
Quit
Refer to F0001

Cause
One phase of output is disconnected

F0024 Rectifier Over Temperature STOP II
Quit
Refer to F0001

Cause
- Ventilation inadequate
- Fan inoperative
- Ambient temperature is too high.

Diagnosis & Remedy
Check the following:
- Fan must turn when inverter is running
- Pulse frequency must be set to default value
- Ambient temperature could be higher than specified for the inverter

F0030 Fan has failed STOP II
Quit
Refer to F0001

Cause
Fan no longer working

Diagnosis & Remedy
- Fault cannot be masked while options module (AOP or BOP) is connected.
- Need a new fan.

F0452 Belt Failure Detected STOP II
Quit
Refer to F0001

Cause
Load conditions on motor indicate belt failure or mechanical fault.

Diagnosis & Remedy
Check the following:
1. No breakage, seizure or obstruction of drive train.

Alarm Messages

A0501 Current Limit

Cause

- Motor power does not correspond to the inverter power
- Motor leads are too long
- Earth faults

Diagnosis & Remedy

Check the following:

- Motor power (P0307) must correspond to inverter power (r0206).
- Cable length limits must not be exceeded.
- Motor cable and motor must have no short-circuits or earth faults
- Motor parameters must match the motor in use
- Value of stator resistance (P0350) must be correct
- Motor must not be obstructed or overloaded
- Increase the ramp-up-time.
- Reduce the boost.

A0502 Overvoltage limit

Cause

Overvoltage limit is reached.

This warning is generated,

- if the dc-link controller is disabled (P1240 = 0).
- if pulses are enabled
- if actual dc voltage r0026 r1242.

Diagnosis & Remedy

If this warning is displayed permanently, check drive input voltage .

A0503 UnderVoltage Limit

Cause

- Main supply failed
- Main supply (P0210) and consequently DC-link voltage (r0026) below specified limit (refer to parameter r0026).

Overvoltage can be caused either by too high main supply voltage or if motor is in regenerative mode.

Diagnosis & Remedy

Check main supply voltage (P0210).

A0504 Inverter OverTemperature

Cause

Warning level of inverter heat-sink temperature (P0614) is exceeded, resulting in pulse frequency reduction and/or output frequency reduction (depending on parameterization in (P0610)

Diagnosis & Remedy

Check the following:

- Ambient temperature must lie within specified limits
- Load conditions and duty cycle must be appropriate

MORE TROUBLESHOOTING HINTS

With new filters installed in EcoloAir unit the exhaust fan runs at maximum speed.
Cause.

The PLC in Ecology control panel doesn't receive signal from pressure transducer.

Diagnosis & Remedy

Check the following.

1. Check if there is 24VDC present on the pressure transducer terminals "EXC +" and "COM –".
2. Check the DC voltage at terminals 22 and 23 in Ecology control panel. It should be the same as on terminals "COM –"and "OUT" on the pressure transducer.
3. Check if the tubing connected port "LOW" on pressure transducer is not disconnected or leaking.

HALTON LIMITED WARRANTY

Halton ("Manufacturer"). Warrants only to its direct purchasers and to no others, that all products manufactured by the Manufacturer shall be free from defect in materials and workmanship for a period of twelve (12) months from the date of the original installation and start-up or eighteen (18) months from date of shipment, whichever occurs first. All products sold but not manufactured by Manufacturer will be warranted for a period of twelve (12) months from date of shipment.

For products manufactured by the Manufacturer we agree to pay any reasonable labor costs necessary to repair or replace, at Manufacturers option, defective parts or materials for a period of twelve (12) months from date of original installation and start-up or eighteen (18) months from date of shipment, whichever occurs first. All labor costs subject hereto shall be performed during standard work hours at straight-time rates.

For products sold but not manufactured by the Manufacturer we agree to pay any reasonable labor costs necessary to repair or replace, at Manufacturers option, defective parts or materials for a period of (90) days from date of original installation and start-up or (12) months from date of shipment, whichever occurs first. All labor costs subject hereto shall be performed during standard work hours at straight-time rates.

Purchaser shall pay incurred premium labor charge, including overtime, weekends and holidays. Travel time, service charges, miscellaneous tools, material charges, and labor charges resulting from inaccessibility of equipment will not be paid by Manufacturer.

This LIMITED WARRANTY SHALL APPLY ONLY to products that have been installed and maintained in accordance with the installation and Care Instruction Manuals. Purchaser shall be solely responsible for adhering to the instructions and procedures set forth in the said instruction manuals.

This LIMITED WARRANTY SHALL NOT BE APPLICABLE to any damage or defect resulting from fire, flood, freezing or any Act of God, abuse, misuse, accident, neglect or failure to adhere to all instructions set forth in the installation and Care Instruction Manuals. Furthermore, this limited warranty shall not apply to any product that has been altered, unless such alteration has been approved in writing by a duly authorized representative of the manufacturer. In no event shall the manufacturer be liable for any loss, expense, personal injury or consequential damage, of any kind or character, as may result from a defect in material, and/or workmanship, however caused.

EXCEPT AS IS EXPRESSLY SET FORTH IN THIS LIMITED WARRANTY, MANUFACTURER MAKES NO WARRANTY OF MARKETABILITY FOR FITNESS OR ANY PARTICULAR PURPOSE. NEITHER DOES MANUFACTURER MAKE ANY WARRANTY, EXPRESSED OR IMPLIED, WITH RESPECT TO PRODUCTS SOLD BY MANUFACTURER OR AS TO THE USE THEREOF.

Halton Company
101 Industrial Drive, Scottsville, 42164 USA
Tel: 270-237-5600 Fax: 270-237-5700
Website address www.haltoncompany.com

Halton Indoor Climate Systems, Ltd.
1021 Brevik Place • Mississauga, ON L4W 3R7 CANADA
Tel: 905-624-0301 Fax: 905-624-0301
Website address www.haltoncanada.com

Halton
CARE FOR INDOOR AIR