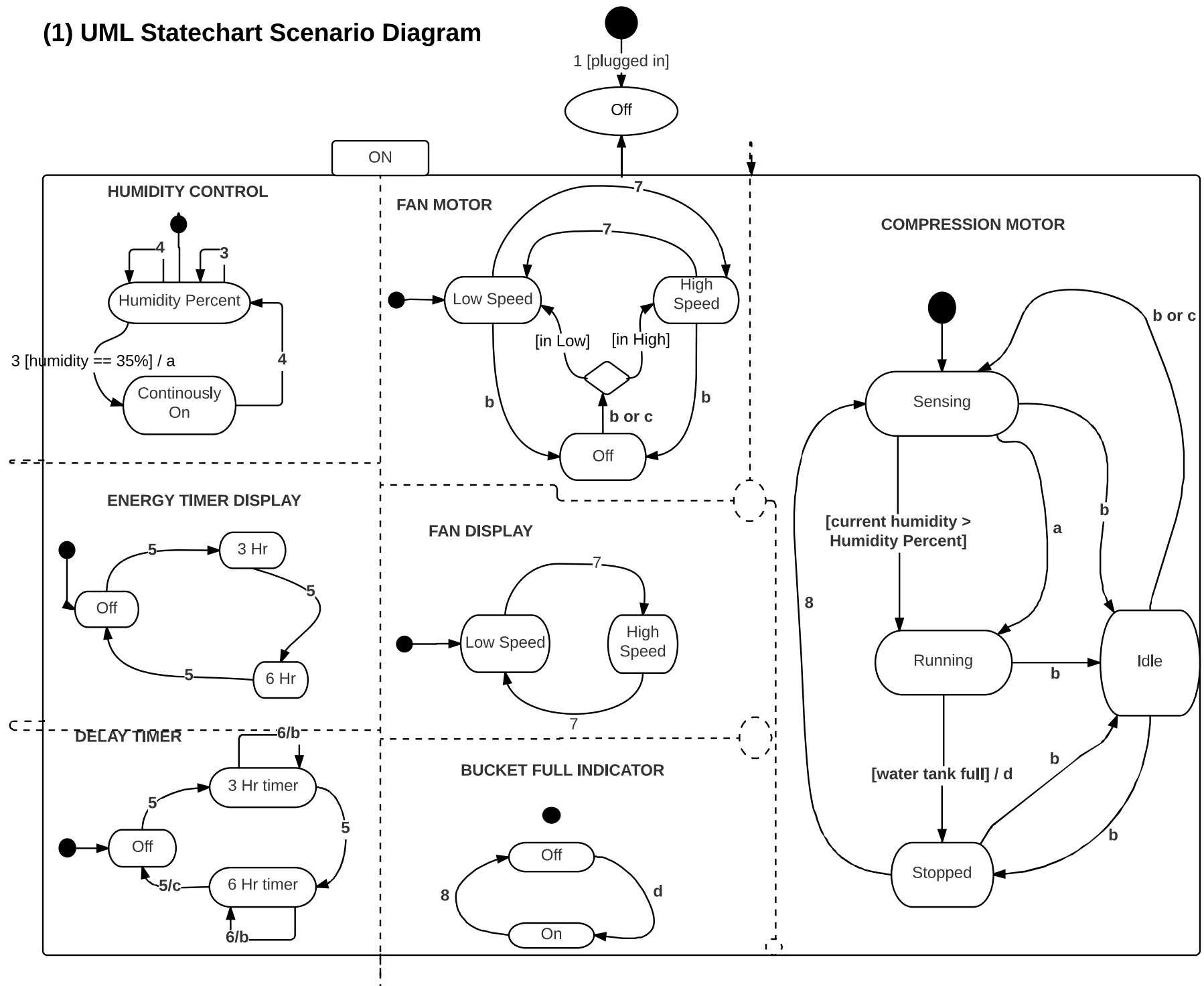


## (1) UML Statechart Scenario Diagram



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### **(1) UML Statechart Event Key**

- 1) Press power button
- 2) Unplug dehumidifier
- 3) Press humidity control down button
- 4) Press humidity control up button
- 5) Press energy timer button
- 6) Delay timer elapses
- 7) Press fan speed button
- 8) User empties water tank

### **Cascaded Events**

- a. Humidity control moves to continuously on state
- b. Delay Timer Elapsed
- c. Delay Timer turned off

## **(2) OCL Expressions Scenario**

### ***OCL Expressions***

1. If the shipping type for an order is “express”, then the order must be shipped within 48 hours of the date it is created.

```
context Orders inv:
If self.ShippingInfo.shippingType == "express" then
    dateCreated - dateShipped <= 48 hours
endif
```

2. If a customer creates an order that includes more than \$100 of merchandise, then they should receive free shipping for all of the included items.

```
context Customer inv:
let totalCost : Real = self.Order.OrderDetails.unitCost *
self.Order.OrderDetails.quantity
If totalCost > 100
    self.Order.ShippingInfo.shippingCost = 0
endif
```

3. Drones (represented by product IDs 50 through 99, inclusive) may not be shipped to Area 51 (represented by shipping region 19).

```
context Order inv:
If self.Order.OrderDetails.productId >= 50 and
self.Order.OrderDetails.productId <= 99
    self.Order.OrderDetails.ShippingInfo.shippingRegionId != 19
endif
```

### ***Interpretations***

1. context Orders inv: orders.dateShipped - orders.dateCreated >= 7  
days implies orders.shippingCost = 0

If the item takes longer than 7 days (a week) to reach the customer, then the cost of shipping is free.

2. context OrderDetails inv: orderDetails.calcPrice >=  
orderDetails.quantity \* orderDetails.unitPrice

The total calculated price of an order (may include taxes, shipping, and other costs) must be greater than its initial total cost (quantity of the product ordered times its unit price).