FALCON ANGEL FRYER

Fault finding and servicing guide for Falcon fryers fitted with the Oil Level Sensor system

T101064

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- **This guide is written to be used in conjunction with the standard user, installation, and service instructions.**
- **Wiring diagrams and circuit diagrams can be found in the user, installation and service instructions.**
- **The service engineer is still expected to follow the standard electrical and gas safety procedures/precautions when carrying out servicing on any fryer fitted with an oil level sensor.**
- **Unless otherwise stated, parts which have been protected by the manufacturer must not be adjusted by the installer/service engineer.**
- **Oil level sensor, UK Patent Serial No. GB2584184**

CONTENTS

1.0 SYSTEM OVERVIEW

The Oil Level Sensor System (UK Patent Serial No. GB2584184 is an additional safety system incorporated into gas and electric fryers.

This additional system is designed to prevent the gas burner or elements in the fryer from switching on if the level of oil in the pan is too low.

This system is designed to integrate with the existing safety circuit within the fryers wiring. It does not interfere with the fryer controller or temperature probes.

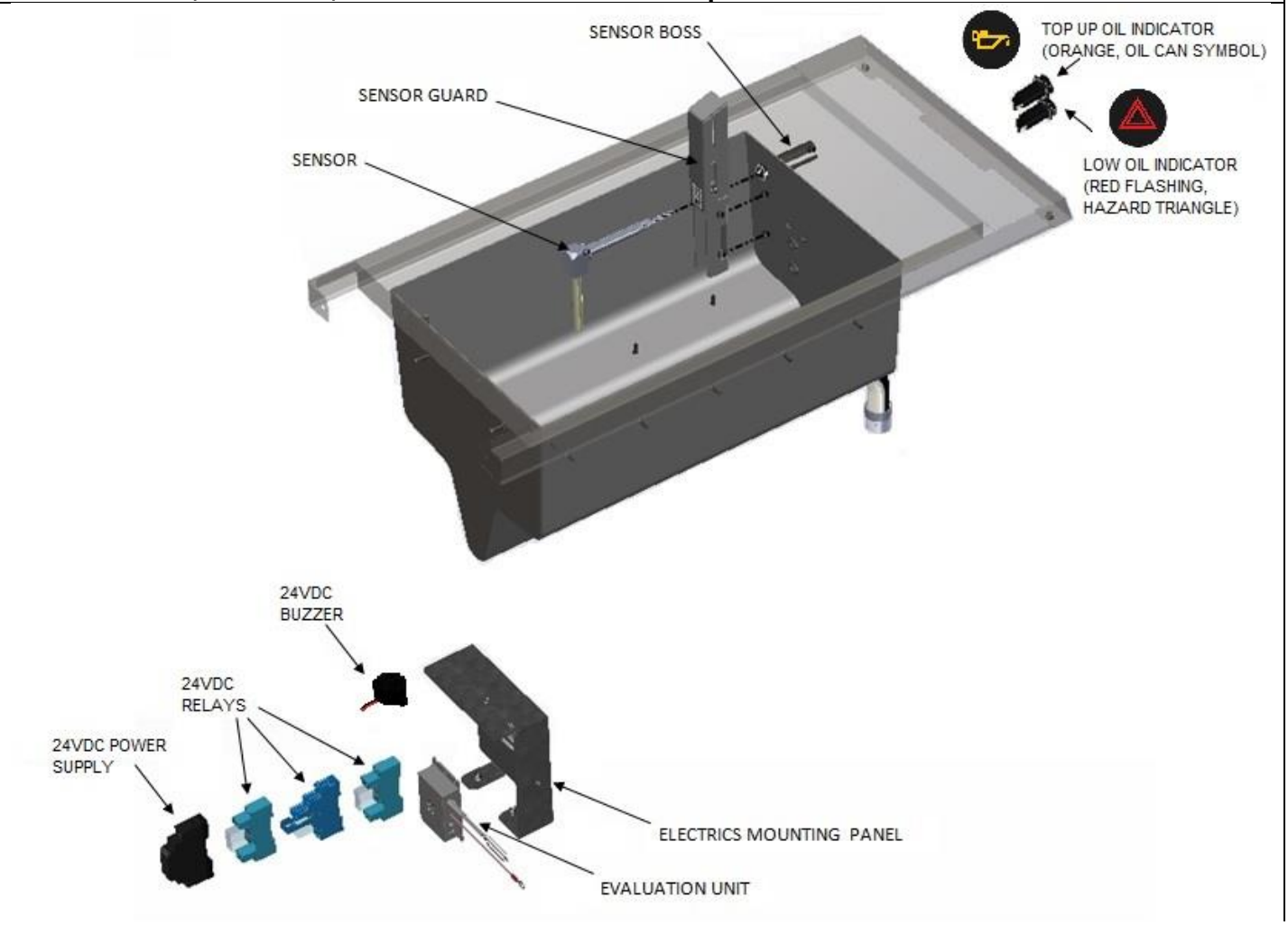
The system also includes additional LEDs and a buzzer. These give the user some indication of the oil level in the fryer. If the oil is at a level below the minimum mark the user will see an orange Oil Can LED on the control panel indicate.

If the level of oil is just above the level of the fish plate, then the red Hazard Triangle LED on the control panel will illuminate and the buzzer will sound in addition to the Oil Can LED illuminating.

2.0 SYSTEM COMPONENTS

2.1 System component locations

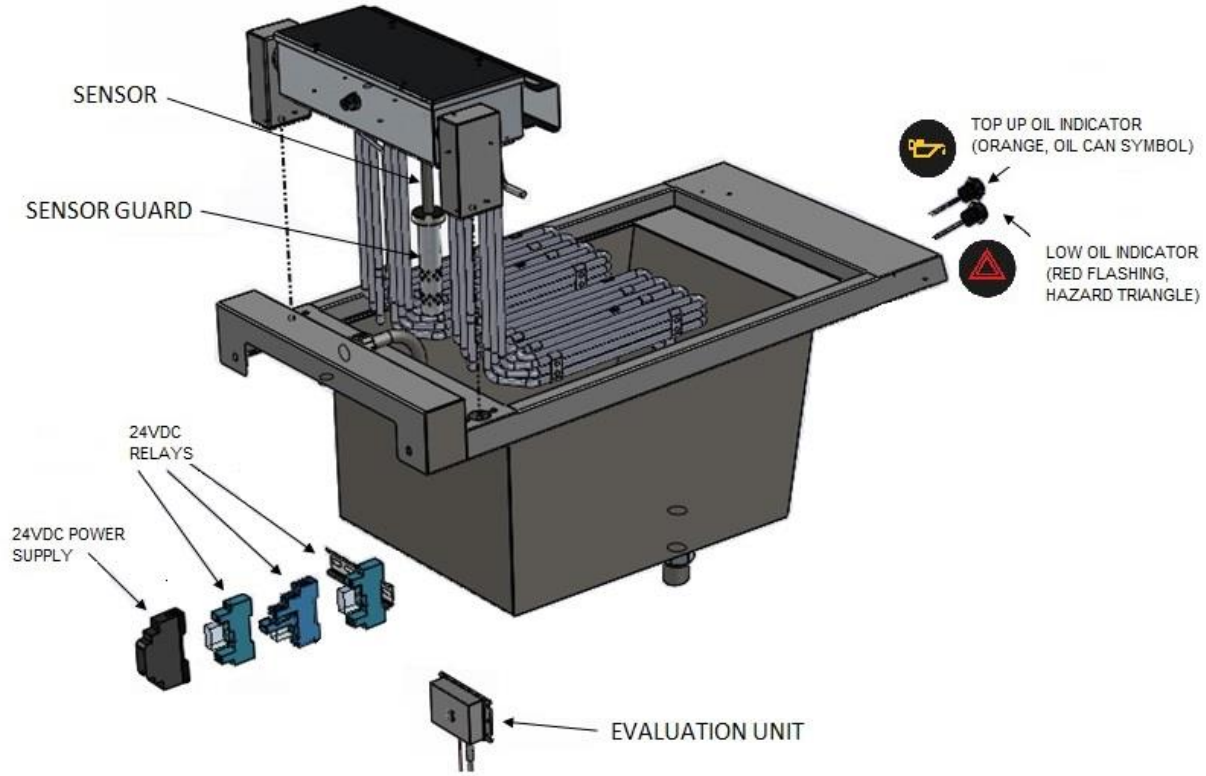
G3840X/FX/PX, G402X/FX, G401X/FX & G9341X/FX Components & Locations



Control Panel
Pan
Rear lower electrics panel

Top up oil & Low oil indicator
Sensor, sensor guard & bracket, sensor boss
24VDC Power supply, 24VDC Relays, Evaluation Unit & 24VDC Buzzer.

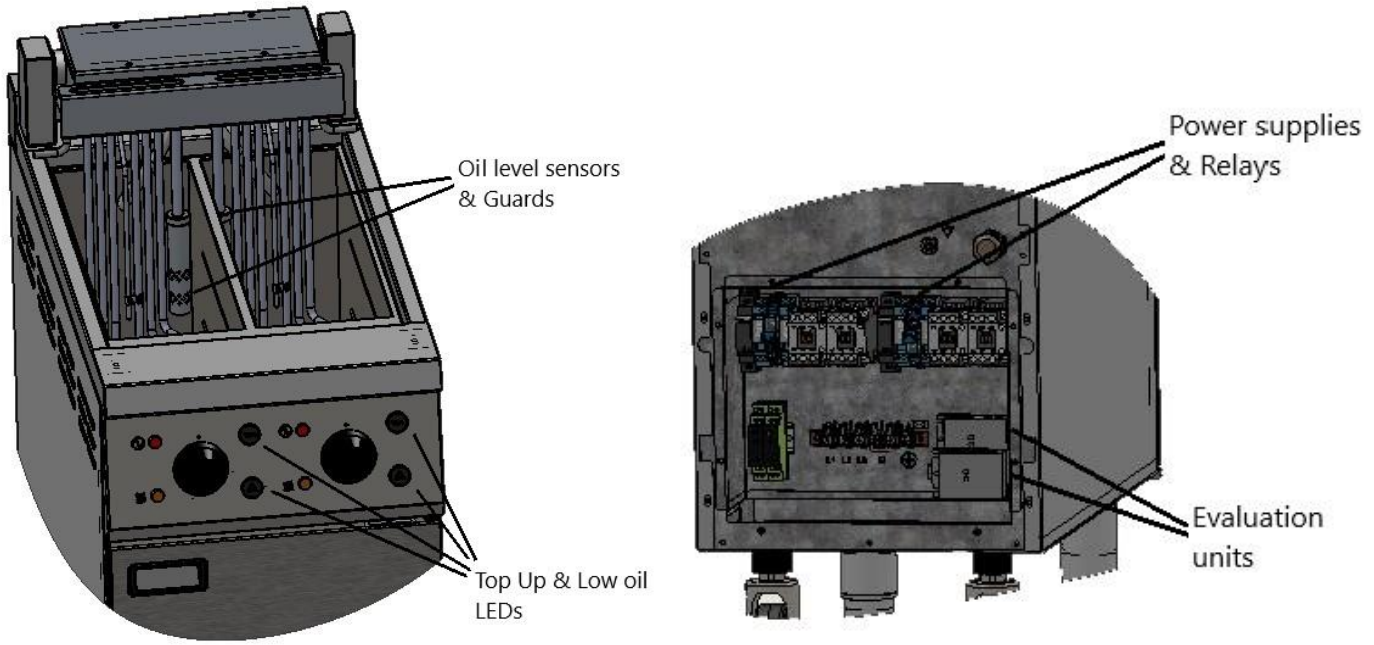
E401X/FX, E402X/FX, E3840X/FX/PX component locations



Control Panel
Element Head
Rear lower electrics panel

Top up oil & Low oil indicator
Sensor & sensor guard
24VDC Power supply, 24VDC Relays, Evaluation Unit

E421X/FX/F2X, E422X/E422FX & E3845X/FX/F2X/PX/PFX component locations



Control Panel
Element Head
Rear lower electrics panel

Top up oil & Low oil indicators
Sensor & sensor guard
24VDC Power supplies, 24VDC Relays, Evaluation Units

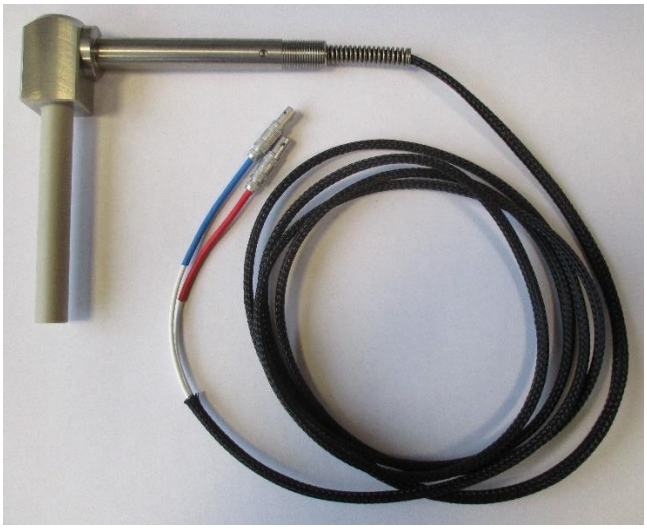
2.2 Sensor

Within the sensor there are two different sensors which detect the oil level. The upper sensor detects when oil is 40mm less than the ‘MIN’ mark and gives the ‘TOP UP OIL’ indication. The lower sensor detects when the oil has reached the ‘LOW OIL’ level, which is approximately 80mm below the ‘MIN’ mark.

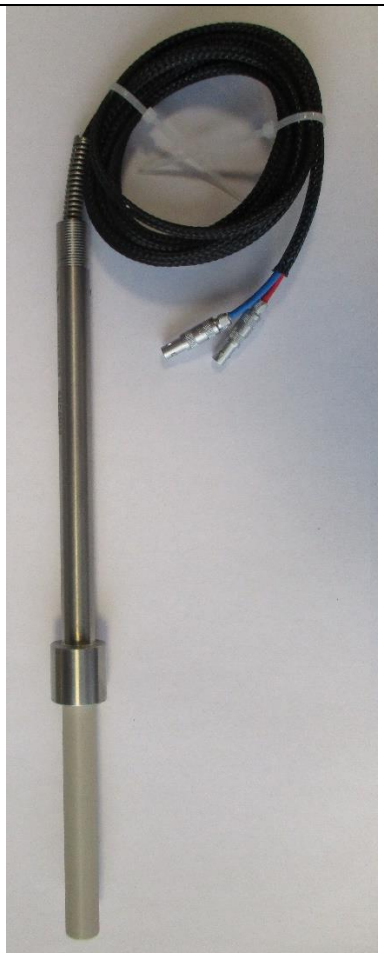
The sensor has a maximum temperature rating of 250°C

The two small BNC leads (Red & Blue) that extend from the sensor are connected to the evaluation unit.

The oil level sensor fitted to the gas fryers is different to the sensor fitted to the electric models. They are not interchangeable.



Gas fryer sensor



Electric fryer sensor

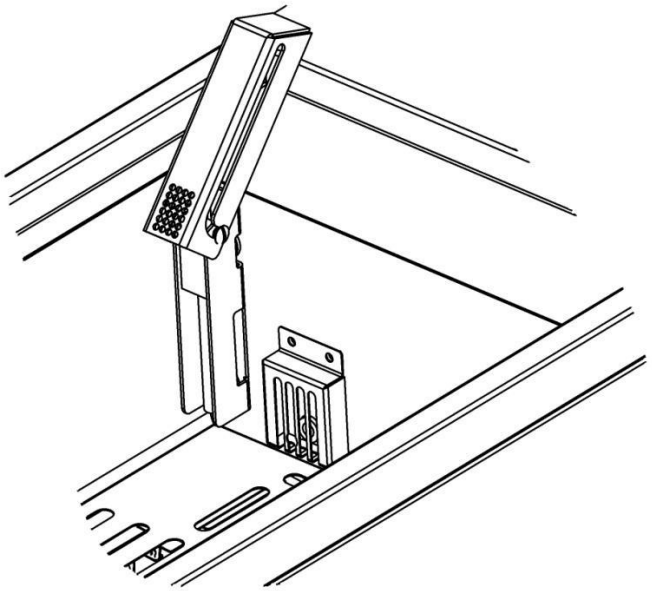
2.3 Sensor guard

The sensor guard is designed to allow oil to surround the sensor whilst protecting the sensor from damage and food debris.

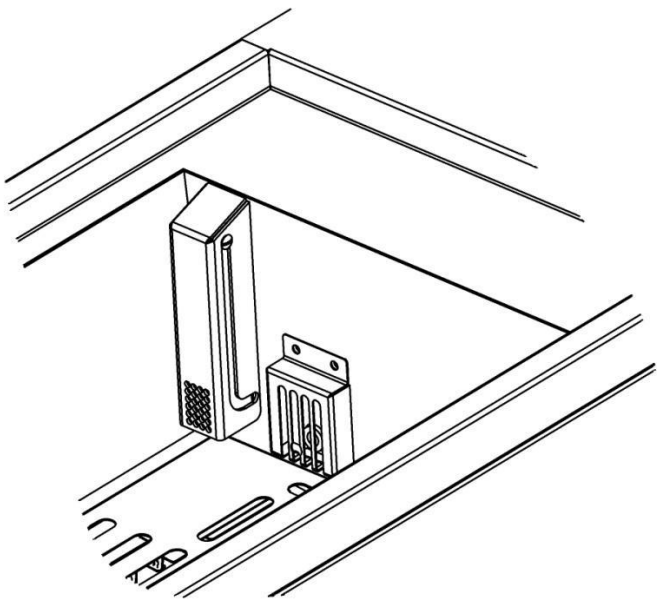
The sensor is calibrated with the guard in place, if the guard has been removed or damaged it may affect the performance of the sensor.

The guards have been designed so that the user cannot remove them completely, but they can slide the guard up/down to allow the sensor to be cleaned.

Sensor Guard in G3840X/FX/PX, G402X/FX, G401X/FX & G9341X/FX

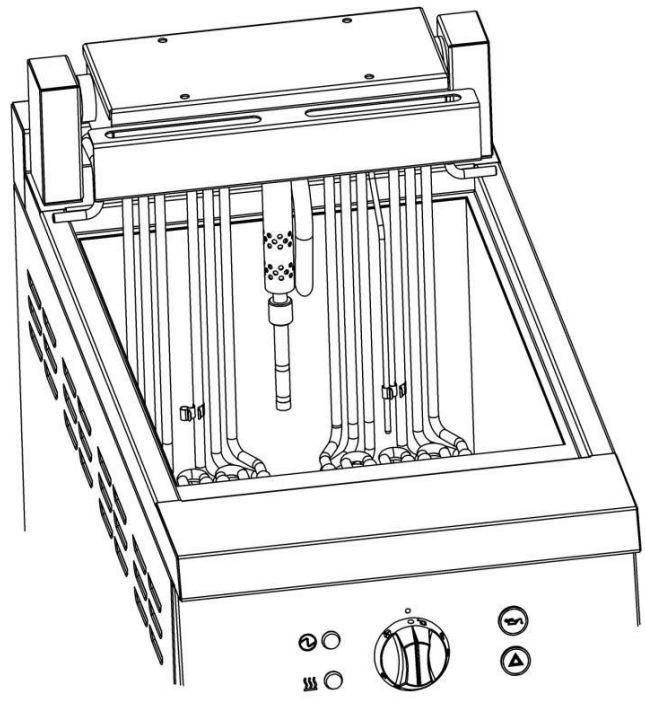


Sensor guard raised for cleaning

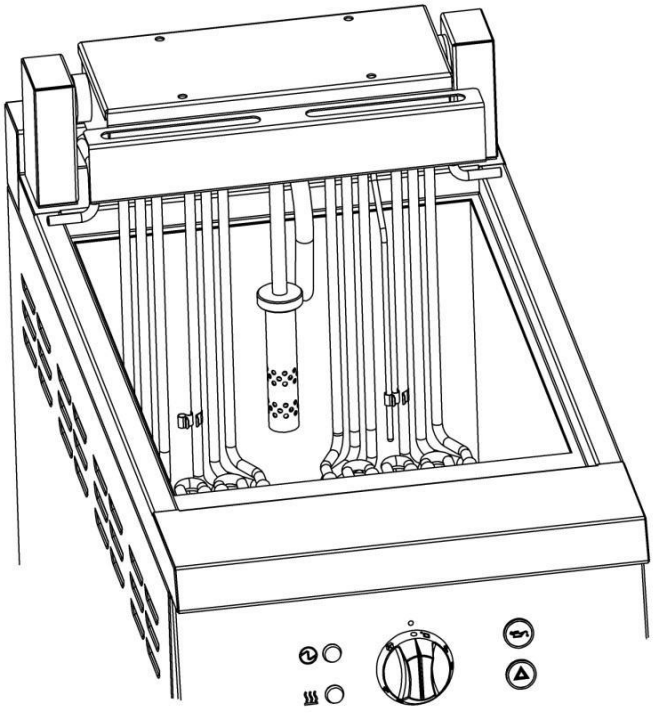


Sensor guard lowered for normal operation

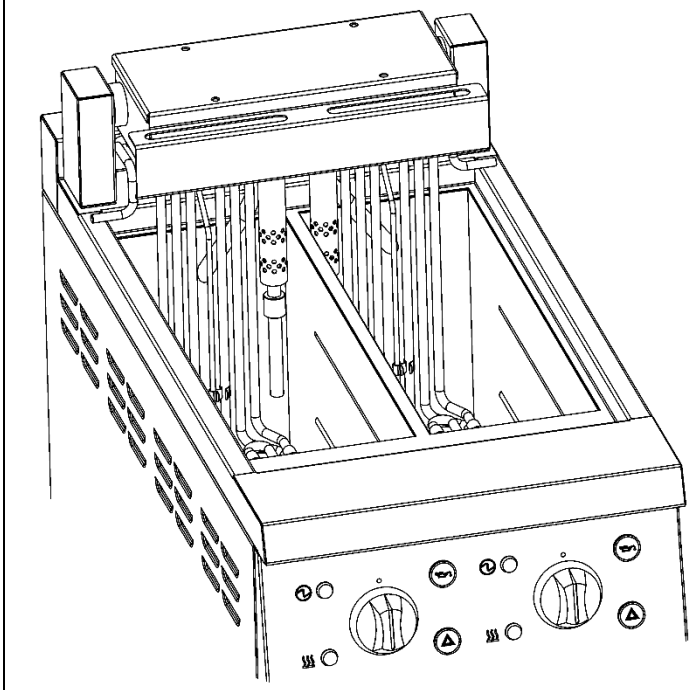
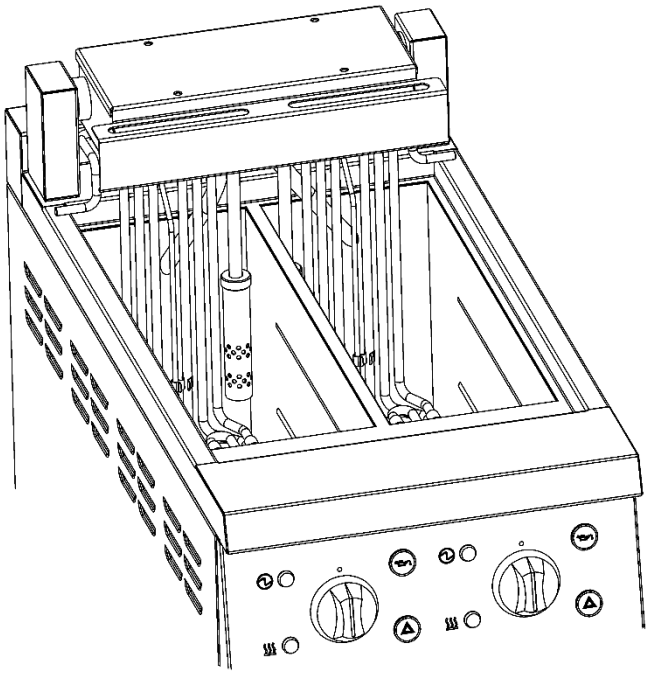
Sensor Guard in E401X/FX, E402X/FX & E3840X/FX/PX/PFX



Sensor guard raised for cleaning

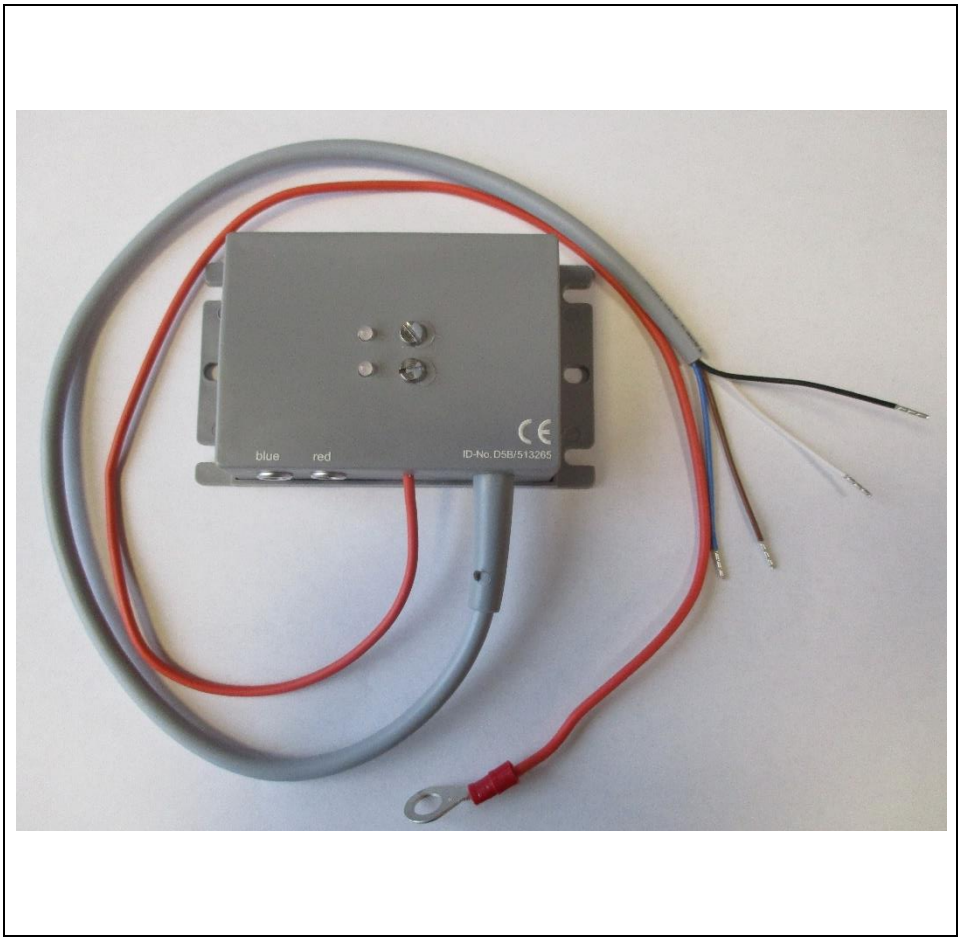


Sensor guard lowered for normal operation

Sensor Guard in E421X/FX/F2X, E422X/FX & E3845X/PX/FX/F2X	
	
Sensor guard raised for cleaning	Sensor guard lowered for normal operation

The guard fitted to the gas fryers is different to the guard fitted to the electric models. They are not interchangeable.

2.4 Evaluation unit



The evaluation unit has the following:

- Two bnc sockets (Red & Blue) which the sensor leads plugs into.
- An earth lead with an M5 ring which must be connected to a good earth.
- A grey cable containing 4 wires.
    - The brown wire is the 24VDC connection.
    - The blue wire is the 0VDC connection.
    - The black wire controls the ‘Low Oil’ relay.
    - The white wire controls the ‘Top Up’ relay.
- Two LEDs which indicate the status of the sensor: **Green** = no oil and **Yellow** = oil present.
    - The upper LED is for the ‘Top Up’ sensor.
    - The lower LED is for the ‘Low Oil’ sensor.

- Two calibration pots which have the screws glued in to prevent tampering.

The evaluation unit compares the reading from the oil level sensors with its switching threshold. If the switching threshold has been reached due to the oil level being higher/lower than the sensor level, then the evaluation unit will energise/de-energise the relay tied to that sensor.

For instance, when the oil level drops to a level lower than the ‘Top Up Oil’ level, the coil on the ‘Top Up’ relay will be de-energised which causes the contact to switch over. This causes 24VDC to be fed to the ‘Top Up Oil’ indicator.

The evaluation unit is pre-set in the factory, service engineers should not make any adjustment in the field. The maximum operating temperature for this unit is 55°C.

2.5 Power supply

The power supply provides 24VDC to the following components:

- Evaluation unit.
- 'Top Up Oil' indicator.
- 'Low Oil' indicator.
- Buzzer (gas models only).

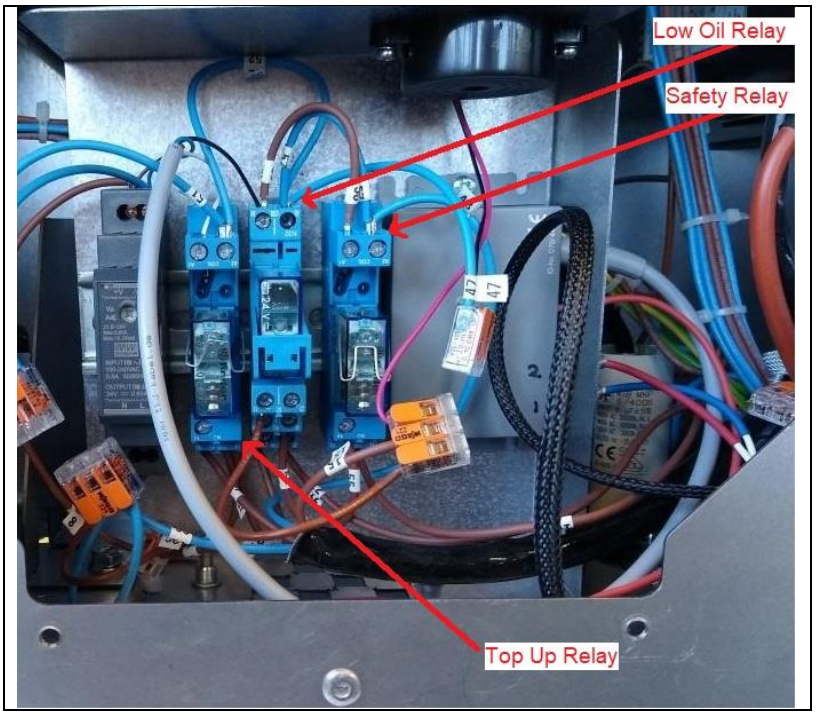
2.6 Relays

There are three 24VDC relays fitted as part of the Oil Level Sensor system:

- Top Up relay – Energise / De-energises 'Top Up' Indicator.
- Low Oil relay – Energise / De-energises 'Low Oil' Indicator & Buzzer (Gas only).
- Safety relay – Makes / breaks safety circuit.

The relays are controlled by the evaluation unit.

Note: Twin pan fryers have an individual Oil Level Sensor system fitted to each pan.



If replacing the relay, make sure that it is the correct 24VDC relay that is fitted.

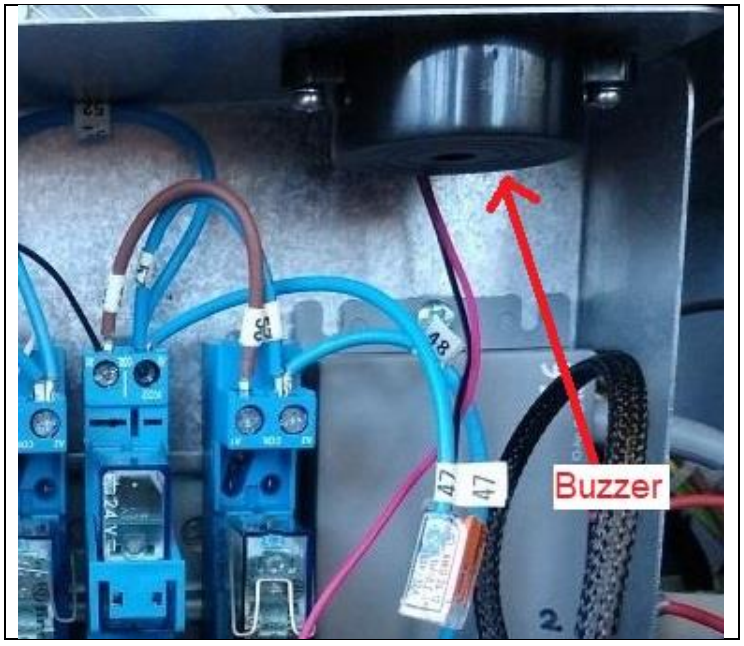
2.7 Indicators

The following 24VDC indicators are fitted as part of the Oil Level Sensor system:

- Top Up indicator – Orange oil can symbol. Indicates when oil level is approximately 40mm below the ‘MIN’ mark.
- Low Oil Indicator – Flashing red hazard triangle. Indicates when oil level is approximately 80mm below ‘MIN’ mark.

2.8 Buzzer (Gas variants only)

The 24VDC buzzer operates when the ‘Low Oil’ level is reached



In the electric variant models the existing ’Check Oil’ buzzer / indicator sounds when the fryer is in a ‘Low Oil’ state. That is why only the gas variants have the additional 24VDC buzzer.

3.0 FAULT FINDING

FAULT	POSSIBLE CAUSES	REMEDY
Unit is switched on and the Top Up/ Low Oil indicators are lit. Buzzer is sounding.	Not enough oil in the pan.	Check the pan is filled with cold oil to the 'MIN' mark.
Correct level of oil in the pan, but the Top Up/ Low Oil indicators are lit.	Safety stat has tripped.	Check safety stat
	Sensor cables not fitted to evaluation unit.	Check the sensor cables are fitted correctly in the evaluation unit.
	Earth lead for the evaluation unit not correctly earthed.	Check the evaluation unit is correctly earthed.
	Guard not in place.	Check guard is in place.
	Low oil & top relays	Check the relays are seated correctly and the wiring is correct and in place. Check for the presence of 24VDC on the white and black wires from the evaluation unit.
	Evaluation unit	Check if the evaluation unit has power. Check if the LEDs are **Green** or **Yellow**. If they are **Green** the evaluation is not registering the oil level. This may be due to a faulty probe or evaluation unit. Plug the current oil level probe into a new evaluation unit and if the fault clears replace the installed evaluation unit.
	Oil level probe	Plug a new probe into the evaluation unit and dip it into the oil before fitting in the element head. If the new probe senses the oil level and the fault clears replace the probe.
Top Up indicator is indicating when the Low Oil indicators should be indicating.	Low Oil & Top Up sensor cables are connected the wrong way round	Check the sensor cables are fitted correctly in the evaluation unit.
Top Up / Low Oil indicators are not lit when the oil is below the sensor levels.	Food debris clogged inside guard giving a false oil level reading.	Lift guards, check for food debris and clean sensors.
	24VDC missing from system	Check 24VDC is available from power supply
		Check evaluation unit is powered.
		Check 24VDC is available at relays.
		Check the correct relays are fitted and they are fitted correctly.
		Check the fryer is powered on.
		Check the fuses
	Fryer is switched off	Check the fryer is powered on.
	Top Up / Low oil indicators are not connected	Check wiring to make sure the indicators are connected.

4.0 HINTS & TIPS

4.1 Electric fryers

If a sensor must be replaced, you will need to remove the following panels:

- Control panel - Allows side panel to be removed.
- Left hand side panel - For cable routing.
- Element head cover - For access to sensor.
- Rear lower electrics panel - For access to evaluation unit.

When replacing the sensor:
Once the sensor leads are removed from the evaluation unit, attach a length of spare wire to the ends of the leads. This spare length of wire should be long enough to go from inside the element to the bottom of the appliance.

As the cable must travel up through the hob and into the element head, this spare length of wire makes it easier to pull the cables back through when replacing the sensor.

4.2 Gas fryers (G401X/FX, G402X/FX & G3840X/FX/PX).

If a sensor must be replaced, you will need to remove the following panels:

- Control panel – For access to sensor and allows side panel to be removed.
- Left hand side panel – For cable routing
- Rear lower panel – For access to evaluation unit.

4.3 Gas fryer (G9341X/FX)

If a sensor must be replaced, you will need to remove the following panels:

- Control panel – For access to sensor.
- Lower inside left-hand panel – For cable routing
- Rear lower panel – For access to evaluation unit.