

AUTOTRACK 500

POWER & FREE

CONVEYOR SPECIFICATION

POWER & FREE INTRODUCTION

The success of a *Power & Free* conveyor system lies in its flexibility of operation, allowing the flow of product to be controlled with the correct sequencing taking place to suit a customer's individual and specific requirements and working environment.

Unlike conventional continuous running chain conveyors, where product loads are attached directly to the conveyor chain via jigs/attachments etc. a *Power & Free* system utilises a series of free running trolley assemblies, which may be connected together with the use of a flightbar, to carry the load.

This obviously eliminates any restrictions in the routing and online assembly operations, which would be apparent within the constraints of a typical chain conveyor layout.

The trolley assemblies are routed in a twin channel section and driven around the system dependant upon the application by a single or multiple conveyor chains, which are mounted above the twin track/trolley track section.

By utilising a trolley assembly to carry a product load, total flexibility, due to the unrestricted movement of the trolley assembly throughout the system can be achieved.

Trolley assemblies may be routed from one conveyor line to another by the use of special transfer devices, stopped on-line for assembly operations or accumulated within buffer zones.

POWER & FREE – SYSTEM FEATURES

- Flexibility of Product Routing* - This may be achieved from one assembly area to another automatically with the use of simple mechanical flags or electronic bar code scanners.
- Products can be routed from assembly load/off-load areas through process plant lines.
- Product Sortation* - Specific product types can be identified and automatically routed to specific destinations, buffer storage areas or assembly operations.
- Storage of Products* - Products can be stopped at virtually any position within a system, allowing various production processes or other functions to be carried out with the product stationary.
- Products can be stored within a buffer area allowing for operational and production imbalances, shift changes and staged start up/shutdown procedures.
 - High level buffer areas can be designated to store specific products, thus leaving valuable floor space available for other purposes.
- Raising/Lowering Products* - Products can be raised and lowered in a vertical plane with the use of a powered 'drop section' which can be utilised at load/off-load areas for larger product types. Variances in conveyor heights can also be accommodated with the use of a drop section where space is a premium, instead of a conventional rise/fall track section.

Conveyor Speeds

- A variance in assembly operations for different component types can be achieved with the transfer of products to separate conveyor lines. Varying product pitches relative to conveyor speeds and product sizes can often reduce the size of process plant items and running costs.

System Diagnostics

- By utilising a comprehensive PLC controlled diagnostics package, maintenance tasks can be eased with on-line technical information regarding running times and suggested maintenance frequencies. Product tracking can be achieved through various stages of manufacture with this facility.

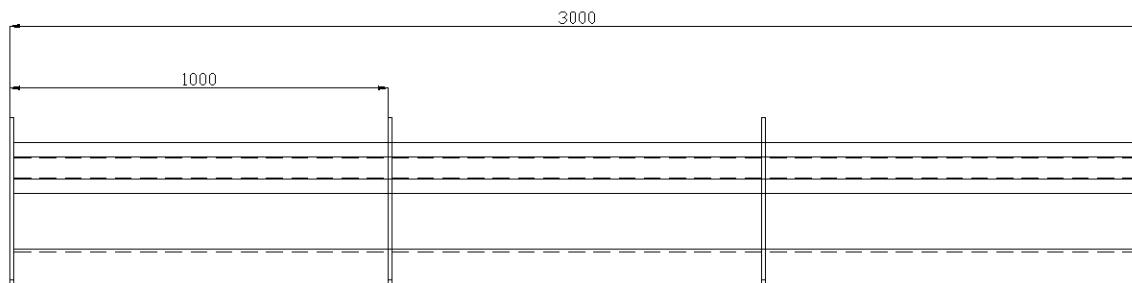
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STRAIGHT TRACK SECTION

The straight track section is made up from two sets of accurately cold rolled steel sections mounted one above the other.

A pair of 'Top Hat' sections, which are placed on their sides are utilised as a carrying and guide medium for the conveyor chain, with a pair of formed channel sections being used to support the trolley and loadbar assemblies. The two sections are then spaced apart by flange plates nominally pitched at 1000mm.

The design of the track section, once welded into an assembly, gives exceptional strength and a robust construction in the form of a composite beam, therefore minimizing support structure requirements.



AT 500
POWER & FREE STRAIGHT TRACK

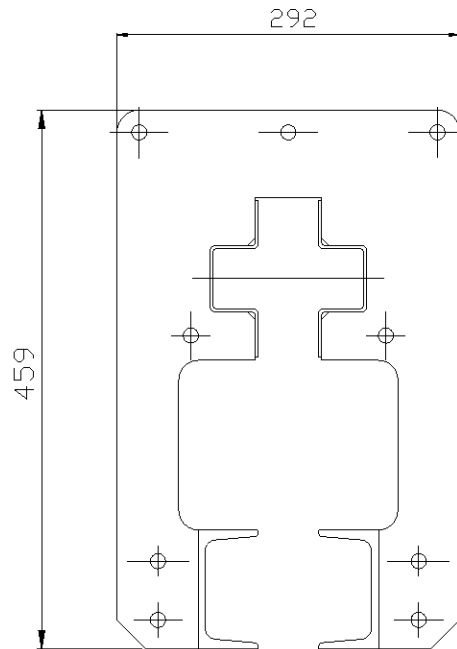
By utilising a channel section for the trolley track, the trolley and loadbar assemblies are totally captivated, thus eliminating any possibility of trolley 'jumping' within the track section when negotiating horizontal and vertical bends.

To ensure uniformity of quality all the track components are jig aligned and welded into standard 3000mm long sections, with variable lengths being cut and jig welded as required for make-up lengths within a conveyor circuit.

Straight Track cont'd

Each flange plate has 9 off holes which are used to bolt together each track joint, using 12mm fixings.

All internal running surfaces, on both the chain and trolley tracks, are aligned to ensure smooth running prior to final tightening of each joint, by our installation engineers.



Material Specification

- Conveyor Track (chain) - Mild Steel HR15 Pickled & Oiled – 3mm thick.
- Conveyor Track (trolley) - 102 X 51 R.S.C.
- Track Flange Plate - Mild Steel - 10 mm thick.

Finish

All conveyor track sections will be powder coated as standard.

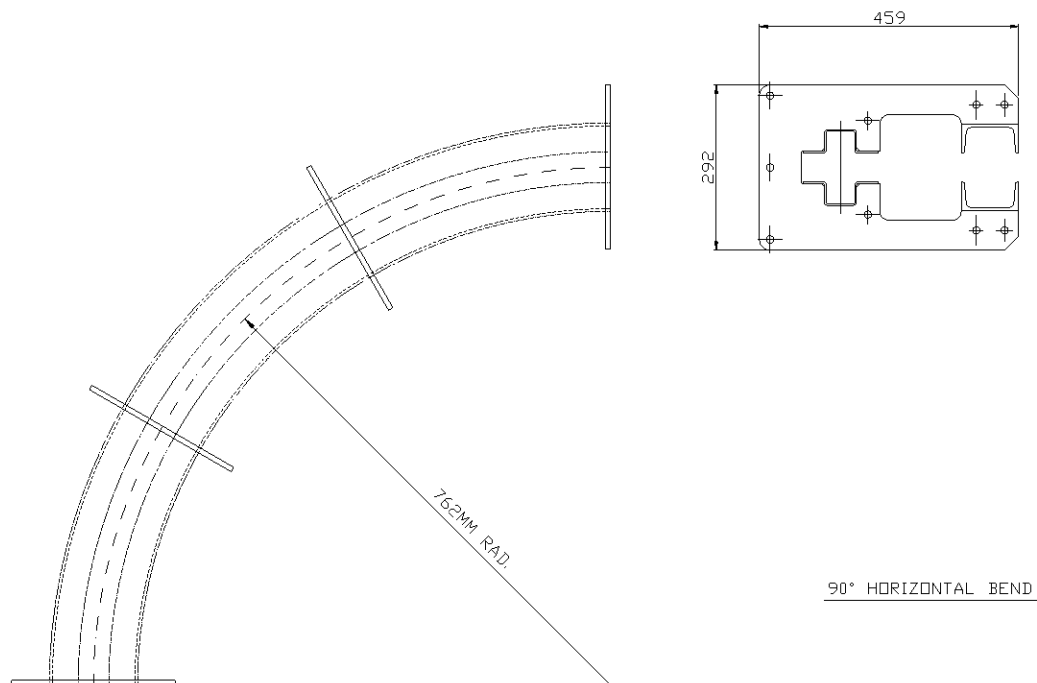
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HORIZONTAL + VERTICAL BENDS

Horizontal Bend

The configuration of the conveyor bends will be identical to that of the straight track, with the top hat and channel sections being rolled to the required radii and coupled with standard flange plates to be jig aligned and welded into a bend assembly.

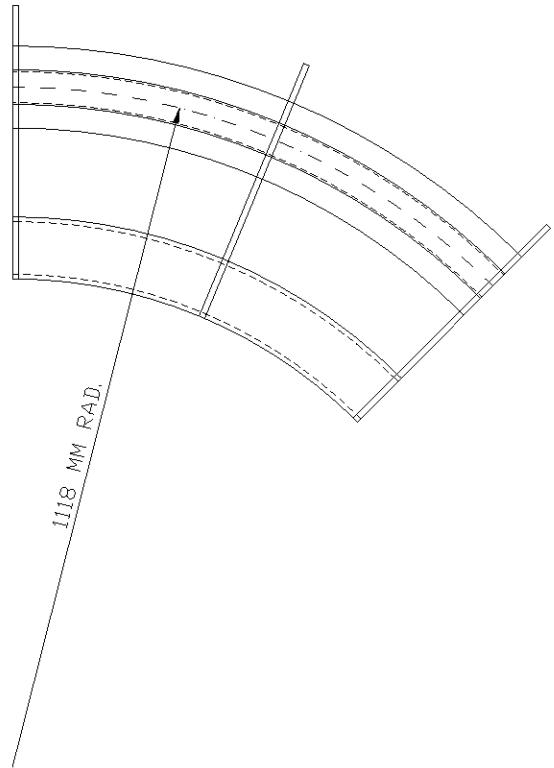
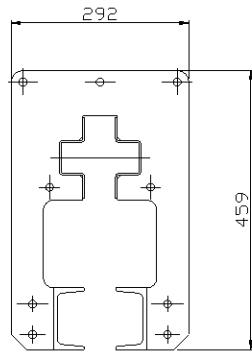
All top hat chain conveyor sections will be case hardened to ensure a prolonged life expectancy with a reliable system operation.



Vertical Bend

The configuration of the conveyor bends will be identical to that of the straight track, with top hat and channel sections being rolled to the required radii and coupled with standard flange plates to be jig aligned and welded into a bend assembly.

All top hat chain conveyor sections will be case hardened to ensure a prolonged life expectancy with a reliable system operation.



45° VERTICAL BEND

Standard bend radii and angles are available, however non standard units or composite type bends can be supplied if required.

<i>Standard Radii</i>	-	Horizontal	762mm
	-	Vertical	1118mm
<i>Standard Angles</i>	-	15°, 30°, 45°, 60° and 90°	

When a change in direction of the conveyor routing is required, from horizontal to vertical planes, it is essential that a minimum length of straight track, usually the length of the product accumulation pitch, is incorporated between a horizontal and vertical bend.

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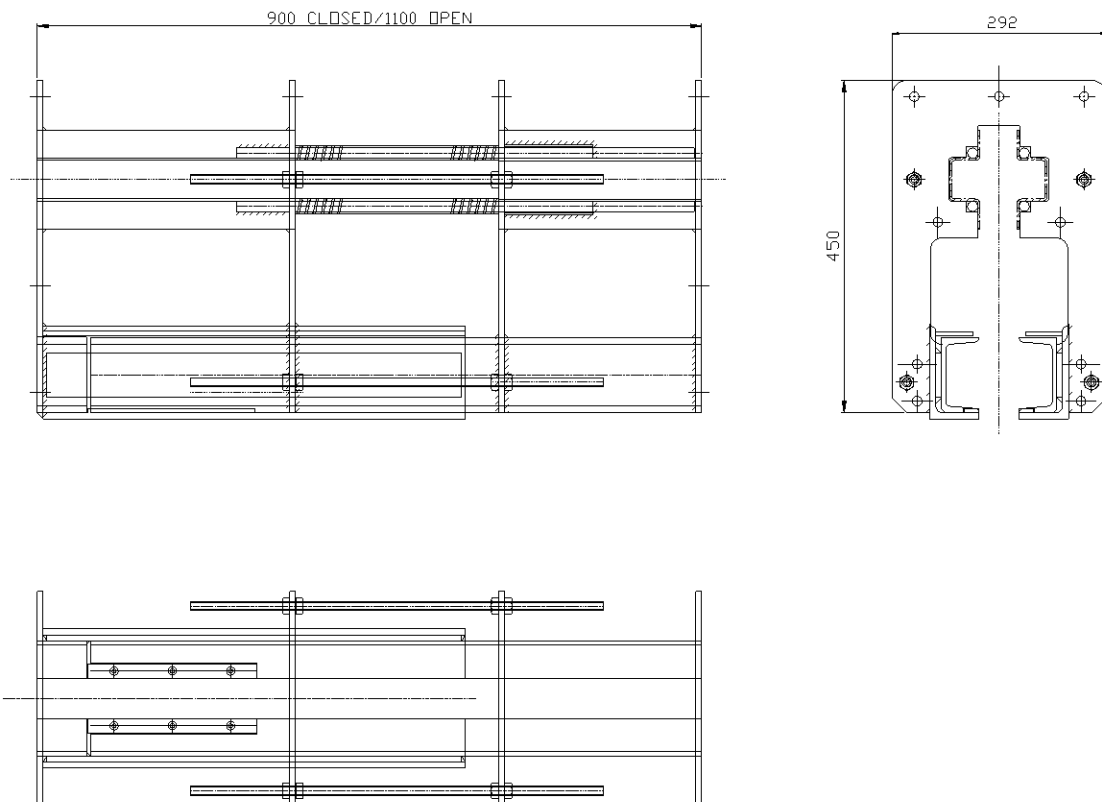
OVEN EXPANSION SECTION

Expansion Section

These units are designed to compensate for the expansion of the conveyor track section when installed through high temperature applications, such as curing ovens.

Dependent upon the oven size and length, at least one unit would be installed into each conveyor run within an oven. All conveyor support brackets attached to the oven structure would be designed so as to allow the conveyor track to 'slide'.

The construction of the unit is similar to that of a linear tension unit, with the use of standard track sections with a fabricated 'sleeved' track on each, to allow for adjustments.



Screwed rod adjusters are utilised to set the unit to the correct length for installation purposes.

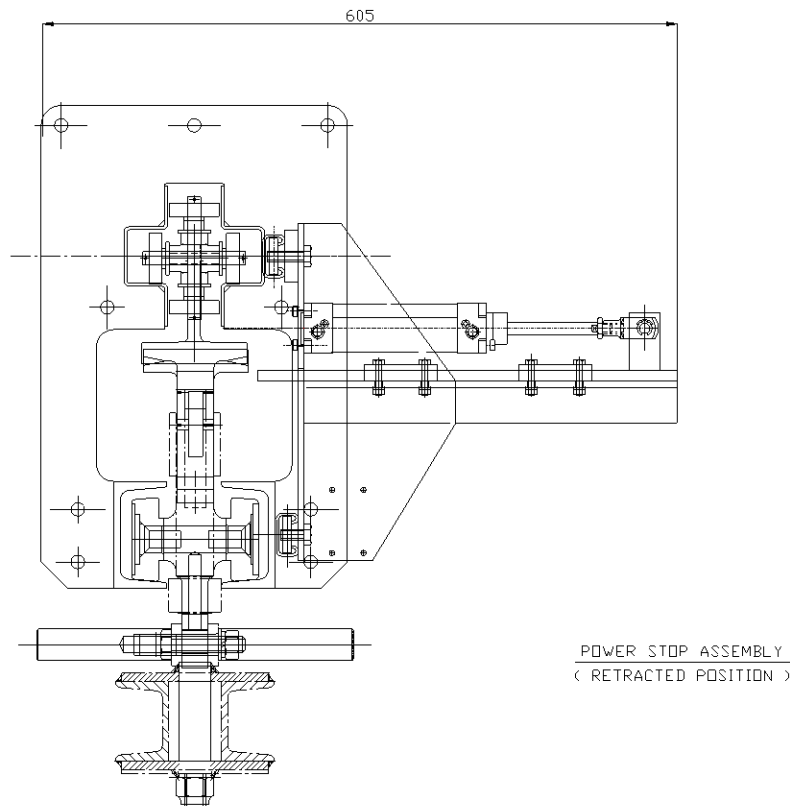
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PNEUMATIC POWER STOP ASSEMBLY

A pneumatic power stop assembly is used to create live storage and can be sited at virtually any position within a system, allowing various production processes or other functions to be carried out on the product, whilst stationary.

The general operation is simple, where a hardened steel blade can extend or retract to allow drive engagement and dis-engagement of the trolley unit. The power stop blade is actuated via a standard pneumatic cylinder.

Upon the blade extending and dis-engaging the trolley drive, all oncoming drive trolley dogs will pass over the blade and stored trolley unit, with no contact occurring.



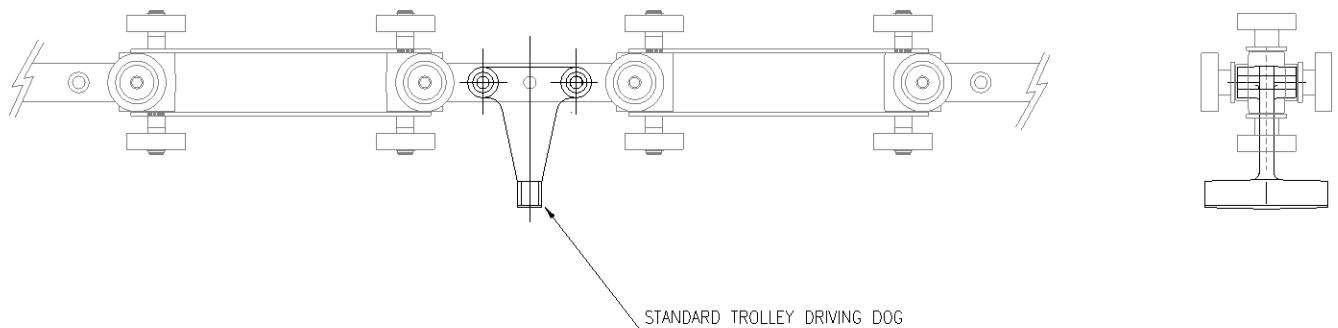
The power stop construction is fabricated from a series of folded plates and channel sections. The whole assembly is then mounted onto three 'unistrut' sections, which offer flexibility for on site positioning when carrying out the system commissioning.

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TROLLEY DRIVING DOGS

Trolley driving dogs are used as a traction medium for the power and free load trolley assemblies. The drive dogs are bolted between the conveyor chain side links at a standard pitch of 406mm, or a multiple thereof, dependent upon the specific application.

If required, intermediate pendants can be fitted into the conveyor chain at 203mm increments, however please consult Amber Industries Ltd. if this is a requirement for the operating parameters of the system.



The trolley driving dogs are cast from a malleable iron, therefore giving a hard wearing, strong reliable component.

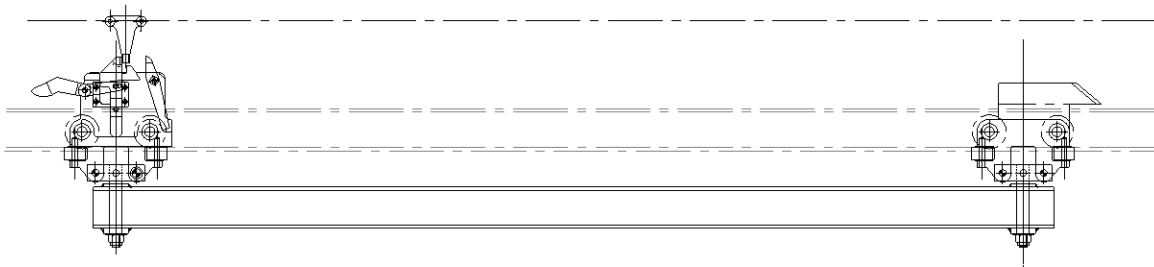
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TROLLEY AND LOADBAR ASSEMBLY

The products passing around the conveyor system will be transported on a trolley and loadbar assembly, which will be capable of bearing the full load of the product & associated jiggging and allow engagement and dis-engagement of drive on the conveyor chain.

The standard arrangement will comprise leading and trailing trolleys, coupled together by a loadbar, onto which is mounted a detachable flightbar. This flightbar will incorporate special locating fixtures allowing it to be automatically loaded and off-loaded through the transporter plant.

The cab products will be fixed directly to the detachable flightbar.



Leading Trolley

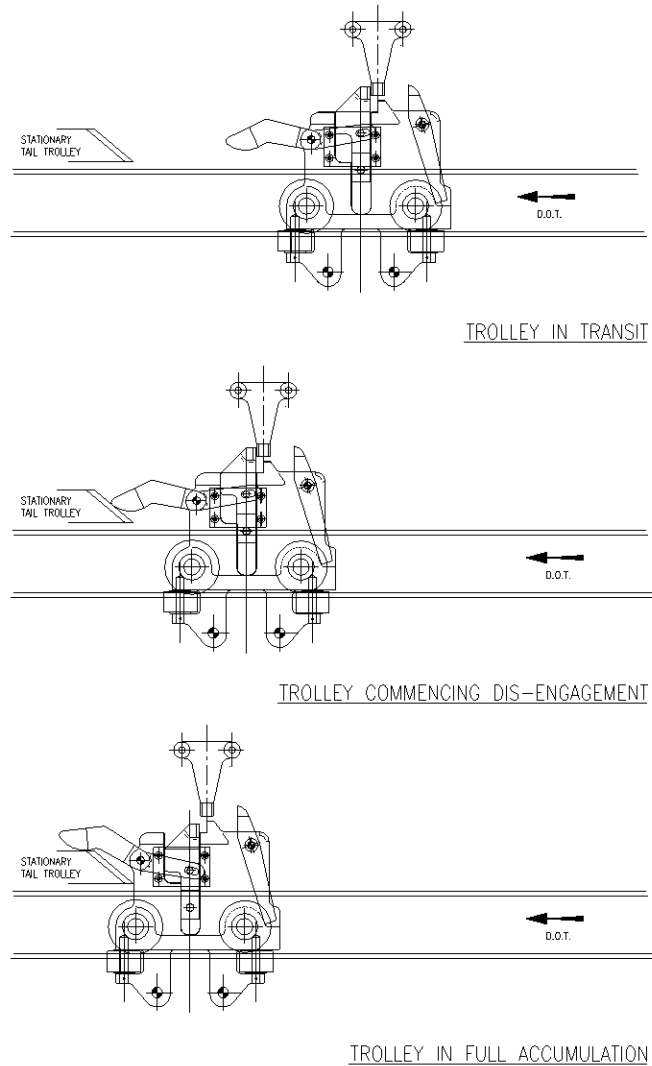
This trolley allows the driving pusher dog to engage and transmit it around the conveyor system, with the facility to uncouple the drive at specific points via the activation of a power stop or transfer section.

An anti run away pawl is also incorporated into the trolley design, which is used to control the trolley movement when negotiating vertical rise and fall sections.

The main body of the trolley is of a cast construction giving a hard wearing, strong and reliable operation. The body is carried by four load rollers, with two additional rollers being used as the guiding medium for the trolley.

A primary loadbar is mounted beneath the trolley body onto which various attachments can be taken, dependant upon the product to be handled.

The engagement and dis-engagement of drive is achieved through a series of mechanical levers, which raise and lower according to the driving requirement.



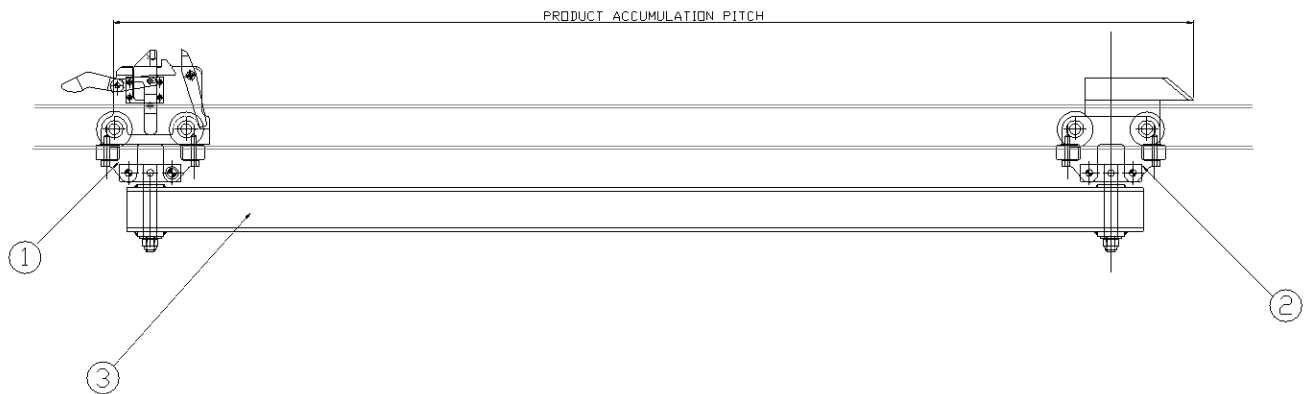
ACCUMULATION CONCEPT OF PF 500 H.D. LEADING TROLLEY

Trailing Trolley

The main function of the trailing trolley is to create the correct storage pitch of the products being handled, ensuring a clearance between product whilst in accumulation.

A secondary loadbar is used to connect the trailing and leading trolleys.

The trailing trolley is a fabricated unit similar in principle to the leading trolley, however, it incorporates a dis-engaging ramp, which is used to raise and lower the mechanical levers on the leading trolley.



<u>Item No.</u>	<u>Description</u>
1	Leading Trolley
2	Trailing Trolley
3	Trolley Loadbar

Product Loadbar

A loadbar assembly joins the leading and trailing trolleys together, therefore creating the storage pitch. The product storage pitch will always be greater than the overall length of the work envelope so as to offer a clearance between stored components.

At either side of the leading trolley centre line will be two out rigged striker bars, which are used to actuate limit switch sensors around the system, ensuring correct trolley routing, operation of power stops and identification requirements.

The loadbar will have three 13mm diameter fixing holes allowing the product jigs to be suitably bolted into position.

Attached to the loadbar will be the detachable flightbar, which will locate via a series of spigots and inverted angles, allowing ease of loading and off-loading.

AUTOMATIC SHOT LUBRICATOR

The purpose of a lubricator is to allow the effective application of lubricant to the conveyor chain and trolley components to enhance the life expectancy and reliability of the conveyor system.

The proposed lubrication system for the conveyor chains allows the precise application of the lubricant directly onto the critical components of the chain and trolleys, i.e. articulating joints and driving mechanisms.

An accurately measured quantity of lubricant is 'shot' onto the chain components via nozzles, which are aligned and set by our engineers during commissioning trials.

This method ensures a very accurate application of lubricant to the conveyor chain, thus considerably reducing the possibility of product contamination and reject components.

The general operation of the unit allows air to enter the pneumatic pump via a solenoid valve. The solenoid valve is controlled by a sensor which is activated upon the detection of each pitch of conveyor chain as it passes the sensing switch.

Oil is forced, by the pneumatic pump, into the nozzles from the lubricator reservoir tank where precise volumes of oil at high velocity are very accurately discharged onto the chain components.

Each conveyor system requires its own lubrication frequency, which is dependent upon certain, variable design parameters.

- ie Conveyor Speed
- Operating Period
- Working Environment (heat etc)
- Carrying Capacities

Due to the variation in the working parameters with every conveyor system, a full on site survey will be carried out, to evaluate the lubrication frequencies, upon completion of production trials.

Lubricator Specification

Reservoir Capacity:	10 Litres.
Energy Demand:	Compressed Air 3-5 bar. 5 cu. Centimetre per actuation.
Lubricant Delivery:	4 cu. m.m. per delivery per nozzle.

Chain Lubricant

We would propose the use of 'TP 1773', which in our opinion has a proven track record and when used in conjunction with our shot lubricators gives the most effective protection to the chain components whilst working in environments upto 250°C. - *Please see following specification details.*

Lubrication Site Survey

Once the system is in production, and operating to the designed plant parameters, we shall carry out a full lubrication survey and offer a suggested lubrication plan, based on the operational and environmental working conditions of the system.