

## Batching & Mixing

### Definitions

**Absorbed Moisture** - The moisture held in a material and having physical properties not substantially different from those of ordinary water at the same temperature and pressure.

**Absorbed Water** - Water held on surfaces of a material by physical and chemical forces, and having physical properties substantially different from those of absorbed water or chemically combined water at the same temperature and pressure.

**Absorption** - The amount of water absorbed under specific conditions, usually expressed as a percentage of the dry weight of the material; the process by which the water is absorbed.

**Admix** - A material other than water, aggregates, and portland cement (including air-entraining portland cement, and portland blast furnace slag cement) that is used as an ingredient of concrete and is added to the batch before and during the mixing operation.

**Admix Dispenser** – a dispensing assembly designed for use in concrete batch plants to dispense admixtures (a liquid or dry power) directly into the mixer with accurate, reliable and easy operation.

**Aerator** (bin/silo) – A bin aerator, when installed on any storage silo, bin or hopper, can be extremely versatile and effective in getting dry bulk materials, like fine cement, to gravity feed more reliably at a very low cost. Materials which tend to pack, bridge or hang up can be made to flow freely and instantly upon demand.

**Aggregate** – the raw materials (rock and sand) used to make concrete.

**Aggregate Batcher Low Limit Tolerance** - This allows the operator to set the minimum tolerance for the Aggregate Batcher. At step # 3 in the Aggregate Batching Sequence where the system checks the Empty Aggregate Batcher Tolerance, if the Aggregate Batchers Scale value is less than the (Aggregate Batchers Lower Limit Weight) this will halt the system and turn on an alarm.

**Aggregate Batchers High Limit** - This allows the operator to set the maximum tolerance for the Aggregate Batchers. At step # 3 in the Aggregate Batching Sequence where the system checks the Empty Aggregate Batchers Tolerance, if the Aggregate Batchers Scale value is greater than the (Aggregate Batchers Upper Limit Weight) this will halt the system and turn on an alarm.

**Aggregate #1 Cutoff Limit** - This value, set by the operator, determines when the slow-feed bite-size cycle starts. Aggregate Gate #1 fast-feeds material into the weigh batcher until the actual material weight reaches the calculated cutoff weight, then starts the slow-feed cycle.

**Aggregate #1 Low Limit Tolerance** - This allows the operator to set the minimum tolerance for Aggregate # 1 weight. The dispensing of Aggregate #1 is stopped when the actual material weight reaches the preset (Aggregate # 1 Lower Limit Weight), this action will start the weight check delay timer. If the actual material weight stays above the (Aggregate # 1 Lower Limit Weight) for the duration of the weight check delay timer then the Aggregate batching will step to the next process.

**Aggregate #1 High Limit Tolerance** - This allows the operator to set the maximum tolerance for Aggregate # 1 weight. During the Aggregate # 1 Batching step, if the actual material weight is greater than the (Aggregate #1 Upper Limit Weight) for the duration of the weight check delay time this will halt the system and turn on an alarm.

**Aggregate Bin** - A fabricated assembly that is designed to store the bulk raw aggregate materials needed for mixing process.

**Aggregate Bin Microwave Probe** - A microwave sensor provides a continuous on-line moisture measurement of materials in bins and silos. The sensor is positioned in or close to the neck of the bin so as to measure in the flowing material during batching (typically used in a weigh batching process).

**Aggregate Blending** - The process of intermixing two or more aggregates to produce a different set of properties, generally, but not exclusively, to improve grading.

**Aggregate Collector Belt Conveyor** - A motor-driven belt conveyor, located under the head pulley of the aggregate meterfeed belts that is designed to collect and convey the raw aggregate materials on to an aggregate incline belt conveyor. (typically used in a volumetric process).

**Aggregate Collector Weigh Belt Conveyor** - A motor-driven belt conveyor, located under the aggregate storage bins, that is designed to collect and weigh (by load cells) the raw aggregate materials, then convey them on to a aggregate incline belt conveyor.

**Aggregate Conveyor Microwave Probe** – A microwave sensor measures moisture in materials on conveyor belts and belt feeders. Suitable for batch or continuous processes, the sensor rides on the surface of the material it is measuring (typically used in a volumetric process)

**Aggregate Gate** - A clam gate, attached to the bottom of the aggregate storage bin, operated by an air-cylinder is designed to dispense raw aggregate material from the bin. (typically used in weigh batching process)

**Aggregate Graduation** - The distribution of particles of granular material among various sizes, usually expressed in terms of cumulative percentages larger or smaller than each of a series of sizes (sieve openings) or the percentages between certain ranges of sizes (sieve openings).

**Aggregate Heavyweight** - Aggregate of high density, such as barite, magnetite, hematite, limonite, ilmenite, iron, or steel, used to produce heavyweight concrete.

**Aggregate Holding Hopper** - A fabricated assembly that is designed to hold and store, the raw aggregate materials needed for mixing process. When requested by the mix sequence, the aggregate holding hopper will dispense the materials into the mixer. (typically used in a volumetric process)

**Aggregate Incline Belt Conveyor** - A motor-driven belt conveyor, located under the head pulley of the aggregate collector belt conveyor that is designed to convey the raw aggregate materials into an aggregate holding hopper.

**Aggregate Lightweight** - Aggregate of low density, such as (a) expanded or sintered clay, shale, slate, diatomaceous shale, perlite, vermiculite, or slag; (b) natural pumice, scoria, volcanic cinders, tuff, and diatomite; (c) sintered fly ash or industrial cinders, used to produce lightweight concrete.

**Aggregate Meter-feed Belt Conveyor** - A motor-driven belt conveyor, located under the aggregate storage bin, that is designed to meter-feed the raw aggregate materials on to a collector belt (typically used in a volumetric process).

**Aggregate Meter-feed Belt Count Switch** - A switch, located on the tail shaft end of the meter-feed belt, is designed to count pulses from a butter-fly shaped target that is attached to the tail shaft. The pulse or counts are use to measure volume of material needed in a volumetric process.

**Aggregate Meter-feed Belt Material Flow Switch** - A paddle operated switch, located near the head pulley end of the meter-feed belt, design to detect material flow. If material is not detected, the meter-feed belt will stop if running, and will not start if material is not detected.

**Aggregate Pantleg Hopper with Flop Gate** - A fabricated assembly that has two compartments (each having an aggregate gate for dispensing), each compartment is designed to hold and store the raw aggregate materials needed for mixing process for a two mixer system. When requested by the mix sequence of each mixer, the aggregate pantleg hopper will dispense the materials into each mixer respectfully (typically used in a volumetric process in a two mixer setup). The flop gate mounted over the two compartments diverts material into each compartment when requested by the mixing process.

**Aggregate Storage Bin** - A fabricated assembly designed to store the raw aggregate materials that are used in the batching and mixing process.

**Aggregate Weigh Batcher** - A fabricated assembly, located over the mixer that is designed to weigh (by load cells) and store, the raw aggregate materials needed for mixing process. When requested by the mix sequence, the weigh batcher will dispense the materials into the mixer. (typically used in a weigh batching process)

**Aggregate Weigh Batcher Gate** - A clam gate, attached to the bottom of the aggregate weigh batcher, operated by an air-cylinder is designed to dispense raw aggregate material from the aggregate weigh batcher (typically used in weigh batching).

**Alternate Batching** – This selection will give the operator the ability to Alternate Batch. This means selecting two (2) Batch Designs, then the system will alternate between these two (2) Batch designs.

**Alternate Mixing** – This selection will give the operator the ability to Alternate Mix. This means selecting two (2) Mix Designs, using the same batch recipe, but being able to have each of these with different color. Fractional size mixes (down to ½) will be the same for each Mix design. Then the system will alternate between these two (2) Mix designs. Example: one (1) mix will be “red” the next will be “black”, and then back to “red”.

**Antiquing** – A color layering technique for giving decorative concrete surfaces an aged or mottled appearance.

**Batching** - The programmed process of accumulating a predetermined target; weight or volume of aggregate, and a predetermined target weight of cement, in a weigh batcher or hopper, and then releasing the materials into the mixer at a predetermined signal from the mixing sequence .

**Batching Recipe** – Is the ability to store individual product batching set-ups, aggregate weights for weigh batching or counts for volumetric, cement weights, the number of ingredients to use and batch size.

**Bin** - (see aggregate storage bin)

**Bin Vibrator** – An efficient means to maintain free flow of product from bins, hoppers and chutes, with a direct and positive result on the bottom line. Whether the need is to ensure constant, uninterrupted material flow, or to eliminate the necessity for manual manipulation of a bin, hopper or bulk material. There are several types of bin vibrators: electromagnetic, rotary electric and pneumatic.

**Bindicator** – A rotating paddle or capacitance type sensing device that is used to measure material levels in aggregate bins and cement silos.

**Bite-Size** (slow-feed) – this is the process in which to slow feed material in to a weigh batcher once the calculated cutoff weight is reached. Bite-size is the length of time that the gate is open; when the bite-size timer expires the gate closes. The bite-delay is the amount of time that the gate remains closed, when the bite-delay timer expires, then the gate is activated to open, this allows the in-flight material to settle in the weigh batcher. This process works the same for the aggregate gate or the cement screw conveyor. When using a meter-feed belt feeding directly to the mixer (as in Load Sensing) then the meter-feed belt is jogged on and off...

**Calibration** – A process to systematically standardize the graduations of a quantitative measuring instrument. In reference to weight, to determine the difference between the balance/scale readout and the actual weight on the weighing platform to determine accuracy. Adjustment means to bring a balance/scale into the state of accuracy required for its use. In reference to moisture, to determine a base set-point reference. Therefore, 'calibration,' actually means "adjustment."

**Cement** – Finely ground calcined rock and clay materials that form the binder in concrete. Types of cements listed below:

*Type 1* - normal portland cement. Type 1 is a general use cement.

*Type 2* - is used for structures in water or soil containing moderate amounts of sulfate, or when heat build-up is a concern.

*Type 3* - high early strength. Used when high strength are desired at very early periods.

*Type 4* - low heat portland cement. Used where the amount and rate of heat generation must be kept to a minimum.

*Type 5* - Sulfate resistant portland cement. Used where the water or soil is high in alkali.

**Cement – Aggregate Ratio** - The ratio, by weight or volume, of cement to aggregate.

**Cement - Water Ratio** - The ratio of the amount of water, exclusive only of that absorbed by the aggregates, to the amount of portland cement in a concrete or mortar mixture; preferably stated as a decimal by weight.

**Cement Air Slide** - An air driven slide, located under the cement storage silo that is designed to convey the raw cement material to the cement weigh batcher. Air slides (closed type) are used for pneumatic transport of the material from one discharge point to another feeding point.

**Cement Batcher Low Limit Tolerance** - This allows the operator to set the minimum tolerance for the Cement Batcher. At step # 3 in the Cement Batching Sequence where the system checks the Empty Cement Batch Tolerance, if the Cement Batch Scale value is less than the (Cement Batch Lower Limit Weight) this will halt the system and turn on an alarm.

**Cement Batch Low Limit** - This allows the operator to set the maximum tolerance for the Cement Batch. At step # 3 in the Cement Batching Sequence where the system checks the Empty Cement Batch Tolerance, if the Cement Batch Scale value is greater than the (Cement Batch Upper Limit Weight) this will halt the system and turn on an alarm.

**Cement #1 Cutoff Limit** - This value, set by the operator, determines when the slow-feed bite-size cycle starts. Cement Gate #1 fast-feeds material into the weigh batcher until the actual material weight reaches the calculated cutoff weight, then starts the slow-feed cycle.

**Cement #1 Low Limit Tolerance** - This allows the operator to set the minimum tolerance for Cement # 1 weight. The dispensing of Cement #1 is stopped when the actual material weight reaches the preset (Cement # 1 Lower Limit Weight), this action will start the weight check delay timer. If the actual material weight stays above the (Cement # 1 Lower Limit Weight) for the duration of the weight check delay timer then the Cement batching will step to the next process.

**Cement #1 High Limit Tolerance** - This allows the operator to set the maximum tolerance for Cement # 1 weight. During the Cement # 1 Batching step, if the actual material weight is greater than the (Cement #1 Upper Limit Weight) for the duration of the weight check delay time this will halt the system and turn on an alarm.

**Cement Screw Conveyor** - A motor-driven screw conveyor, located under the cement storage silo, which is designed to convey the raw cement material to the cement weigh batcher.

**Cement Screw Disk Valve** - A slide gate, attached to the discharge end of the cement screw conveyor, operated by an air-cylinder is designed to open and close to allow the flow of material.

**Cement Storage Silo** - A fabricated assembly designed to store the bulk raw cement materials that are used in the batching and mixing process.

**Cement Weigh Batcher** - A fabricated assembly, located over the mixer, which is designed to weigh (by load cells) and store, the raw cement materials needed for mixing process. When requested by the mix sequence, the weigh batcher will dispense the materials into the mixer. (typically used in a weigh batching process)

**Cement Weigh Batcher Gate** - A pinch gate, attached to the bottom of the cement weigh batcher, operated by an air-cylinder is designed to dispense raw cement materials from the cement weigh batcher (typically used in weigh batching).

**Cementitious** – A material containing Portland cement as one of its components or having cement-like properties.

**Check Weighing** - To compare a weight against limits to determine if the weight is within preset limits.

**Color Dispenser** – A dispensing assembly designed for use in concrete batch plants to dispense color pigment (a liquid or dry power) directly into the mixer with accurate, reliable and easy operation.

**Color Mottling** – Applying layers of color to achieve variegated or faux finish effects, such as antiquing or marbleizing.

**Combo Weigh Batcher** - A fabricated assembly, located over the mixer, that is designed to weigh (by load cells) and store, the raw cement and raw aggregate materials needed for mixing process. Aggregate and cement each stored in separate compartments, each with its own gate. When requested by the mix sequence, the combo weigh batcher will dispense the materials into the mixer. (typically used in a weigh batching process)

**Concrete** - A composite material that consists essentially of a binding medium in which is embedded particles or fragments of relatively inert material filler. In portland cement concrete, the binder is a mixture of portland cement and water; the filler may be any of a wide variety of natural or artificial aggregates.

**Final Water** - The process in which water is added to the mix after all the materials are in the mixer and have thoroughly mixed.



**Forming Hopper** – A fabricated assembly located under the mixer discharge door that is attached to the mixed material belt. This forming hopper is designed to guide the mixed material onto the mixed material incline belt conveyor as the material is being discharged from the mixer. This forming hopper will not hold a full load from the mixer, the mixed material incline belt conveyor needs to be running before mixer can discharge. When a signal from the rollout hopper low probe is received, then the mixed material incline belt dispenses all the mixed material into a rollout hopper.

**Fly Ash** – A byproduct resulting from the combustion of ground or powdered coal; sometimes used as a cement replacement in concrete.

**Grizzly** – The area where aggregates are dumped from a truck into the aggregate handling system. A grizzly consists of a hopper with a grate over the top to allow trucks to drive over.

**Hopper Level Control** – The process in which to control the level of material in a hopper. This is accomplished by using an electronic module, and a hopper probe which is installed the hopper. The process can be used in controlling a meter-feed belt feeding into a hopper, also, sensing the material in a surge hopper, so as to signal the mixer when to discharge.

**Hopper Module** – An electronic device that accepts input from the hopper probe, the hopper module then sends an output signal to the PLC.

**Hopper Probe** – A manufactured rod assembly mounted in the side of a hopper. The hopper probe detects material in the hopper by means of resistance to ground. This change in resistance is sent to the hopper module.

**Hydration** - The reaction of cement with water to form a chemical compound.

**In-Flight Material** – This is the material that is free-falling, from the time the aggregate gate closes or the feeder belt shuts off till it settles into the weight batcher.

**Last Batch** – As selectable option used for shut-down, at the end of the day or shift's production run. When selected "On", any batch that has been started will be finished and used, but no new batches will be weighed or started.

**Lockout Tagout** – A means to control a hazardous energy source, such as using locks or tags to prevent electrical switches, pneumatic and hydraulic disconnects, from being turned on. These are the correct procedures necessary to shut down and prevent accidental activation of machines and equipment and protect employees from hazardous energy while they are servicing or maintaining machines or equipment.



**Load Cell** – A load cell is classified as a force transducer. This device converts force or weight into an electrical signal.

The strain gage is the heart of a load cell. A strain gage is a device that changes resistance when it is stressed. The gages are developed from an ultra-thin heat-treated metallic foil and are chemically bonded to a thin dielectric layer. "Gage patches" are then mounted to the strain element with specially formulated adhesives. The precise positioning of the gage, the mounting procedure, and the materials used all have a measurable effect on overall performance of the load cell.

Types of load cells typically used are; S-Beam (weight suspended or hung) pulling on the load cell, a Shear Beam or Tank weighting (weight is sitting) compressing the load cell.

**Load Cell Summing Box** - An electrical circuit generally used with load cells enabling the connection of two or more (up to four) load cells in parallel. Can be supplied with balancing components, to adjust the sensitivities of one or more load cells individually.

**Load Sense** – A process in which the aggregates are batched, from overhead bins or belt conveyors, directly into the mixer. This method of aggregate batching is based on the principle that any aggregate added to the mixer will offer a definite opposition to the rotation of the mixer blades. This opposition is transmitted to the mixer motor, via the drive train, resulting in an increased motor load that is proportional to the material in the mixer. A transducer and sensor continuously monitor the motor load to develop a usable output signal. In the proper sequence this signal is compared to different pre-set reference set-point; which correspond to definite quantities of the various aggregates. The flow of aggregate is precisely controlled; therefore, consistent proportioning is always assured.

**MBS** – Modular Batching System

**Mix Sequence** - A programmed routine that generates a stepping cycle. Position/function logic from the cycle, and input data processing, provides functional control of outputs and timing to produce the required batching and mixing results.

**Mixed Material Incline Belt Conveyor** – A motor-driven belt conveyor, located under the discharge door of the mixer that is designed to convey the mixed materials into a rollout holding hopper located over the block machine.

**Mixer** - A machine used for blending the constituents of concrete, grout, mortar, cement paste, or other mixture.

**Mixer (pan style)** – A mixer having a cylindrical pan (fixed or rotating) with a vertical shaft, while one or two sets of blades rotate inside the pan to mix the materials and a blade scrapes the wall of the pan. Types of pan mixers: Center Shaft (Pan fixed/ scaper moving), Center Shaft (Pan rotating/scrapper fixed), Dual Shaft (Pan fixed/scrapper moving), Counter-current motion (pan rotating/scrapper fixed. The shaft is also rotating), Planetary motion (Pan fixed/scrapper moving. The shaft is also rotating).

**Mixer (ribbon style)** – A mixer having a stationary cylindrical mixing compartment, with the axis of the cylinder horizontal, and one rotating shaft to which mixing blades, paddle arm or paddles are attached.

**Mixer Blade** – A blade that is attached to the mixer arm which moves through the material as the mixer shaft rotates.

**Mixer Clean-out Door (bottom) (optional)** – A manually operated door designed to use only during clean-up.

**Mixer Clean-out Door (rear)** – A manually operated door designed to use only during clean-up.

**Mixer Door / Gate** – A pneumatic or hydraulic operated door, when opened, is designed to discharge the mixed material from the mixer.

**Mixer Hold** – A selectable option used to pause/hold the mixing sequence/cycle. When selected “On”, the mixing cycle finishes the current step, then pauses until selected back to the “Off” position, or manually stepped to the next position.

**Mixer Liner** – A cast wear plate attached to the inside of the mixer tub, these replaceable liners are designed to protect the mixer tub from wear.

**Mixer Paddle Arm** – A cast arm that attaches to the mixer shaft. The mixer blade attaches to the arm.

**Mixer Probe (microwave)** – A microwave sensor that provides a continuous on-line measurement of moisture content in the mixer.

**Mixer Probe (resistive)** - An resistance sensing device installed in the mixer to sense the amount of moisture in the concrete mixture.

**Mixer Shaft** – The rotating drive shaft for attaching the mixer arms.

**Mixing Cycle** – The time taken for a complete cycle in a batch mixer; i.e., the time elapsing between successive repetitions of the same operation (e.g., successive discharges of the mixer).

**Mixing Recipe** – Is the ability to store individual product mixing set-ups, mixing sequence options such as color or admix, and blend times.

**Mixing Time** - The period during which the mixer is combining the ingredients for a batch of concrete. For stationary mixers, the time is measured from the completion of batching cement and aggregate until the beginning of discharge. For truck mixers, mixing is given in term of the number of revolutions of the drum at mixing speed.

**Moisture Module** - An electronic device that accepts a resistance input from the mixer probe, determines the amount of moisture in the concrete mixture (relative to a target amount), and outputs a signal to the PLC.

**Pivoting Mixed Material Belt Conveyor** – A motor-driven belt conveyor, located under the discharge door of the mixer that is designed to convey the mixed materials into a rollout holding hopper located over the block machine. This belt is capable of pivoting out of line by a motor-driven tire; this allows plant personnel to discharge a bad mix without running in through the block machine.

**Plasticizer** - A material that increases the workability or consistency of a concrete mixture, mortar or cement paste.

**Portland Cement** - A commercial product which when mixed with water alone or in combination with sand, stone, or similar materials, has the property of combining with water, slowly, to form a hard solid mass. Physically, portland cement is a finely pulverized clinker produced by burning mixtures containing lime, iron, alumina, and silica at high temperature and in definite proportions, and then intergrinding gypsum to give the properties desired.

**Prewet Water** – The process in which water is added to the aggregate mix in the mixer prior to the adding of cement.

**Rollout Hopper** – A fabricated assembly that located over the block machine. The rollout hopper is designed to hold and store the mixed materials needed for the block machine. Under the rollout hopper is the meter-feed belt conveyor. When the block machine hopper low probe calls for more material, the meter-feed belt conveyor will meter material into the block machine hopper. This Rollout hopper will hold a full discharge load from the mixer.

**Screen** (or Sieve) - A metallic sheet or plate, woven wire cloth, or similar device, with regularly spaced openings of uniform size, mounted in a suitable frame or holder for use in separating material according to size.

**Shuttle Belt Conveyor** –A motor-driven belt conveyor, located under the head pulley of the aggregate incline belt conveyor that is designed to convey the raw aggregate materials into two aggregate holding hoppers, (reversing).

**Sieve Analysis** - The classification of particles, particularly of aggregates, according to sizes as determined with a series of sieves of different openings.

**Silo** – (see cement storage silo)

**Skip Hoist** – A fabricated bucket assembly which provides a fast and dependable lifting means for all material handling operations. Applications can be to charge mixers with dry materials, or load mixed materials (concrete) into a rollout hopper.

**Slump** - A measure of the consistency of plastic concrete relative to the amount it falls when a slump cone filled with concrete is lifted vertically. The slump cone is then placed beside the specimen of concrete and the number of inches from the top of the cone to the top of the specimen of concrete is the slump. (see ASTM C143).

**Slump Water** – The process in which a metered amount of water is added to the mix after trim water is complete, and then the mixed material will be discharged from the mixer.

**Slurry** - A mixture of water and such finely divided materials, such as Portland cement, slag, or soil in suspension.

**Surface Moisture** - Water retained on surfaces of aggregates capable of mixing with portland cement in concrete; distinguished from absorbed moisture, which is contained inside the aggregate particles.

**Surge Hopper** – A fabricated assembly that located under the mixer discharge door. This surge hopper is designed to hold and store the mixed materials needed for the block machine. Under the surge hopper is the mixed material incline belt, when the block machine hopper low probe calls for more material, the mixed material incline belt will meter mixed material into the hopper. Surge hopper will hold a full discharge load from the mixer.

**Tare Weight** – The weight of a batcher without the weight of the goods it contains.

**Trim Water** – The process in which a final check of moisture content is made in the mix before it is discharged from the mixer. If the check finds that the moisture content in the mix is dry, then water will be added to bring the moisture content up to set-point, then mixed material will be discharged from the mixer.

**Vane Feeder** (rotary) – A fabricated assembly attached to the outlet of a bin or silo. A rotor of cylindrical outline with radial, spaced plates or vanes rotating on a horizontal axis, for controlling the flow of bulk materials.

**VFD** (variable frequency drive) – A electronic motor control device that is capable of controlling a motor at more than one speed. It can be used on; cement screw conveyors, aggregate feed belts, etc..

**Volumetric** – The measuring of the constituent materials for mortar or concrete by volume.

**Water Meter** – A positive displacement flow meter designed to measure precise amounts of fluids of each volume cycle. As the disc rotates, the center of the spindle rotates and sends a pulsed signal. Each pulse is equivalent to a fixed volume of fluid, example: (4oz. per pulse). This pulse then is used to measure total volume, indication or process control. Used primarily to measure a fixed volume of water in the mixer for when making a slump mix.

**Weigh Batching** – Measuring the constituent materials for mortar or concrete by weight.

**Weigh Indicator** – It provides a regulated excitation voltage (typically 10vdc) to the system's load cells or scale. A conditioned weight signal of (4-20ma) is transmitted to a PLC analog input.

**Weight** - The weight of an object is the result of gravity pulling a mass toward earth. When a balance has been calibrated using a known mass then any unknown mass placed upon the scale will have a weight proportional to the known mass. The unit's gram and kilogram, and ounce and pounds are often used to describe the weight of an object. It is common for mass and weight to be used interchangeably. A weight can also be any mass that is used, for example to put a weight on the scale.

**Zero Speed Switch (ZSS)** - The unit consists of electronics and magnetic sensing assembly potted in a probe body. This self-contained device provides a set of dry relay contacts for indication of motion or lack of motion in rotating, reciprocating, and conveying equipment.