

# ELECTRONIC BOTTOM LOADING SKID

## Operation & Maintenance manual



# **IFC Bottom loading skid with electronic batch control**

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## Installation notes

Reference to General arrangement drawing and circuit diagram

- Unless designed otherwise the skid must be mounted on a solid flat surface with the forward edge approximately 2.4 to 2.8 metres from the centre line of the tanker.
- IFC recommend the skid is secured to a flat concrete grade of at least 100mm depth using expansion bolt or similar fixings to suit mounting eyelets.
- The skid bottom loading arms are pre-balanced at the factory to an estimated balance setting only. Additional tensioning may be required once the arm has been filled with product & after several months of service. This is a simple procedure that is covered under our *loading Arm* section.
- The vapour overspill vessel terminates with a riser flange. The follow-on pipework must remove the vapours away from the loading area to a height of no less than 5.5 metre above grade. The Stack should terminate with some form of rain protection.
- Full provision has been made on the skid for pressure and thermal relief. Unless piped accordingly this will not protect up-stream pipeline.
- Unless otherwise designed all IFC skid electrical systems are manufactured to meet zone 1 rating. Electrical cable and fittings used around the skid area must be suitable for the zone classification based on the duty & current standards.
- The IFC bottom loading skid is designed for simple operation and commissioning.
- Ensure your electrical supply is sufficient & stable for the skid demands. Frequent power outs & fluctuating mains can cause loading faults & errors with the equipment & may invalidate warranties.

## **PRE LOADING SEQUENCE MPC100 Batch Controller**

### **Prior to loading:-**

1. Ensure all personnel wear adequate PPE when loading or operating around loading Gantry
2. Ensure power to the skid is present – i.e. the MPC100 batch controller and High Level Shut-Off (HLSO) are on. (If there is no power consult the fault finding procedure)
3. Connect the combined high level shut off & earth monitoring (HLSO) cable and plug to your truck
4. Connect the vapour hose to the truck
5. Connect the product hoses and enable your truck for bottom loading.
6. Ensure the HLSO unit is showing green “*permissive*”
7. Refer to MPC operator manual Page 15 & 16 (as attached)
8. When loading is complete, disconnect equipment in the reverse order, i.e. product arms first, vapour hose next and finally the earth / HLSO.
9. Disconnection of the earth / HLSO will signal the electronic batch controller the “*end of loading operation*”.

## **OPERATIONAL SEQUENCE FOR ELECTRONIC BATCH CONTROL**

After pressing the "START" button the following sequence will happen

1. The pumps will start and the solenoid flow control valve will start to open
2. For the first 200 litres of the delivery the control valve will limit the flow rate to around 300l/min
3. After this initial quantity, the control valve will open to full flow
4. Again at around 200 litres prior to the end of the delivery, the flow control valve will start to close and slow the flow down to around 300l/min

## **PULSERS**

Our skids currently have optical Pulse Output Device's (POD) fitted.

The square wave signal can be set in either single or dual quadrature channel output.

The M100 4" flow meters are set to 19.6 pulses / litre / Channel. These are calibrated upon commissioning using weights and measures approved flow meters.

## **IN THE EVENT OF AN OVERSPILL**

In the event of an over-fill or emergency shut-down the skid unit has a number of systems in place to prevent its continuing operation.

1. High Level Shut Off (HLSO) - If too much product is loaded into a truck compartment then the tanker high level probe will operate. This will register on the HLSO unit and automatically turn off all power to the pumps - **LOADING STOPS**
2. Vapour Pot Switch - If for any reason the High Level Probe does not work then product will pass via the trucks vapour recovery system through the vapour recovery hose into the vapour pot where there is a float switch. When operated it will automatically turn off all power to the pumps - **LOADING STOPS**.
3. Emergency Stop button - The emergency stop (E-Stop) button can be pressed at any time during operation. Depending on the type of skid system this will either:-
  - a) Turn off all power to the pumps - **LOADING STOPS**.
  - b) Shut the control valve and then turn off the pump after 10-20 seconds – **LOADING STOPS**

## STANDARD PROCEDURES IN THE EVENT OF AN OVERFILL

1. Once pumps stop inform depot / site Manager of overfill and follow any site procedures
2. Disconnect Loading Arm from tanker

### **DO NOT DISCONNECT THE VAPOUR RECOVERY HOSE FROM THE TRUCK!**

3. Place a fuel resistant container such as a large steel bucket under the Vapour Pot. Slowly open the drain ball valve and drain until the Vapour Pot is empty of product.  
**NOTE:- there will be approximately 35 litres of product in the vapour pot after an overfill**
4. Place a fuel resistant container with a minimum capacity of 20ltrs under the vapour hose coupler connection point to the tanker
5. Carefully disconnect the vapour hose from the truck & place the coupler into the container to allow the left over product in the hose to drain out into the container.  
**NOTE:- There will be approximately 17 litres of product in the vapour hose after an overfill**
6. Empty the tanker 'on board' vapour return pipe. Follow the tanker manufacturer's instructions to do this.
7. Disconnect the High Level Shut Off (HLSO) & earth gantry plug
8. If loading of other pots is to continue, reconnect the HLSO plug.
9. If the tanker probe in the overfilled pot is still wet from the over-fill then the HLSO system will not show the green permissive light and will not allow loading to recommence, it will however show the tanker pot with the wet probe.  
**In this instance the HLSO requires by-passing to allow loading to continue. Refer to HLSO operations manual for by-pass instructions or see below.**

### **HLSO BY-PASS OPERATION (only perform if operator is sure that overfill will not occur)**

10. **SKULLY** - Hold the HLSO By-pass key to the right hand side of the HLSO control box for a few seconds or until you see the red LED light flashing.
11. **LIQUIP** – Swipe the by-pass key along the front of the unit over the glass panel to reset the loading permission
12. Carry on programming/loading as normal to complete load.
13. Disconnect and Bill of Loading (BOL) will be printed as per normal.

# ELECTRONIC SKID SYSTEM

## Recommended Maintenance Schedule

### Daily schedule:

1. Vapour vessel – Drain daily
2. HLSO - Inspect & clean tanker plug contacts with a wire brush
3. General - visual inspection for signs of leaks
4. API Couplers - Inspect & clean all coupler contact parts

### 6 monthly schedule:

5. **Electronic air systems only** -Remove & clean out air pressure / filter bowl
6. Flow-Meter - Remove & clean meter strainer element
7. Swivel Joints - 1 shot of grease to the loading arm & hose end swivels

### Annual schedule:

8. Drop & Vapour hoses - Pressure & continuity test
9. Flow-Meters - Calibrate & leak test
10. **Mechanical systems only** - Apply small amount of grease to the meter linkage and ball joint
11. Electrical - Remove knock out switch, test & lubricate float arm
12. Pressure Relief System - Remove, inspect and test pressure relief valves
13. Replace desiccant inside high level shut off monitor & batch controller if present

## Troubleshooting Guide

### ELECTRONIC SKID SYSTEM

<b>Fault</b>	<b>Cause</b>	<b>Solution</b>
<b>No electrical power to skid</b>	Control panel isolator tripped	Press isolator button (green) on. [If applicable].
	Emergency stop or vapour switch enabled.	Release emergency button & ensure vapour pot is drained repeat above action.
<b>Overspill monitor shows (red) After connection</b>	1 or more compartments are in an overspill condition	Identify and drain off some of the excess product.
	Poor contact at the plug	Inspect the plug & vehicle socket for damage, dirt or misaligned pins.
<b>Electric panel will not reset. Buzzing / clicking noise from Panel (mechanical systems only)</b>	Control valve has been left open by last operator	Press stop on preset to cancel last batch and close valve
	Pump start micro-switch is not quiet contacting	Ensure micro-switch assy. Is secure. Ensure switch is making positive contact
<b>API couplers hard to connect</b>	Worn or damaged adapter face	Replace as necessary.
	Misaligned contact	Ensure the coupler is square to the adapter face.
	Interlock stiff or seized	Identify and free up.
<b>Arm very heavy to handle</b>	Under-tensioned or broken spring	Adjust balance or replace spring cylinder unit.
<b>Pump will not start when the control valve opens (mechanical systems only)</b>	Micro-switch loose or broken	Identify and repair.
<b>Pump is operating but there is no flow</b>	Filter blocked or other line obstruction. Tanks empty, air in system, failed solenoid valve	Clean filter, check lines for blockage, check tank liquid levels. Contact IFC for service
<b>Control valve handle is loose and there is no flow (mechanical systems only)</b>	Valve shaft shear pin or internal linkage has failed	Identify, repair or contact IFC to arrange servicing



Fault	Cause	Solution
<b>Pump is operating at very low flow</b>	Motor is wired backwards	Call in certified electrician to rewire
	Filter blockage	Identify and clean element
	Tank level low or partially closed line valves	Identify and correct.

# Bottom Loading Skid Control Panel ECP1

## OPERATING PROCEDURES FOR ELECTRICAL PANEL

1. Turn on power at the door isolator
  - a. The WHITE “power on” light illuminates
  
2. Press the “System rest” button:
  - a. The GREEN “System Healthy” light illuminates

## THE SKID IS READY TO READY FOR OPERATION

### FAULT FINDING

Fault	Cause	Solution
RED “Overload Trip” light illuminates:	One of the motor circuit breakers has tripped due to excessive current draw.	Establish which motor will not run and rectify the cause.
	One of the thermistor relays has tripped due to motor overheating	
GREEN “System Healthy” light goes out:	The Panel has lost its power	Establish the cause and on regaining power follow the above “Operating Procedures”
	The Skid Emergency Stop button has been pressed	Check each button, establish the reason for it being activated and if safe to do so reset and follow the above “Operating Procedures”.
	The Panel Emergency Stop button has been pressed	
	The Vapour Pot Liquid Level Switch has activated	4) Drain the Vapour Pot and follow the above “Operating Procedures”.