

Coffetek Brewer

Guidance Note for developers

Simplified Principle of Operation.

The Coffetek brewer can be thought of as a vertically oriented movable cylinder. This cylinder is referred to as the brew chamber. The cylinder can be moved so that its lower end is covered by a nylon filter belt. With the brew chamber positioned so that its lower end is in contact with the nylon filter, a mixture of ground coffee and hot water is dispensed into a mixing chamber connected to the top end of the movable cylinder by a flexible bellows. The mixture drains from the mixing chamber into the brew chamber through a mechanical valve arrangement.. After the appropriate time has elapsed to allow the mixture to enter the brew chamber the mechanical valve closes. An air pump then pressurizes the chamber to approximately .25 bar forcing the liquid through the nylon filter. The filtered coffee is then driven under pressure to a mixing system which aerates it giving the crema expected of a traditional espresso. From the mixing system the beverage is delivered to the cup. The brewer then rotates to clear the grout cake and return to its idle position.

Controls

The brewer unit is driven by a 24V DC electric motor. Sequencing of the filter belt rotation, the brew chamber movement and the operation of the valve are achieved mechanically. A second motor drives the air pump. Both motors have a common high side supply. They are turned on by providing a return (current sinking drive).. **It is important to observe this polarity as running the brewer motor in reverse will cause damage to the index switch.**

Indexing

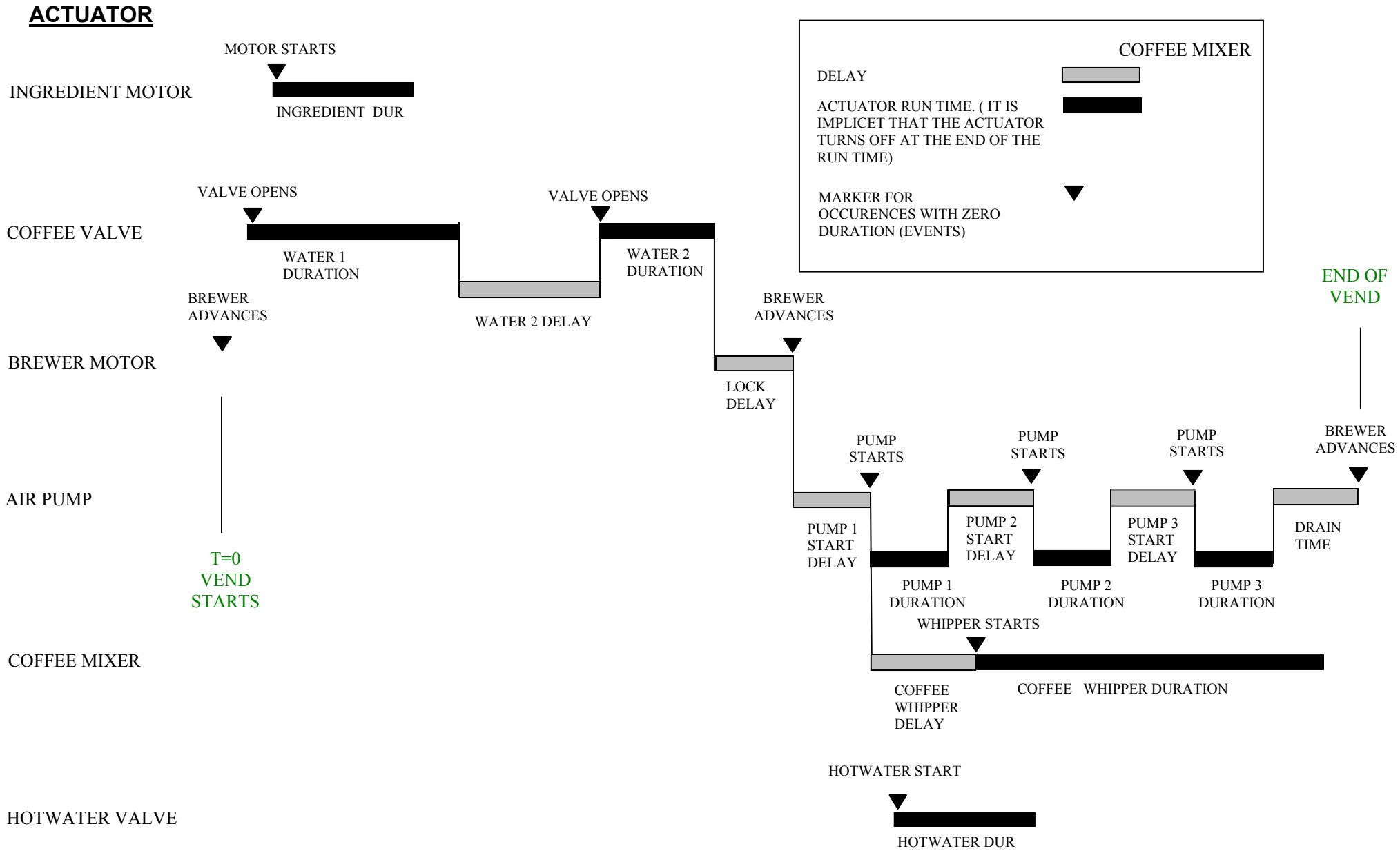
In addition to the two motors an index switch provides positional feedback as to the motors position. It is necessary to perform a complete rotation of the brewer on power up to allow the position of its idle slot to be determined. This can be achieved by measuring the transit times between index positions. (If a transition is longer than two seconds it is the transition to the idle slot is one algorithm). Other more robust algorithms are obviously possible. The choice of normally open / normally closed contacts for the index switch is arbitrary. The Geneva uses the normally open pair.

Pressure Switch

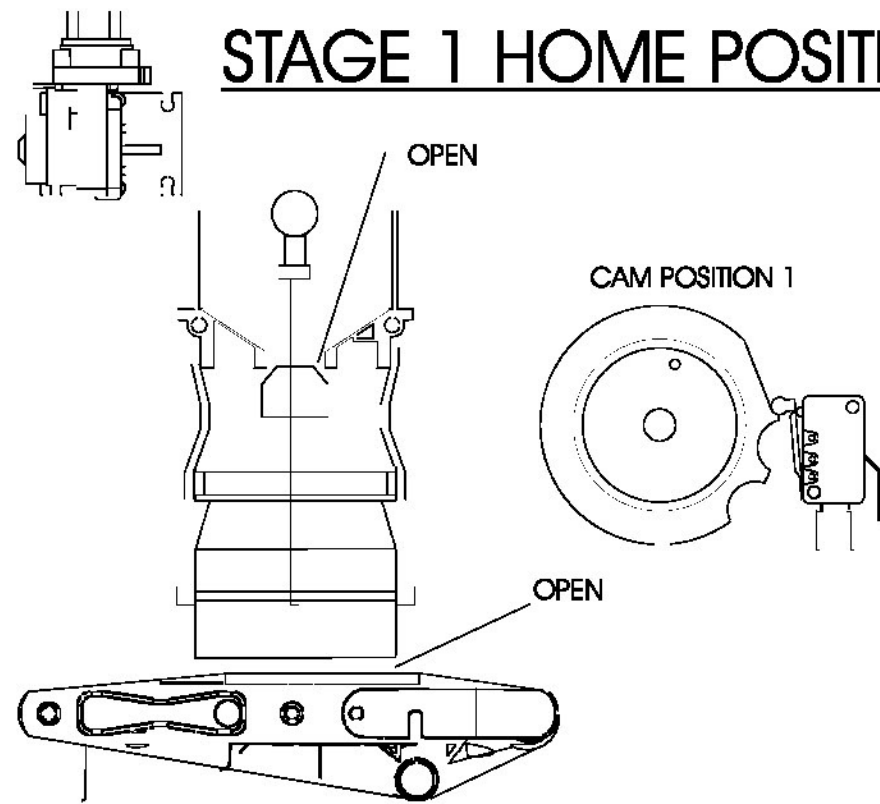
A pressure switch provides a closing contact signal to indicate the brew chamber is pressurised above .25 bar. **The control system should be programmed so that the brewer motor does not run if this signal is asserted.** This is to prevent that the brewer opens when pressurised there by ejecting hot liquid in all directions! This is not a safety issue in normal operation, however if the covers are removed for development purposes it can be quite messy.

A secondary purpose of the switch is to allow the control system to determine when the belt needs replacing or will shortly need to be replaced. This is done by measuring the time that the brew chamber remains pressurised beyond that which is expected. On a Geneva this is achieved by the control system starting a counter at the moment the brewer would be expected to open. If after 7 seconds the chamber is still pressurised a flag to warn that replacement will soon be needed is set. If the chamber is still pressurized after 20 seconds a flag to indicate that the brewer has failed is set. The machine's LCD displays suitable messages and the selections are made unavailable if appropriate.

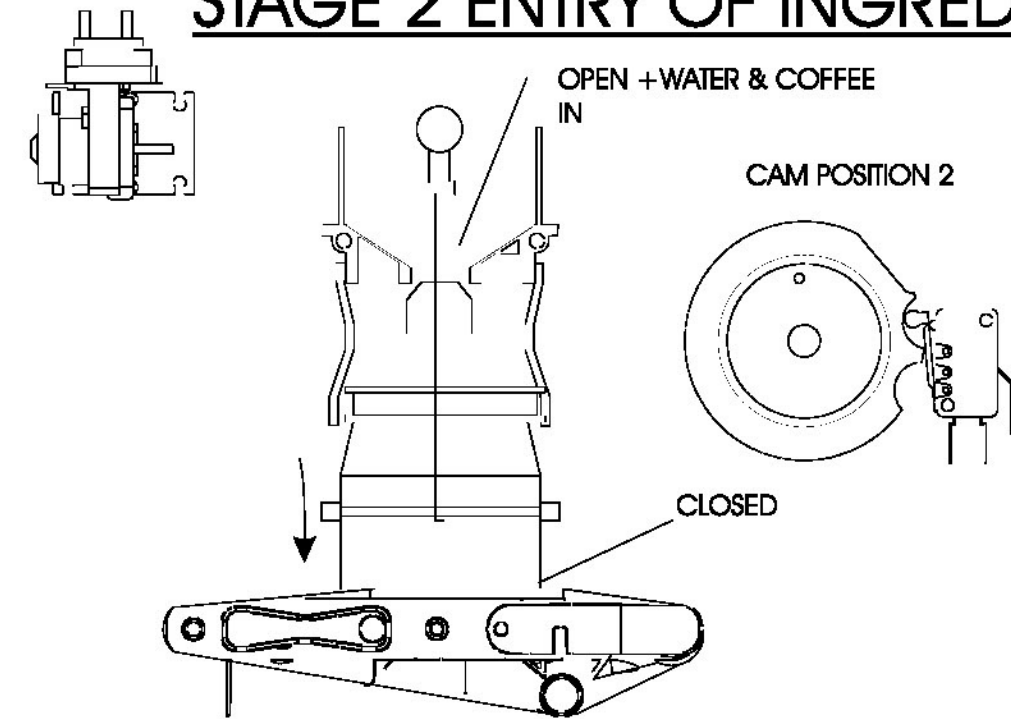
Coffetek Coffee Brewer Timing Relationships



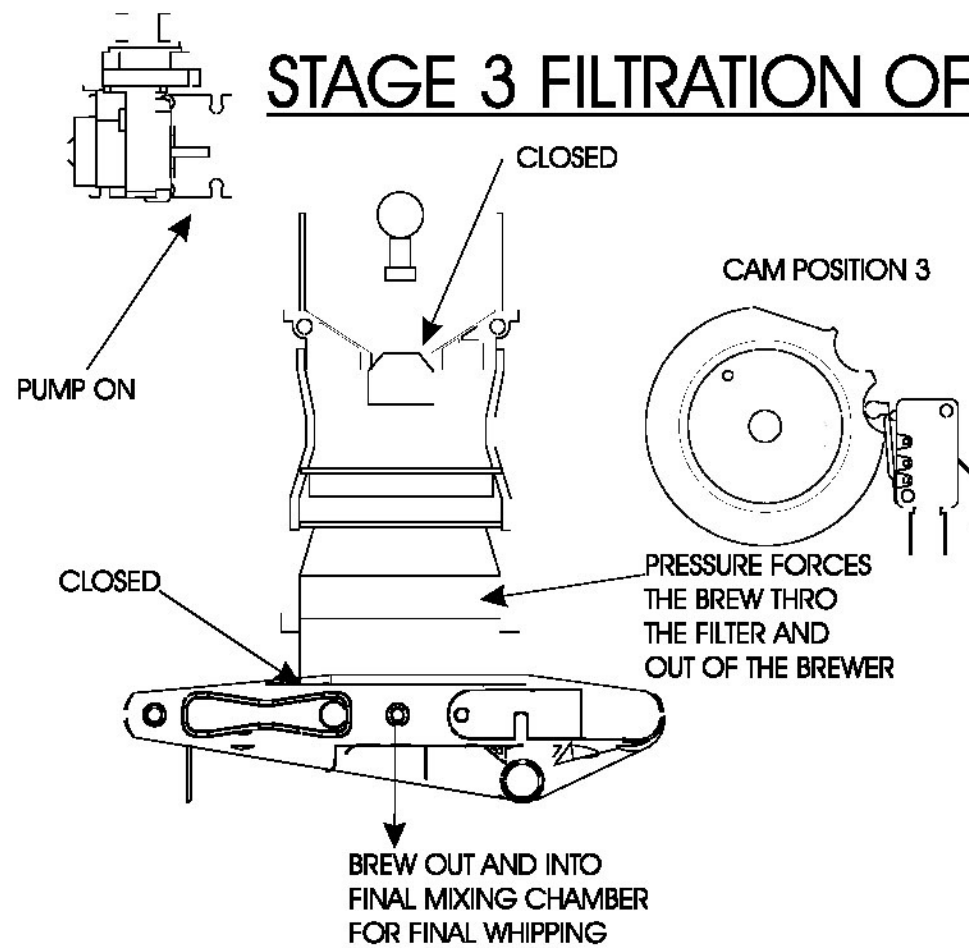
STAGE 1 HOME POSITION



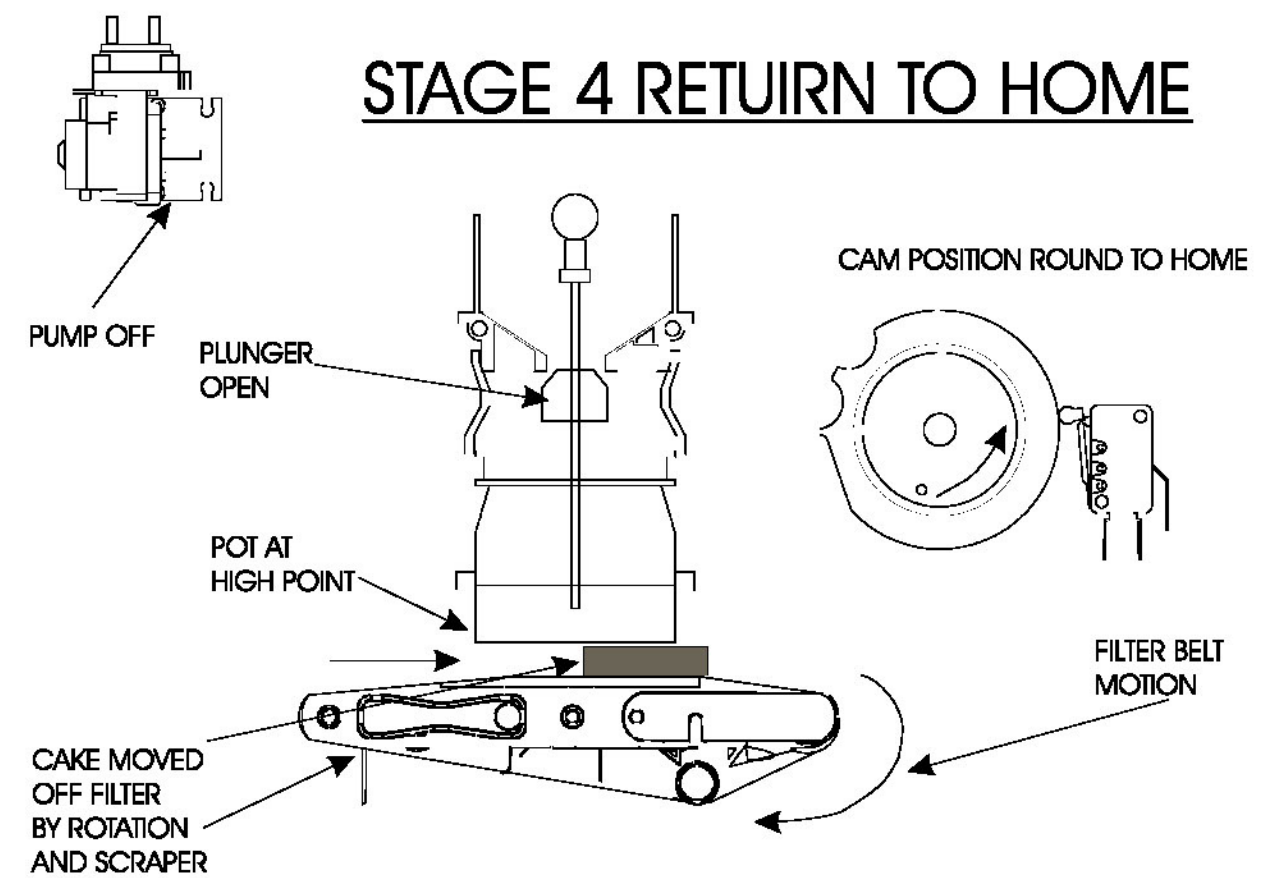
STAGE 2 ENTRY OF INGREDIENTS



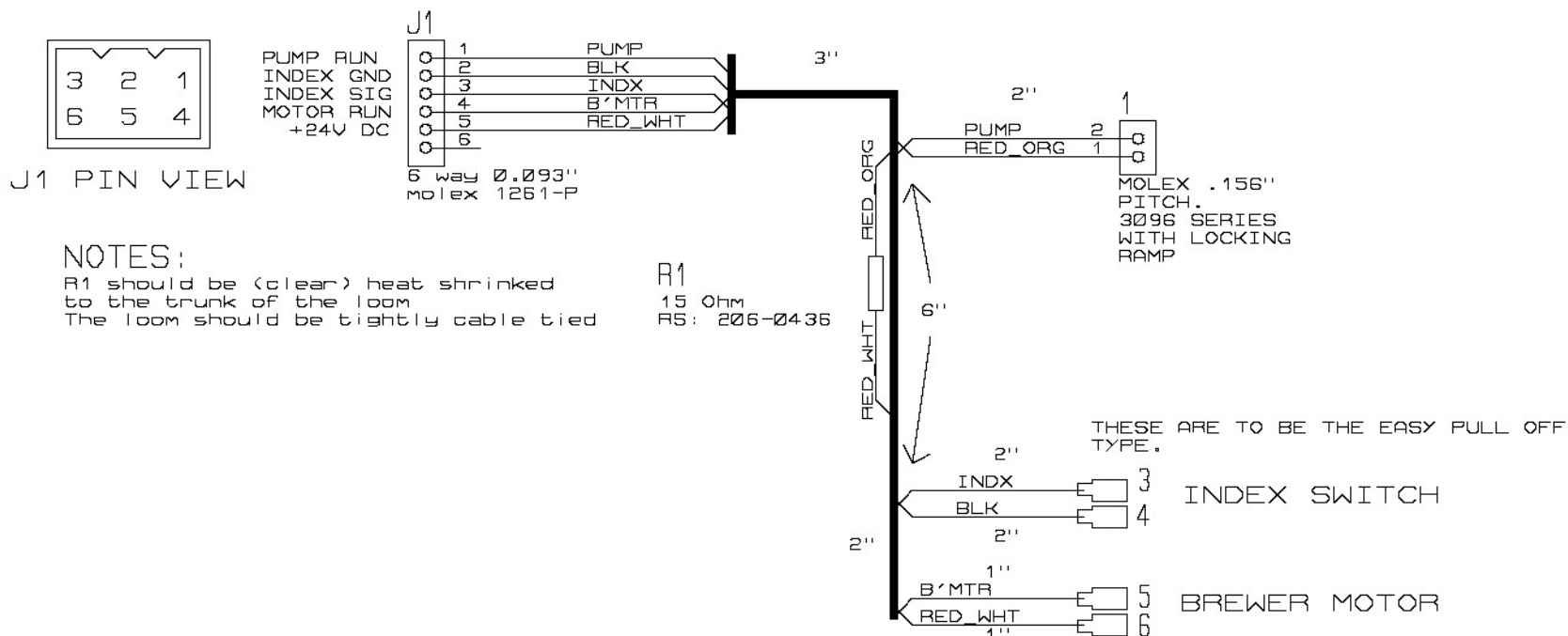
STAGE 3 FILTRATION OF INGREDIENTS



STAGE 4 RETURN TO HOME



BREWER PLUG



REVISION HISTORY

Revision 1 -> Revision 2 DV (12/7/06)
Locations 5 and 6 now have fastons with boot.

Revision 2 -> Revision 3 RAC (12/7/06)
LOC 1 & 2 CONSOLIDATED INTO CONNECTOR 1

Revision 3 -> Revision 4 RAC (12/9/07)
LOC 3 & 4 TO BE EASY REMOVE FASTON & B'T

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BY: DE	PAGE: 1/1
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