

AutoTrolli— PAC/TRAC:ModSys

COMPLETE AGV —LOWCOST UNIT—HIGHSPEC FUNCTION & DESIGN

SWAC

Intelligence in Automation



Features:

- Lightweight Aluminium construction
- Laser Scanner
- Visual and Audible warning system
- Safety Bumper
- Drive & Steering Liftsystem
- Control with integrated Touch Screen
- AluTape routing system
- RFID Reader & Tags
- Flexible design and function
- For safety operation
- Integrated to Scanner and Bumper
- Integrated to safety relay
- Control & drive safety when repositioning
- Ensures easy programming and operator use
- Easy work route planning
- Enables specific programmed operations eg. Course change, door opening request, load or unload stop for specified time period

Options:

- Integrated battery charger—Reliability of operation
- Battery charging station—Increases uptime operation
- Laser zone scanner—Flexibility in operation
- RF communication—IT in realtime operation
- Central server control system—Remote overview operation

Function:

- Simple, safe, efficient, quiet, economical and flexible design enables application of SWAC—PAC or TRAC AutoTrolli technology for use in improving material flow, delivery of components, tak time and integration with manual work procedures and forklift operations.

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Trailer Hook



Visual and Audible Warning System

SWAC Controls & Touch Screen

Drive Steering Lift Lever

Hokuyo or SICK Obstacle Scanner

Safety Bumper to Pilz Relay

Rigid Aluminium Modular Design



Optional Battery Loading and Charging Station

Ensures quick changeover of batteries to facilitate optimum operational AGV usage



Technical Specifications:

- Load or Towing Capacity :- 0—2000kgs
- Trolli Dimensions :- BxLxH 75 x 140 x 93cm
- Height to top of Handle :- 1 mtr
- Loading surface area :- 70 x 100cm
- Height to load area :- 28cm
- Weight minus batteries :- ca. 85kg
- Travel directions :- Forward: straight on / left / right; Optional: reverse
- Protection rating :- IP20
- Speed of travel :- ca. 20m/min with max weight allowed
- Minimum turning radius :- 0.8m from centrepont
- Operational time :- Dependent on operating conditions and battery capacity.
- Motors :- 1 x DC Motor 24v with differential drive gearbox
 1 x DC Motor 24v with worm gear drive & toothed belt for steering
- Guidance system :- 1. Inductive prox sensors & floor laid aluminium tape
 2. Laser Scanner & Reflect System for indorro or outdoor use
 3. Radar Sensor for outdoor use only.
- Programs :- Unlimited programmability & instructions using embedded Linux software & RFID tags
- Safety functions :- Programmable obstacle scanner enables speed reduction and complete stop, safety bumper for immediate zero stop, emergency push button, amber warning lamp,audible warning unit.

Questions

Answers

- How fast can an AutoTrolli travel? • • Speed is programmable with an average speed of 24 metres per minute with or without load
- How does the AutoTrolli know where it is? • • We use a specific track layout and we can determine position by the control and the transponders over which the AutoTrolli has passed
- How is the AutoTrolli guided? • • It follows an Aluminium Tape stuck to the floor, so it follows a predefined circuit
- Does an AutoTrolli need be put on the path at only one specific location? • • The AutoTrolli can be introduced at any stage providing it is logical and functional to do so relevant to the work required
- Is an upper level control system required in complex systems? • • Only required if communication with a Factory Information Network is required or where interlocks relevant to robotic, conveyor or machining operations is intended.
- Do we need to install a wireless system in our plant? • • No this is not necessary, our system is self contained with intracommunication capability and possibility to network to a Factory Information Network, ie Profinet, Profibus, Devicenet etc.
- Does your communication system "speak" only when spoken to? • • Our controls and embedded RF technology permit continuous communication for efficiency of operation, where such continuous messaging is required.
- How does your cart know where to STOP? • • This can be achieved in two modes, 1 by use of the RFID reader and associated programmable transponders that allow the user to create specific instructions along the route when optimising the use of the AutoTrolli. 2 Within our control functions is a counter for distance travelled and this can override or report errors should a transponder fail to relay its instruction.
- How do you handle the positional error (count) created by drive wheel slippage or skidding to a stop? • • This can be achieved when the control system recognises a specific transponder information that is known to be at a specific location within the programmed circuit operation
- Can the AutoTrolli be routed to different destinations? • • If the circuit is laid out with instructions embedded in the RFID transponders, this can cause an instruction for a route change. Random route changes are not possible due to Safety requirements for such AGV systems
- How sharp of a turn can your AutoTrolli accomplish? • • The AutoTrolli has a 1.2m turning radius relevant to position opposite the centre of the track.

- What happens if there are tape gaps from fork truck or pallets being pushed around?
 - The sensors and controls act in unison to overcome short breakages so that an intermittent damage does not affect the overall performance. Severe damage will cause the signal to be lost and the AutoTrolli will stop and emit an appropriate visual and audible alarm.
- What if the tape gets dirty?
 - The colour of the tape is not important as we do not rely on colour for track guidance.
- How do you repair the tape if it gets damaged and the steering is affected?
 - If the tape is damaged, remove damage section, clean floor and reapply the recommended aluminium tape
- Can complex paths be laid out?
 - The short answer is Yes, but the operator should be aware of the greater complexities entailed to ensure safety of any crossover points and communication protocol between the AutoTrolli's on the route. Best practise for this technology and process is to keep it simple.
- How do we get a cart to stop "exactly" where we want it to stop?
 - Stopping in exact locations is governed by the RFID transponder information, the speed of the AGV and the stopping distance once a stop signal is initiated. Planning in advance will help to determine the required stopping points, which can then be fine tuned during implementation.
- How does the cart know when and where to stop?
 - RFID transponders activate stop points by transmitting a signal to the control, which cuts motor power and the AutoTrolli stops relative to speed and load.
- How does a cart stop at a stop?
 - Stopping incurs a slow down mode prior to final resting place. The final position can be determined with specific datum location points.
- How does the steering wheel know what direction to turn?
 - Steering & direction is governed by two factors. Primarily the aluminium tape determines the route. Turns left or right are preceded by RFID transponder information and the sensors respond to the parallel tape either to the left or right according to the imparted information.
- Will the cart bump into things left in the guideway?
 - If the laser sensor is correctly programmed the cart will stop before contact with any objects along the route. Furthermore we use a Safety bumper which upon actuation causes an immediate stop.

- If there are obstructions near the path (ex.: a rack structure or a bin) can they be ignored?
- Can flexible bumpers be used as a safety device?
- Are there other safety features required or supplied?
- Does the cart have load present sensors?
- Can off-board controls be used to release the cart from a stop?
- How is a disabled cart recovered from an assembly line or moved offline for service?
- How can we diagnose a cart problem?
- How long will the batteries last?
- Why is there a AUTO and MANUAL position indicated on the Lift Lever?
- The laser sensor we use has a wide programmable field that can be taught to ignore or recognise certain objects so that they do not interfere with the normal programmed operation of the AutoTrolli.
- Yes and we use them in our system as a standard safety item
- All our safety elements are working in tandem and co-operation with each other and controlled by Pilz Safety relay.
- Not as a standard item, but are available as an option
- Yes, for example an object or safety cone placed in the field of the laser sensor will prevent the AutoTrolli from moving. Once removed the AutoTrolli will automatically recommence operation.
- Manual recovery is straightforward. The AutoTrolli has a lift lever that picks up the drive steering module and allows the AutoTrolli to be used as a manual trolley. This allows the AutoTrolli to be corrected, moved for maintenance or battery charging and of course in the unlikely event of losing the course to be redirected.
- Our Control panel Touch Screen will indicate what problem is existing. However good practise and observation by the operators and users are the best source for determining any issues.
- This is dependent upon the type of batteries the customer wishes to use. The batteries we supply when requested will provide sufficient power for continuous operation for 16 hours.
- The lift lever allows the drive steering module to be lifted and thus disengage the control features of the AutoTrolli. This allows manual operation. When auto operation is required, the AutoTrolli is positioned over the Sensors and a light on the Control Panel will indicate that the course is detected, the lift lever is lowered and the start button is pushed and normal automated operation will recommence.