Cell Sensor CS-1

Operating Instructions Manual

The Cell Sensor provides precise electronic control of the expression of plasma from whole blood. Placed on the back plate of any plasma expresser, the Cell Sensor optically analyses the blood passing through the plastic tube from the collection bag and clamps the tube shut as soon as it detects red blood cells. A red signal light advises the operator when the cycle is completed and the unit is ready for removal. The action is positive and consistently accurate. The Cell Sensor is UL Listed and carries a 1 year unconditional warranty. The Cell Sensor allows the laboratory technician to clamp and remove the unit at their convenience. The Cell Sensor consistently optimizes the quantity of component yields while substantially reducing man-power requirements.

Installation Instructions:

1. Hang the Cell Sensor on the back plate of any plasma expresser or sit unit on table top.
2. Plug power cord into any wall unit.
3. Turn power switch on.

Operating Instructions:

1. Load plasma expresser in the normal manner.
2. Thread tubing between the two optical sensors as shown See Fig. A.
3. After placing tubing between the optical sensors, slide tubing under the edge of tube guide until it rests against the stops. See Fig. B.
4. The unit is now ready for use. Operate the plasma expresser according to manufacturer's specifications. When a red blood cell in the tubing reaches the optical sensor, the plunger will be activated, stopping the flow.
5. Release pressure on the plasma expresser sealing tube. You can now remove the tubing from the Cell Sensor.

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Calibrating the Cell Sensor:

The Cell Sensor comes factory set to a preset optical standard. After repeated use, some minor adjustment may be required. This can be completed in one of two ways:

Calibrating While Using:

If it becomes apparent that the Cell Sensor is activating either too soon or too late a simple adjustment will remedy the problem.

1. With the Cell Sensor operating, locate the trim pot adjustment located inside the hold in the rear of the unit.

2. Turn the trim pot using a screw driver.

DO NOT TURN MORE THAN 360°
IF RESISTANCE IS FELT, DO NOT FORCE,
DAMAGE TO THE UNIT MAY RESULT.

3. Turn the trim pot adjusting screw until the plunger activates as the first red blood cell reaches the sensor.

Calibrating Using Gray Scale Strip:

The Gray Scale Strip is a 21 Step Sensitivity Guide available from Melco Engineering.

1. Turn the Cell Sensor on. Place the Gray Seal Strip between the sensors. See Fig. C.

2. Starting at the lowest density on the scale, slide the gray scale between the sensors. Note at what step on the scale the sensors activate. Normal factory setting is, plunger is on at #7 and off at #6.

3. If adjustment screw is needed, turn the trip pot adjusting screw. See Fig. C.

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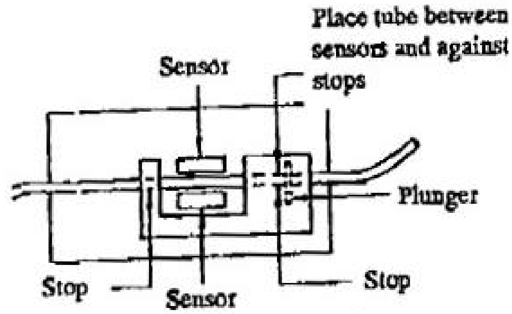

Fig. B

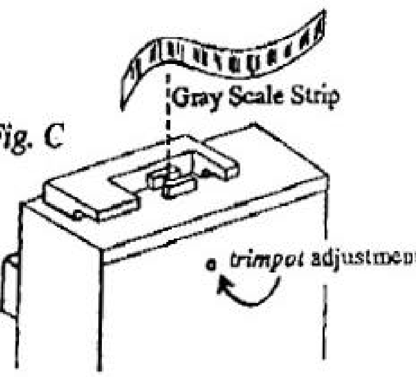

Fig. C

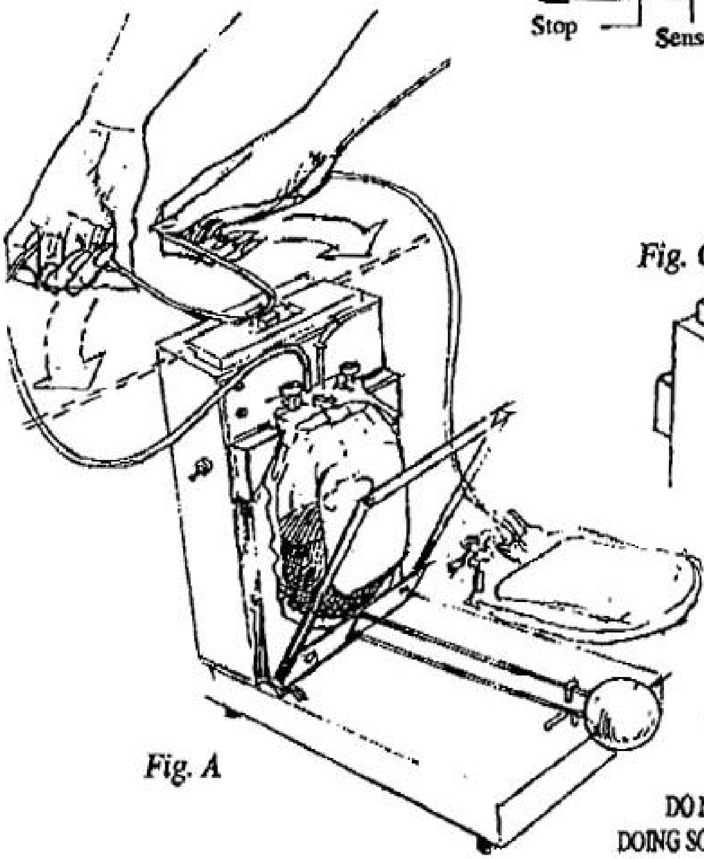

Fig. A

CAUTION

The *trimpot* adjustment screw
will not turn more than 360°
DO NOT FORCE IF RESISCE IS FELT.
DOING SO CAN RESULT IN DAMAGE TO UNIT.

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Melco®

USING A CELL SENSOR TO INCREASE EFFICIENCY AND PRODUCTION, WHILE STANDARDIZING THE QUALITY OF PLATELET RICH PLASMA, S. Ruoff, American Red Cross Blood Services, Los Angeles-Orange County Region.

The Cell Sensor (Model CS-1) manufactured by Melco Engineering Co. was evaluated in our laboratory. The cell censor is an automated sensing device which detects an optical density change through the integral tubing of a standard blood collection bag. The cell sensor is a self-contained unit that hands on the vertical back plate of a plasma expresser, by two triangular shaped pockets. When the sensor is in operation, it will stop the flow of plasma in the tubing when the optical density changes due to the presence of Red Cells. At this time, the sensor initiates the clamp to close and pinches the tubing shut.

We evaluated the cell sensor on the basis of whether it would increase production and efficiency in preparation of platelet rich plasmas. First, we used two methods for determining the difference in time of preparation of platelet rich plasma using the cell sensor and our conventional "eyeball" technique. We timed 5 individual technicians preparing 8 units of platelet rich plasmas using the cell sensor and 8 units of platelet rich plasma using the "eyeball" technique. We also compared the time it took a team of 3 technicians to process 20 units beginning with weighing and loading the cups to the final expression of platelet rich plasma.

Secondly, using an ordinary stopwatch, we evaluated whether the use of the cell censor increased the flow rate time because of threading the tubing in an upward manner through the sensor. Thirdly, we evaluated the cell sensor on the basis of whether it standardized our technique of separating platelet rich plasma. The sensing device on the cell sensor can be adjusted for greater or lesser sensitivity to Red Blood cells, so we purchased a photographic standard from a local photo lab. Passing the graphic standard across the sensing device and noting the exact number of the standard that initiated the clamp, we set all cell sensors to that number.

The results of our trial period are as follows: The average time it took to prepare 8 units of PRP using the cell sensor was 5 minutes and the average time using the "eyeball" technique was 8 minutes. Although there is some time advantage to using the cell sensors, the largest gain of time was in the freedom from watching the expression of platelet rich plasma. While it took 8 minutes to "eyeball" 8 units, those 8 minutes were totally committed to watching the expression of PRP. If you subtract the 5 minutes from the 8 minutes, there is a gain of 3 minutes per technician between the two techniques. This enables a technician to process more units. It takes our technicians on the average of 45-60 seconds to weigh and load a 4-place centrifuge. We found that we could weigh and load approximately 12 more units in the 3-minute gain, as well as continuing to unload centrifuged units ready to be expressed. Over a 7 ½ hour work day, we found that we can process an additional 50-75 units without increasing demand on technicians.

It took our team of 3 technicians 15 minutes to express 20 units of PRP using the cell sensors. This enabled the team of 3 to process more units and more efficiently use their time to weight, load, and separate platelet rich plasma. It took the same team 30 minutes to process 20 units of PRP using the “eyeball” technique. This team did experience some difficulty using 8 expressers per technician. We found that a team of 3 cannot successfully handle 8 units per technician using the “eyeball” technique. The “eyeball” technique required a minimum team of 4 technicians, each handling successfully 4 units of platelet rich plasma. Increasing the 4 units per technician ratio increased red cell run over into the PRP and also increased the variability of where the red cell/plasma interface line is stopped in the whole blood unit. The technicians felt more stress and increased pressure trying to work in a 3-person team without using the cell sensors.

The results from timing the flow rates of comparable sized PRP’s using the cell sensor and the “eyeball” technique were as follows: There were a total number of 27 units timed. The average volume of plasma expressed was 245 ml, and the average time to express by the “eyeball” technique was 57 seconds. The average time it took to express the plasma using the cell sensors was 58 seconds. There was no difference in flow rate between the two methods.

Our last evaluation was whether we could achieve standardization of our separation technique which we felt would improve quality by preparing platelet rich plasma more consistently. By setting the sensitivity with the gradient standard the cell sensors consistently left 1-2 cm of plasma at the top of the primary bag.

In conclusion, we found that the overall results of our trial period showed that quantity and efficiency of platelet rich plasma production increased and standardization of the separation technique from one unit to another was achieved. Also, the technicians using the cell sensors preferred to continue using the cell sensor over the “eyeball” technique. The overall acceptance of the cell sensor in our laboratory has been quite high.