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USER INSTRUCTION MANUAL

FOR

INTELLI-SASH

Rev.	Date	By	Description	ECO#
-	03/30/11	GH	Release	G173
A	06/20/13	RU	Updated description, diagrams, operation and changed smart sash & auto sash to Intelli-Sash.	H677
B	08/12/13	RU	Added optional footswitch and troubleshooting information.	H741
C	07/11/17	RU	Added LED blink code, replacement parts, Routine Service Operations, inspecting, and belt tensioning information.	K839

Labconco Intelli-Sash System Instructions

General operation: The Labconco Intelli-Sash system can open and close a fume hood sash automatically. The sash is opened based on the detection of a person by an occupancy sensor. The sash is closed depending on a time delay started after the occupancy sensor no longer detects anyone near the fume hood. As a safety feature sash sensors are provided on the bottom of the sash handle to detect obstructions and halt the downward travel of the sash. The open position for automatic operation is set in a calibration mode and is factory set to be 18". The Intelli-Sash has two operating modes, automatic **Up & Down** and automatic **Down Only.** The two operating modes are detailed below.

The **Up & Down** mode (set by switches on the Intelli-Sash control box) opens the sash when a person is detected by the Occupancy Sensor. The Occupancy Sensor detects a semi-circular area in front of the center of the fume hood. The width and depth of the detection area is adjustable. Once opened the sash stays open as long as a person is sensed in the detection area. Once a person leaves the detection area in front of the hood, the system will close the sash after a fixed time delay, based on switch "delay" settings on the control box. These delays can be 1, 3, 6, 10, 30, or 60 minutes (set by switches **S3** and **S4** on top of the Intelli-Sash control box). If no one is sensed in the detection area for the entire delay time, the sash will close. If someone is sensed during the time delay, the time delay is reset and will start over once no one is sensed in the detection area again. If someone is detected while the sash is moving downward the sash will stop and then reverse direction to the open position.

The **Down Only** mode will only close the sash when no person is sensed in the detection area –the operator must open the sash with the override switch or manually lift the sash. The sash closing operation is the same as for the **Up & Down** mode.

In all modes the user can move the sash by use of the override switch on the corner post, by use of an optional foot switch or by manually lifting the sash. The only exception is when using the override or foot switch to lower the sash and the sash sensors detect an obstruction. Also, if the sash is automatically closing and the sash sensors detect an object in the way of sash, the sash will stop at that point and await conditions to continue. Similarly, when the sash has gone up and stops for any reason, it will not try to go up again, but will await conditions for closing.

Note: When power is applied to the Intelli-Sash system (i.e. when it is first powered up, or by the Intelli-Sash on/off switch, or a power failure) the system waits 30 seconds to allow the sensor to stabilize and then beeps. After the beep the system waits for a person to be detected by the Occupancy Sensor and then moves the sash *slowly* to a fully OPEN position and then back down to the

working height. The system then returns to normal operation. As a result, after power up, please allow the system to complete it's initialization before using the hood – it should take about 45 seconds.

Specs for the Labconco Intelli-Sash System

General: The Labconco Intelli-Sash system consists of a sash drive to move the sash, an occupancy sensor to detect a person using the hood, sash-mounted "line-of-sight" sash sensors to detect obstructions, motor torque sensing components , a sash position sensor, and a control system.

Sash Drive: The sash drive system moves the sash up and down. The drive system is designed so that the override switch will "override" an automatic action and move the sash in the selected direction. The drive motor is a non-sparking type motor and no clutch is used.

Occupancy sensor: The occupancy sensor detects when a person is using the hood, in an area that is roughly semi-circular and is centered at the middle of the hood width. This sensor includes a mechanical focusing system, where the "sensed area" can be made smaller or larger, by retracting the sensor into a cone, and/or tilting the sensor forward or back and locking the position. The sensor itself can sense motion in a cone that is roughly 45 degrees in all directions.

"Line of sight" sash sensor system: The sash sensor system consists of sensors along the bottom of the sash at each end of the sash handle. This "line-of-sight" system can sense if objects are in the path of the closing sash, and the downward motion stopped by the controller. The sash sensors override all other operations.

Sash position sensing: A limit switch and encoder are used to indicate the exact position of the sash. This fail-safe system will not be affected by power loss or memory failure so the sash location is always known.

Motor Torque Sensing: The control system incorporates a "torque-overload" sensing system to deal with the case where the motor drive is trying to move the sash, and an obstruction is encountered. Under this condition the controller will shut off the drive motor.

Control System: The control system reads the occupancy sensor data, sash sensor data and the sash position data to control the movement of the sash according to the rules listed below.

1) If no one is present at the hood for a period of x minutes, (where x is set by the switches **S2** and **S3** discussed below), the controller will close the sash. If objects are in the way of a closing the sash, the “line-of-sight” sash sensor will detect the objects and the sash will stop.

2) If the hood is in **Up & Down** mode with the sash closed and a person walks up to the hood and is detected by the occupancy sensor, the sash will automatically move to the open position that was set during calibration mode.

3) If the hood is in **Up & Down** mode and the sash is automatically opening and the sash is stopped the sash will stay stopped for x minutes (where x is set by the switches **S2** and **S3** discussed below) and then close.

4) If the hood is in **Down Only** mode and the sash is automatically closing and the sash is stopped due to the sash sensors the sash will stay stopped.

5) If the hood is in **Up & Down** mode and the sash is automatically closing and the sash is stopped the sash will stay stopped until the occupancy sensor detects a person in the detection area which will cause the sash to open.

6) The override switch will override any function of the sash including those listed above except for a stoppage due to the sash sensors detecting an obstruction.

The system incorporates LED’s to indicate the operation of the occupancy sensing system and also the “line-of-sight” sash sensor system, to provide the user visual feedback as to the system status. A red LED on the occupancy sensor lights when the occupancy sensor detects someone’s presence. A green LED on the sash sensor lights when the sash is closing and there is no obstruction detected.

The controller is housed in a box on top of the hood on the right side. The control box has an On/Off switch (**POWER**) on the far left of the box. The **POWER** switch is marked with the international symbols for On = O and Off = I. The control box has 3 control switches (**S2, S3, S4**) to allow programming of various system parameters as described below. The picture below is of the label on the side of the control box which identifies the switches and indicates switch functions.

A RESET pushbutton switch is provided next to the occupancy sensor to allow the user to reset a system that they believe is not responding correctly. The operation after a reset is similar to after power is applied.

Switches and Controls on Intelli-Sash Models

The functions of the switches and controls on the control box are described below:

Switch S2: Calibrate, Delay X1, Delay X10:
This switch sets the Intelli-Sash into the Calibration mode or sets the time delay multiplication factor.

- **Calibrate** (along with **S4** set to **SET-UP)** will allow the user to set the sash open or working height. This sash location will be stored in memory for use in the Auto Up mode. This height needs to be set even if using the **Down Only** mode.
- **Delay X1** position selects normal delays as set directly by switch **S3**.
- **Delay X10** selects delays that will be 10 times those selected by switch **S3**.

Switch S3: 6 Min. Delay, 3 Min. Delay, 1 Min. Delay:
This switch selects the time delay before the sash closes. The setting of **S2** can extend this delay time by a factor of 10.

- **6 Min. Delay** sets a 6 minute delay before sash closing if **S2 = Delay X1**. Sets a 60 minute delay if **S2 = Delay X10**.
- **3 Min. Delay** sets a 3 minute delay before sash closing if **S2 = Delay X1**. Sets a 30 minute delay if **S2 = Delay X10**.
- **1 Min. Delay** sets a 1 minute delay before sash closing if **S2 = Delay X1**. Sets a 10 minute delay if **S2 = Delay X10**.

Switch S4: Down Only, Up & Down, Set-Up:
This switch selects the operating mode of the Intelli-Sash as "**Down Only**", "**Up & Down**", and "**Set-Up**".

- **Up & Down** mode moves the sash both up (when a person is detected by the overhead sensor) and down when no person is detected in the area for the delay time set by **S2** and **S3**.

- **Down Only** mode will close the sash as in the **Up & Down** mode but will not open the sash. The user will need to use the override switch to open the sash when in **Down Only** mode.
- **Set-Up** mode is used prior to entering Calibration mode to stop the sash from reacting to any sensor inputs.

Motor Optimizer: Rotary position setting:
This control can be rotated clockwise and counterclockwise through approximately 320 degrees. It is used to adjust the motor for the smoothest and quietest operation while maintaining sufficient torque to move the sash. This is factory set and normally does not require adjustment.

Switch POWER: ON/OFF:
This switch controls power to the Intelli-Sash system. This switch **DOES NOT** control electrical power to the lights, receptacles or blower of the fume hood.

INTELLI-SASH CALIBRATION in the field --- how to set the "working" or "open" height that the sash will go to when under Intelli-Sash control

Make sure the Intelli-Sash controller is powered Off (**POWER** switch off). Then, locate Switch **S4** on top of the Intelli-Sash control box and select **Set-Up** –this blocks the sash from moving due to other sensor inputs. Then, locate switch **S2** on top of the Intelli-Sash control box and set it to **Calibrate**. Set switch **S3** to the desired base time delay of **1 Min**, **3 Min** or **6 Min**. Turn the Intelli-Sash on by setting the **POWER** switch to **I**. When the unit is powered on with the Calibrate mode selected by switch **S2** the unit will automatically detect the full open position by raising the sash until the limit switch closes. Then the sash is automatically lowered to the previously set working height. The Intelli-Sash controller then waits for the sash to be positioned to the new working height. When no sash movement is detected the Intelli-Sash system will beep once per second for 15 seconds. The sash may be repositioned before the 15th beep and the timer function will start over again. At the end of the 15 seconds the beep changes to a steady tone indicating that the current sash position has been saved as the new working height. Now move switch **S2** on the Intelli-Sash control box from **Calibrate** to the **Delay X1** or **Delay X10** position and return switch **S4** to the **Up & Down** or **Down Only** position. Calibration is now complete and the unit is in normal operating mode.

In summary, to calibrate the "open" or "working" height of the sash:
1) Ensure unit is powered Off (**POWER** switch on control box in OFF [O] position).
2) Check that **Motor Optimizer** is at factory setting.
3) Move switch **S4** to **Set_Up**.
4) Move switch **S2** to **Calibrate**.
5) Move switch **S3** to desired delay time before automatic closure: **1 Min**, **3 Min**, or **6 Min**.

6) Move switch **POWER** to the on position.
7) After unit beeps (~30sec), activate the occupancy sensor. Sash will automatically move to the full open position and then down to the previously calibrated working height.
8) After the sash stops, adjust sash to desired open position using the manual override switch or manually move the sash. When the sash is stationary the unit will beep 15 times then switch to a steady tone. The 15 beeps indicate that the unit is about to set the current sash position as the "open" or "working" height and the steady tone indicates the sash position has been set.
9) At the steady tone set **S2** to **Delay X1** or **Delay X10** (**S3** delay times one or ten) for desired delay before automatic closure.
10) Move switch **S4** to the **Up & Down** or **Down Only** position to select the desired automatic sash movement.

Note: What the Intelli-Sash module does, when in Calibrate mode, is to store the sash position as the new working height of the sash for auto operation at the end of the 15 second beeping period when the sound changes to a steady tone.

Setting of Closure Time Delay

Setting of the sash closure time delay is determined by the operation of the lab. From the factory the Intelli-Sash is set to a default delay of 10 minutes. Setting too short of a delay may cause nuisance closings of the sash while too long of a delay may not result in the desired energy savings or protection. With long delay times the sash can always be closed by the manual override switch instead of waiting for the time delay to time out.

Occupancy Sensor adjustment

The Occupancy sensor is a Passive Infrared (PIR) type sensor and is located on the header panel in the top front of the hood. It has a barrel type fitting that can be used to focus the detection beam – screwing the barrel in widens the detection area, while unscrewing the barrel will narrow the detection. Also, the sensor is mounted on a moveable bracket that can be rotated either forward or backward to allow the center of the detection area to be moved. This sensor detects when a person is present in front of the hood, so a wider detection area that is aimed away from the hood will detect a person walking up to the hood from farther away, while a narrower detection area directed straight down will allow people to walk near the hood without being detected by the occupancy sensor. A narrow detection area centered close to the hood would be good for use when the hood is located in a narrow hallway, where side traffic might accidentally be detected by the sensor. A wider detection area aimed farther away from the hood would be good for early detection of the user in an area where there is little traffic.

Optional Footswitch

An optional Footswitch is available for the Intelli-Sash that when plugged into the system will duplicate the function of the manual override switch that is on the right hand corner post. The footswitch will allow a user to manually raise or lower the sash when it is inconvenient to use the manual override switch on the corner post. The footswitch plugs into a mating connector located behind the right corner panel and below the manual override switch. The footswitch can be ordered from your Labconco representative as part number 5243602.

Troubleshooting

PROBLEM	CAUSES	CORRECTIVE ACTION
Sash will not move up.	Unit not plugged in or turned on.	Verify that the Intelli-Sash controller is plugged in and the POWER switch is in the ON position.
	Circuit breaker tripped.	Verify that the Intelli-Sash controller circuit breaker(s) are not tripped. Verify main power circuit breaker is not tripped.
	Unit in DOWN ONLY mode.	Verify switch S4 is set to the UP & DOWN mode.
	Sash limit switch defective/wires loose.	Have sash limit switch function and wiring checked.
	Occupancy Sensor not working.	Verify that when the occupancy sensor is activated the red LED lights. Have wiring and sensor checked if LED does not light.
Sash will not move down.	Unit not plugged in or turned on.	Verify that the Intelli-Sash controller is plugged in and the POWER switch is in the ON position.
	Circuit breaker tripped.	Verify that the Intelli-Sash controller circuit breaker(s) are not tripped. Verify main power circuit breaker is not tripped.
	Occupancy Sensor tripped.	Wait for programmed time delay without tripping occupancy sensor.
	Sash sensors blocked.	Verify that the Sash Sensors are not blocked. Green LED on right sensor will light if an obstruction is sensed when in the down travel mode. Have sensors and wiring checked if LED is always on.

Sash does not stop moving down when encountering an obstruction.	Sash sensor defective, misaligned or wiring issue.	Have the sash sensors and wiring checked.
Occupancy sensor does not detect approaching user.	Occupancy sensor not adjusted correctly.	Increase Occupancy sensor sensitivity by rotating barrel counter clockwise or rotating sensor board outward towards sash.
Occupancy sensor detects too far away.	Occupancy sensor not adjusted correctly.	Decrease Occupancy sensor sensitivity by rotating barrel clockwise or rotating sensor board inward towards sash.
After power up, unit beeps and sash moves down.	Sash limit switch defective/wires loose.	Have sash limit switch function and wiring checked.
Unit emits a steady, loud tone from control box	Unit is in calibration mode.	Turn unit off and then perform calibration procedure.
Sash is not opening to correct height.	Calibration value changed.	Press reset button next to Occupancy Sensor. Follow power on procedure. If this does not correct the problem perform calibration procedure.
Unit is not responding correctly.		Press reset button next to Occupancy Sensor. Follow power on procedure.

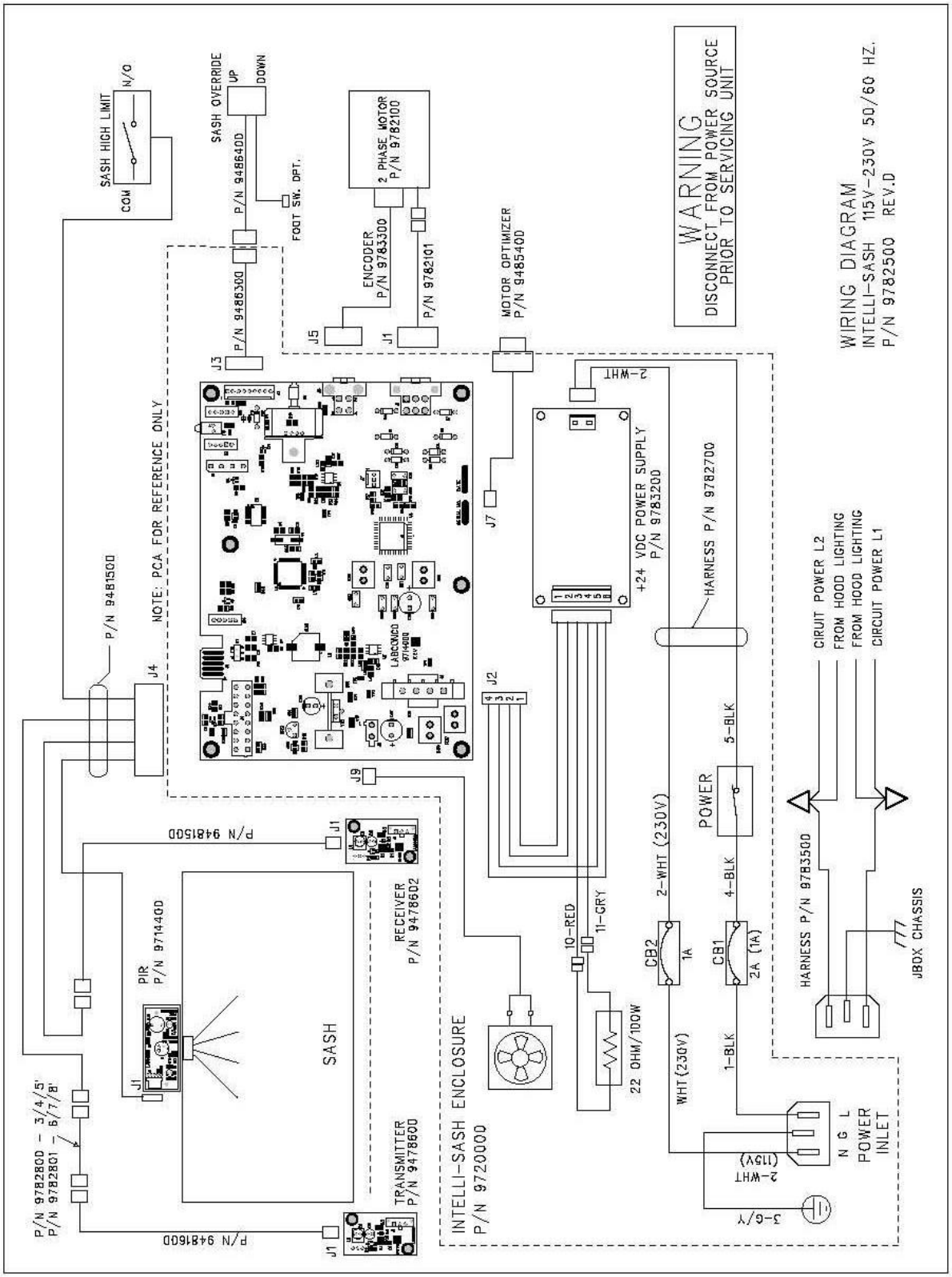
LED Debug Signal (located on front of Control Box)	
# of Flashes	Cause of Stoppage
2	Motor Stuck
3	Sash sensor beam blocked
4	Occupancy sensor detected motion
5	Manual override switch
6	Upper limit switch
7	Calibrated working height

Replacement Parts

9720000	Assembly, Control Box Intelli-sash, 115V
9720001	Assembly, Control Box Intelli-sash, 230V
9481600	Cable, Transmitter/Receiver side Intelli-sash (Koiled Kord)
9782100	Motor, Intelli-sash
9480800	Belt, Timing HTD 85 teeth
9478602	PCB Assembly, IR Receiver, Intelli-sash
9478600	PCB Assembly, IR Transmitter, Intelli-sash

Routine Service Operations

1. Inspect the Koiled Kord Cable 9481600 (Transmitter/Receiver) and the PCB Assemblies (IR Receiver/IR Transmitter) for possible wear annually. If needed, then replace.
2. Inspect the tension on the motor timing belt. If needed, readjust and tighten the belt by sliding the motor mounting plate.


WIRING DIAGRAM
INTELLI-SASH 115V-230V 50/60 HZ.
P/N 9782500 REV.D
WARNING
DISCONNECT FROM POWER SOURCE
PRIOR TO SERVICING UNIT
SASH HIGH LIMIT
N/O
COM
SASH OVERRIDE
UP
DOWN
FOOT SW. OPT.
P/N 9486400
P/N 9486300
2 PHASE MOTOR
P/N 9782100
ENCODER
P/N 9783300
P/N 9782101
J5
J1
J3
MOTOR OPTIMIZER
P/N 9485400
NOTE: PCA FOR REFERENCE ONLY
P/N 9481500
J4
J7
2-WHT
+24 VDC POWER SUPPLY
P/N 9783200
HARNESS P/N 9782700
J2
J9
CIRUIT POWER L2
FROM HOOD LIGHTING
FROM HOOD LIGHTING
CIRCUIT POWER L1
P/N 9481500
J1
RECEIVER
P/N 9478602
PIR
P/N 9714400
SASH
10-RED
11-GRY
2-WHT (230V)
POWER
5-BLK
4-BLK
CB2
1A
CB1
2A (1A)
HARNESS P/N 9783500
JBOX CHASSIS
22 OHM/10OW
WHT(230V)
1-BLK
2-WHT
(115V)
3-G/Y
N G L
POWER
INLET
P/N 9782800 - 3/4/5'
P/N 9782801 - 6/7/8'
P/N 9481600
TRANSMITTER
P/N 9478600
INTELLI-SASH ENCLOSURE
P/N 9720000