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1. Application description

In the food industry, the field of vegetables selection and processing is characterized by machinery that requires a level of flexibility based on the product that needs to be selected, transported and stored. In this area there are many companies that design and manufacture machines to offer new and more efficient solution.

Belong to this sector the machines involved in filling bags, baskets and boxes using variable speed drives and belt conveyors for conveying fruit and vegetables inside the bags.

These machines consist of three functions that deal with move/convey, select and transport the product into bags which are subsequently stored in silos or warehouses.

For the operation of this type of machines **mechanical variators with a gearboxes** are used, with the aim of being able to change the filling speed in function of the loading/unloading of the productive day: as regards the mechanical variator is used a TXF from Motovario mechanical variators family, coupled with a worm gear reducer. The drive is managed by a pedal which activate/deactivate the movement of the belt conveyor, through a control box.

In recent years, with the rise of electronics, these motovariators begin to be replaced with electronics speed drives, which offer the possibility of a more flexible use due to the fact that they can be managed from a distance of several meters.

The torque transmission takes place via a worm gear reducer; the torque is transmitted to the belt conveyor which has a load that varies according to the quantity of material present; the load is set into motion with a speed that varies from 0.015 m/s up to 0.075 m/s following the application of drive torque required.

2. Motovario Solution

For this type of application Motovario offers in its product range the mechanical speed variator, which allows to carry out a speed change even if with some limitations given by the mechanical solution.

The solution foresees the use of a gear reducer motovariator, made by:

VARIATOR	TXF
Sizes	002 ÷ 010
Command type	Manual
Control handwheel	Disc Inc./Dec.
GEARBOX	Worm gear reducer
Sizes	NMRV030 ÷ NMRV-P075
Mouting Position	Horizontal BS/B3
MOTORE	DR Drives
Sizes	63, 71, 80
Efficiency level	according to IEC60034-30
Power	0,18 kW ÷ 0,75 kW

Motovario offers an alternative to the mechanical variator, this solution is an electronic speed variator integrated on the motor. Smartdrive®, beyond ensuring a higher efficiency (the use of electronics increases the efficiency of the machine), it also provides greater flexibility in addition to the possibility of the entire machine evolution.

INVERTER MOTOR	Smartdrive
Type	Single phase
Sizes	063
Power	0,22 kW
Control type	on board with/without potentiometer

The choice of the gear unit remains unchanged as product series, worm gear reducer, but in some cases it gets size / ratio variations.

Using the same components of the mechanical solution, through Smartdrive® **can be eliminated the control box that allows the activation of the gearmotor**, and connecting the pedals directly to the motoinverter using the digital inputs.

In terms of development of the machine Smartdrive® would also allow to remote the speed control, using the expansion board to connect a remote keypad (with or without potentiometer); it also has four digital inputs, of which only one is occupied, and the others can be used with electronic sensors that would act on the motoinverter and machine working way, using other functions available on the inverter.