Automatic guiding system

Controls overview

Version 2.0

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This document is found at www.flexlink.com: Technical library/Functions/Automatic guiding system.

1. System overview

AGS should be safe, flexible, easy and fast to engineer and install.

A system is built up by a number of guide units which adjust the distance between the guides.
The guide units are grouped together in groups by 20 (10 in each direction) and controlled by an AGS box. Two kinds of AGS boxes exist:

- Control box
- Junction box.

The AGS Control box is the main electrical cabinet of AGS.

The Controls box is active[1]. Functionality:

- Receive control signals
- Supply controlled power[2] to up to 5 AGS Junction boxes in two directions
- Supply one guide unit group of 20 guide units[3]

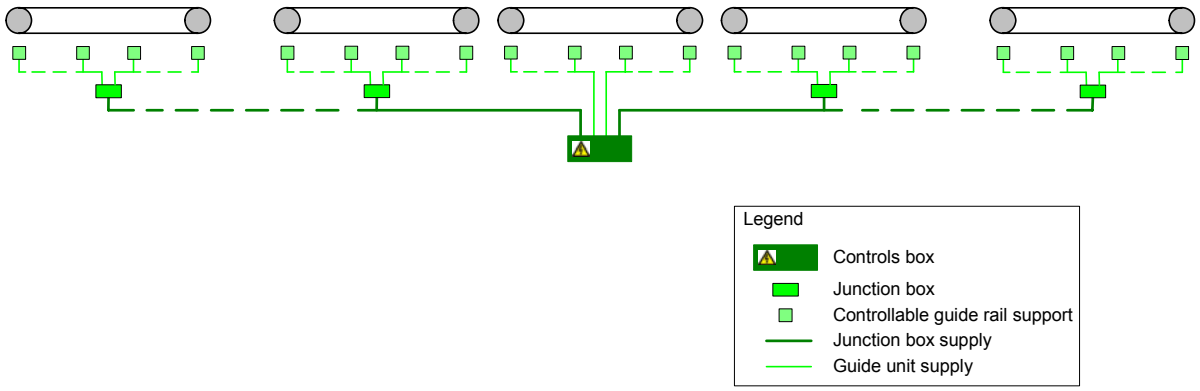
The Junction boxes are passive[1]. Functionality:

- Receive controlled power[2] from AGS Control box
- Supply one guide unit group of 20 guide units[3]

Note 1: Active in this case means containing control equipment, while passive means means it contains not other control equipment than transformers.

Note 2: The voltage of Junction box supply is high to reduce voltage drop at long distances and depends on geography. European boxes (50Hz) use $230V_{AC}$, while US boxes (60Hz) use $480V_{AC}$.

Note 3: The voltage of Guide unit supply is always $24V_{AC}$.



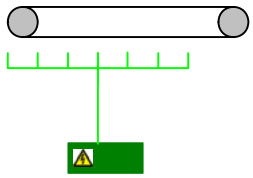
Picture: Adjustable guiding system topology

2. Easy to expand system

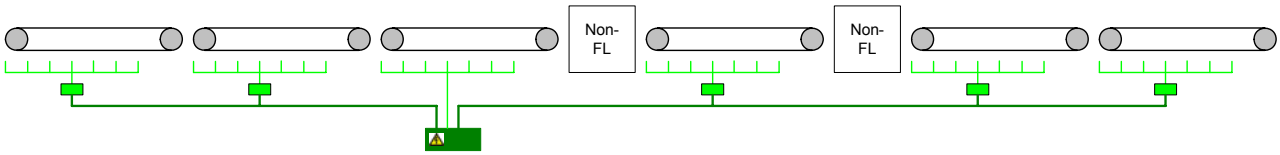
The Control box itself controls one group of 20 guide units. For each extra group of Guide units needed, an Junction box is added to the system.
Expanding is easy and flexible – the cable between the Control box and Junction boxes is connected terminal to terminal.

The Junction box's function is to junction, thus equipped with double terminals:

- one intended for the supplying cable
- one intended for the cable continuing to the next Junction box



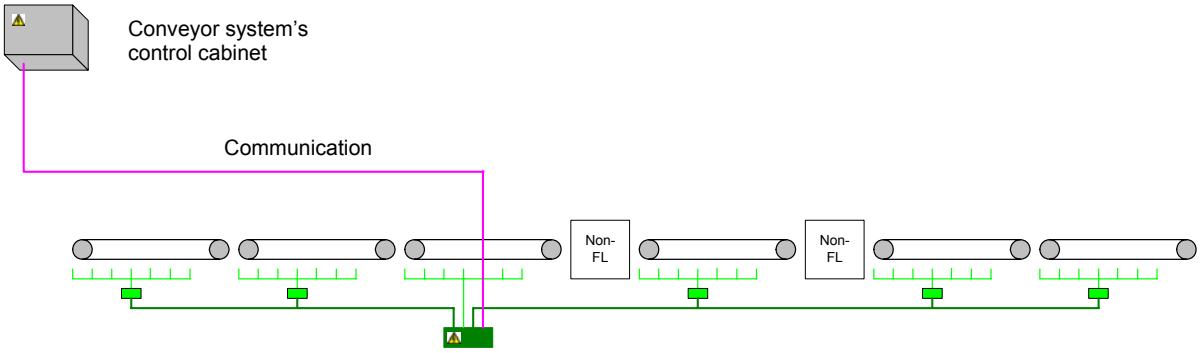
Picture: Small system.



Picture: Larger system

3. Utilizing existing investments

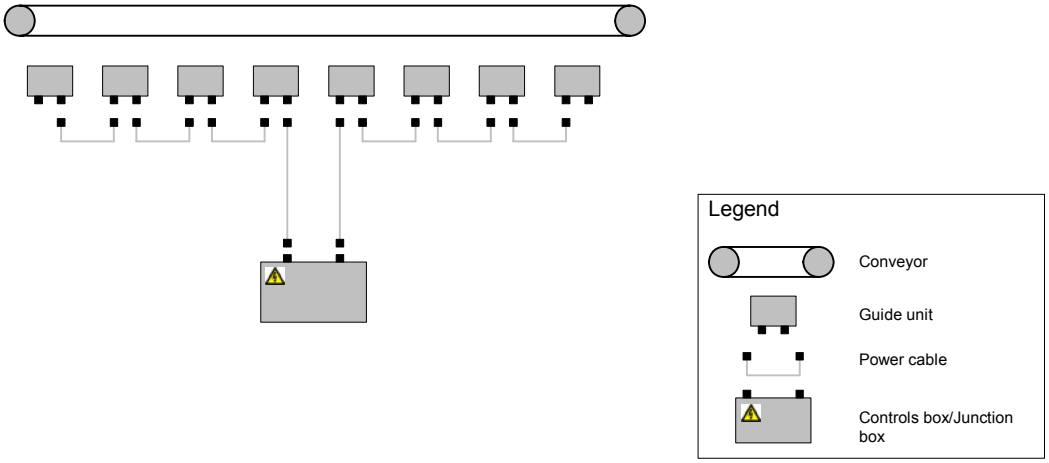
AGS is regarded as accessory to the conveyor system, consequently is the conveyor system's PLC used for controlling the Controls box (Type 2) in order to utilize existing investments.



Picture: AGS is connected to the conveyor system's fieldbus network

4. Installation hours minimized

The guide units are equipped with fast connectors as the distance between guide units do no differ. Consequently the guide unit supply cables are also equipped with fast connectors in both ends which is efficiently minimizing the number of installation hours.

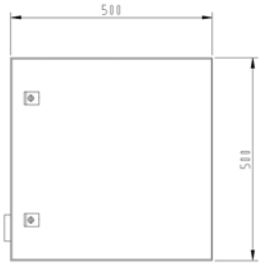


Picture: Guide unit supply

5. Boxes

5.1 Control boxes

The Control box is delivered in different types, all with the same physical size but with different ways of controlling the guide unit motion.



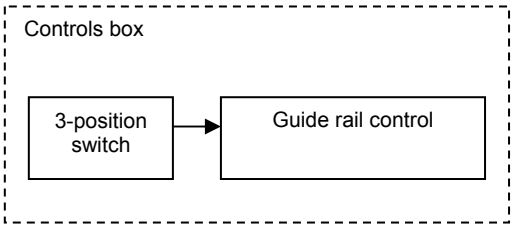
Picture: Controls box

Variables the have impact on selection:
- Easy solution is enough → 1
- Impossible to overview guide unit positions from Control box → 2
- Push a button and do other work while the system finds the position automatically → 2
- Repeatability → 2

Functionality:

- Receive control signals: "Guides inwards" and "Guides outwards"
- Junction box supply: Supply controlled power to Junction boxes in two directions
- Guide unit supply: Supply one guide unit group of totally 20 guide units.10 Guide units in each direction.

5.1.1 Control box Type 1: Manual setting

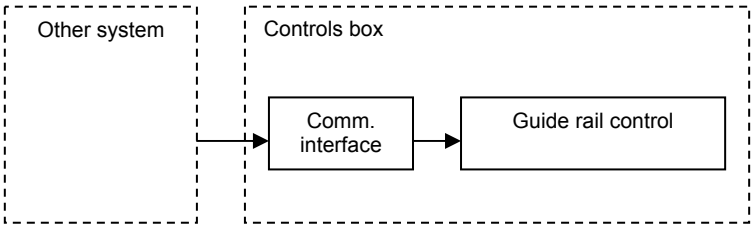


Picture: Signals

The door of the Control box is equipped with a 3-position switch.

The assembly plate inside the Type 1 box has an empty space with assembly rail dedicated for fieldbus module, simplifying up-grading to Type 2 in future.

5.1.2 Control box Type 2: Automatic setting



Picture: Signals

The Control box is equipped with a communication interface. Other machine/system controls the guide rails through the communication interface.

The fieldbus module contains 4 inputs and 2 outputs. The outputs control the guide unit motions. The inputs are free to use.

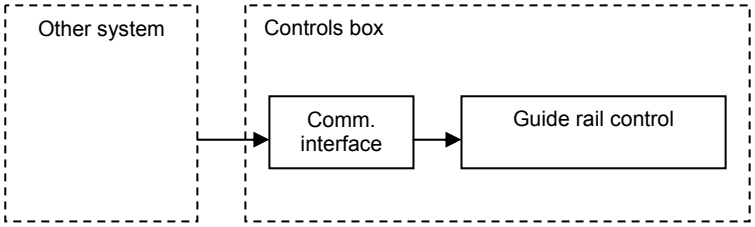
The fieldbus module is modularized and there is plenty of space for expanding the fieldbus module with more inputs and outputs.

5.1.3 Manual control kit

The Manual control kit is used on a Control box Type 2 in order to be able to manually control the Guide units before the communication is working.

The kit includes a 3-position switch to be integrated on the inside of the Control box next to the communication interface. It is removed when the communication is up and running.

5.1.4 Control box Type 2b: Automatic setting



Picture: Signals

Type 2b is similar to Type 2 but excludes the communication interface.

The integrator selects a communications interface which fits and integrates it easily.
Other machine/system controls the guide rails through the communication interface.

Type 2b is designed to let AGS be open for future communication standards.

5.2 Junction box

The Junction box comes in one type.

Functionality:

- Receive controlled power from AGS Control box
- Guide unit supply: Supply one guide unit group of 20 guide units. 10 Guide units in each direction.

The Junction box does not have any other power supply than that coming from the Control box.

6. Feedback functionality – Track width setting

See document "Software user guide" for information about Track width setting.