Crane Shopperton - Drum/Stop Pin solenoid work flow

Principle of operation
On an operational machine with the door closed pressing either of the direction arrow will cause the drum to rotate.
With the door open and the interlock switch pulled the drum will rotate.
However there is a set sequence that things MUST run in to allow this to happen. Once we understand this sequence we can easily troubleshoot any issues.

NB: Please adhere to the correct procedures when carrying out any testing. There is a risk of electric shock and also entrapment.

We will assume the door is open, that all cables, connections and circuit boards are ok, the machine lights are on (therefore the interlock switch must be operated) the cover on the stop pin solenoid is removed and we are using the loading switch to rotate the drum.

1. Press loading switch
2. Machine will check there are no vend doors open – check price displays
3. Stop pin solenoid will energise – you will hear/see this
4. Stop pin Motion Sensor (opto) is blocked by the Actuator Lever – can be seen
5. Drum motor will start to turn – can be seen
6. Drum motor Motion Sensor (opto) will see state changes and allow the drum to keep rotating as long as the loading switch is activated (for a maximum of 67 seconds).
7. Release loading switch
8. Solenoid will remain activated (electrically) until the stop pin has passed the penultimate lock hole in the base of the drum
9. Solenoid will de-activate (electrically) but the pin will be held down mechanically by the pin running on the base plate of the drum and hence the stop pin motion sensor will remain blocked by the actuator lever.
10. The drum will continue to turn until the springs on the stop pin assembly push the pin into the lock hole, at this time the actuator lever will unblock the motion sensor which will signal the boards to remove the power from the Drum Motor

Points to remember:

- Stop pin solenoid is 220Vac – coil resistance is Circa 160 Ω approx.
- Drum motor is 220Vac – winding resistances are Circa 200 Ω approx. on each winding
- The drum motor connector has three wires, there is a neutral (yellow or black depending on which side of the connector you are looking) and two 220Vac live feeds (red and brown). For the motor to turn the 220Vac feed needs to be on BOTH live wires (the Motor Run Capacitor induces a phase shift) There is a separate earth directly onto the motor.
- The drum must turn at the correct speed and also the stop pin operate within tight parameters for the drum to be able to find home.

Check diagnostic messages
These are not necessarily shown in the order they should be addressed, for example, you may see a CANT HOME error message followed by MOTOR JAM. From the sequence we have seen above it is clear that it will not be able to find home if the motor is jammed.

CANT HOME – only if no other drum errors are reported should you suspect the Home Switch
MOTOR JAM – motor movement in either direction is not detected. (Be aware the motor will try to turn five times in alternating directions to clear the jam, it will then time out. After 5 mins will try to clear the jam again. It will repeat this procedure if necessary a total of 12 times)
NO WHEEL – no input from the drum motor Motion Sensor after a command to turn
SOLENOID – no input from the motion sensor on the Stop Pin assembly

Useful tips
If the drum is moving slowly

- check for obstructions
- check resistance of both windings
- test voltage to both windings
    - if all these checks are good replace the drum drive capacitor

A multimeter can be used to check the (proximity sensor) home switch by passing a magnet over it
Apart from on initial power up you should never see the message **PLEASE WAIT** if you do it means the machine is trying to find its home position, usually caused by a dirty encoder (motion sensor wheel) on the drum motor or incorrect setup of the stop pin solenoid assy

Part numbers

Drum Motor - C4321192
Drum Motor assembly - C4321186
Motion Sensor (opto) - C4321199
Stop pin assembly - C4321186
Proximity Sensor - C4301402
Motor Run Capacitor - C9988211
Control Board - C4326051
EPROM - C4326026
Interface PCB - C4326020