This section details the primary mechanical and sensor components used across both the palletizing and bag placer lines, providing a record for future engineering reference.

1.Supplied Motor & Gearbox Specifications (Main Lines)

The following Bonfiglioli VF and W series right-angle worm gearboxes were used, paired with 3-phase, 380 VAC, 50 Hz motors common in South Africa.

Qty	Motor KW	Gearbox	Mount	Ratio	Motor Frame
10	0.18	VF49	P 1	1:70	P63-B14
4	0.18	VF49	P 1	1:70	P63-B14
2	0.37	VF49	F 1 Flange	1:24	P71-B14
1	0.37	VF49	F 1 Flange	1:24	P71-B14
12	0.37	VF49	Torque Arm	1:60	P71-B14
6	0.55	W63	Torque Arm	1:64	P80-B14
6	0.55	W63	Torque Arm	1:64	P80-B14
3	0.75	W63	Torque Arm	1:45	P80-B14
16	0.75	W63	UFC 1 Flange	1:45	P80-B14
1	0.75	W75	UF 2 Flange	1:50	P80-B14
1	0.18	VF44/W86	UFC Flange	1:400	P63-B14

2.Control & Sensor Technology (Bag Placer Lines)

The bag placer lines were mechanically designed with a focus on robust, "analogue-first" reliability using standard industrial components to facilitate easy local maintenance.

Component Type	Application	Key Features
Pneumatics	Bag handling, gripping, and positioning	Primarily double-acting cylinders for precise linear motion control. Utilizes standard 5-way, 2-position valves and FRL (Filter/Regulator/Water trap) units for reliable air preparation.
Motors	Conveyors, linear motion on bag placers	Standard 3-phase, 380 VAC motors operating at 50 Hz, designed for robustness and ease of local servicing.
Laser Distance Sensors	Precise bag opener positioning & orientation feedback	Uses time-of-flight (ToF) principles to provide high-accuracy, non-contact measurements in a dusty environment.
Position Sensors	Cylinder stroke verification & safety interlocks	Cylinder position reed switches and dustproof inductive sensors used for reliable feedback on mechanical position, essential for system synchronization.
PLC & HMI	Process Control and User Interface	Omron (or Delta) Control PLC, Safety PLC and HMI's are used to implement programming logic within the conveyor and related equipment interlocked control groups, with essential operator input via the HMI such as programme selection and bag sizing detail changes to automate setup and running.

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