



# MODEL KS-160

## GRAIN EXTRUDER

**The KoEx Grain Extruder is designed to produce between 80 and 200 kg per hour of raw expanded collets from a variety of grains such as rice, maize, mungbean and soybean.**

A large number of product shapes and sizes are available using existing KoEx dies or those built to customer requirements. The product can then be either dried or fried to produce an expanded snack, and flavoured to taste.

The KoEx Grain Extruder consists of the following functional parts:

#### *Grain Delivery System*

This consists of a self-contained grain feeder mounted on the extruder cabinet. It has its own hopper and feeds directly to the barrel inlet. The operator may adjust the feed rate from the Machine Control Display screen.

#### *Extruder Barrel*

This assembly houses the temperature controlled auger/die system. Grain metered from the grain feeder is gravity fed into the auger/die system through one of two feed holes depending on the feed and the product required. The male and female augers mix and gelatinise the grain before forcing it through the shaped die in the outer end of the barrel.

The Die Assembly is held in place by a heavy-duty quick release clamping system, enabling assembly or disassembly to be accomplished within seconds, greatly reducing machine downtime.

Electric heating is provided to raise the auger system temperature to the required operating level. Cooling is provided by passing a water spray through special passages in close proximity to the female auger. Once production has commenced, the temperature controls automatically heat or cool the system to maintain the desired product process conditions.



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### *Knife System*

The product extruded from the die is cut to length by a rotating knife. This is driven by an independent variable speed electric motor, the speed of which controls the length of the product. The knife assembly is enclosed in a stainless steel guard for safety and cleanliness and directs the product downwards for collection. To provide quick and easy access to the die, the knife, complete with its guard assembly can be moved out of the way after releasing a clamping lever.

### *Main Drive System*

A variable speed 30 kW electric motor drives the auger system through a Poly Chain belt and speed reduction pulleys. The main shaft bearings are grease lubricated for long life and minimum maintenance. For safety the belt drive is totally enclosed in an integral lockable cabinet.

### *Frame*

The machine frame is constructed of heavy steel sections rigidly welded as a unit. Stainless steel covers provide protection for safety and cleanliness. The frame is mounted on four adjustable feet, which may be skid mounted or bolted to a base or floor.

### *Control Equipment*

The machine control system, consisting of a PLC and LCD Display Screen gives the operator control and indication of the following functions:

- Main drive ON/OFF, Status, Speed Control & Indication and Load Indication
- Knife drive ON/OFF Status, Speed Control & Indication and Load Indication
- Feeder ON/OFF, Status, Speed Control & Indication
- Barrel heater control, Temperature Indication (3 places)
- Barrel cooling control
- Product recipe control
- Start & Stop Sequence control
- Machine Overview Screen
- Head Overview Screen

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The use of sophisticated and flexible control equipment in the form of a PLC with LCD Operator Display Screen, allows us to offer functions which previously could only be achieved with great difficulty. Many additional features can be provided, from simple trend displays to keep track of production rates and maintenance schedules, to on-line management reporting on a computer screen in the supervisor's office.

### *Safety Features*

To protect the operators from accidental injury, the back cabinet door, which is lockable and houses the main belt drive system, as well as the knife guard, are interlocked with their respective motors. Interlocks are also provided to sequence drives and thereby reduce the risk of accidental damage to the extruder.

Consumable tooling comprises male and female augers and die sets. These can be supplied to KoEx standards or to Client specifications.

### *Replacement Parts*

It is recommended that the following replacement parts are held in stock at the Clients works:

- Female auger 150 long 1
- Male auger 150 long 1
- Die assembly (Typical) 1
- Heating element 2
- Barrel die clamp 1
- Outer die retaining ring 1
- Thermocouples 2

KoEx holds these and other components in stock and they are normally available for dispatch within 24 hours of receipt of order.

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