

Product description

1. Product what SHINKO apply to FCC part 15 subpart C

1.1 general

What SHINKO want to apply is a communication system for transportation system on the track.

SHINKO transportation system on the track are for example OHT(Overhead Hoist Transport),OHS(Over Head Shuttle) in clean rooms.

This communication is between ground side vehicle controller and the vehicle on the track. Communication items are vehicle destination, other control commands to the vehicle, vehicle status to the ground, etc.

1.2 How to operate communication system

In SHINKO transportation system on the track, in order to supply the power to the vehicle , system adopt the non-contact power supply system.

That is , parallel wires are set in the track and 8.66kHz AC current are lead to this wire from the ground side power supply unit. Vehicles take power with pick up transformer, which is set to the vehicle, from the parallel line.

Communication system utilize this power supply line. Communication system superimpose signals in frequency of about 300kHz to 350kHz on the power supply line.

1.3. Construction of communication system

Please refer to fig.1

Fig.1 Outline construction of communication system

Communication system mainly composed from next .

CMC: Communication Modem Controller

It is equipped In the Power Supply Unit on the ground.

It's function is modulation and demodulation of the signals of the ground side vehicle controller

Vehicle controller is a FCC recognized PC based controller.

CMC is composed mainly from next.

Printed circuit board (Circuit board name : BV-BC, BV-BM2)

Transformer for Transmit

Transformer for Receive

COM: Communication parts

It is a vehicle side unit.

It's function is modulation and demodulation of the signals of the vehicle controller on the vehicle.

Vehicle side PC based controller is used for both communication and control of the vehicle. Clock frequency of the PC is 66MHz.

COM part is composed mainly from next

Printed circuit board (Circuit board name : BV-COM)

Transformer for Transmit

Transformer for Receive

Using frequency (Adoption of Frequency Shift Keying Method, so 2 frequency are used for each transmit)

From Ground to Vehicle : 285.7kHz and 315.8kHz

From Vehicle to Ground: 342.9 kHz and 363.6kHz

2. Example of the transportation system using communication system

Fig.2.1 is a OHT(Overhead Hoist Transportation system) utilizing this communication system

With this OHT system, I'll explain the application of this communication system.

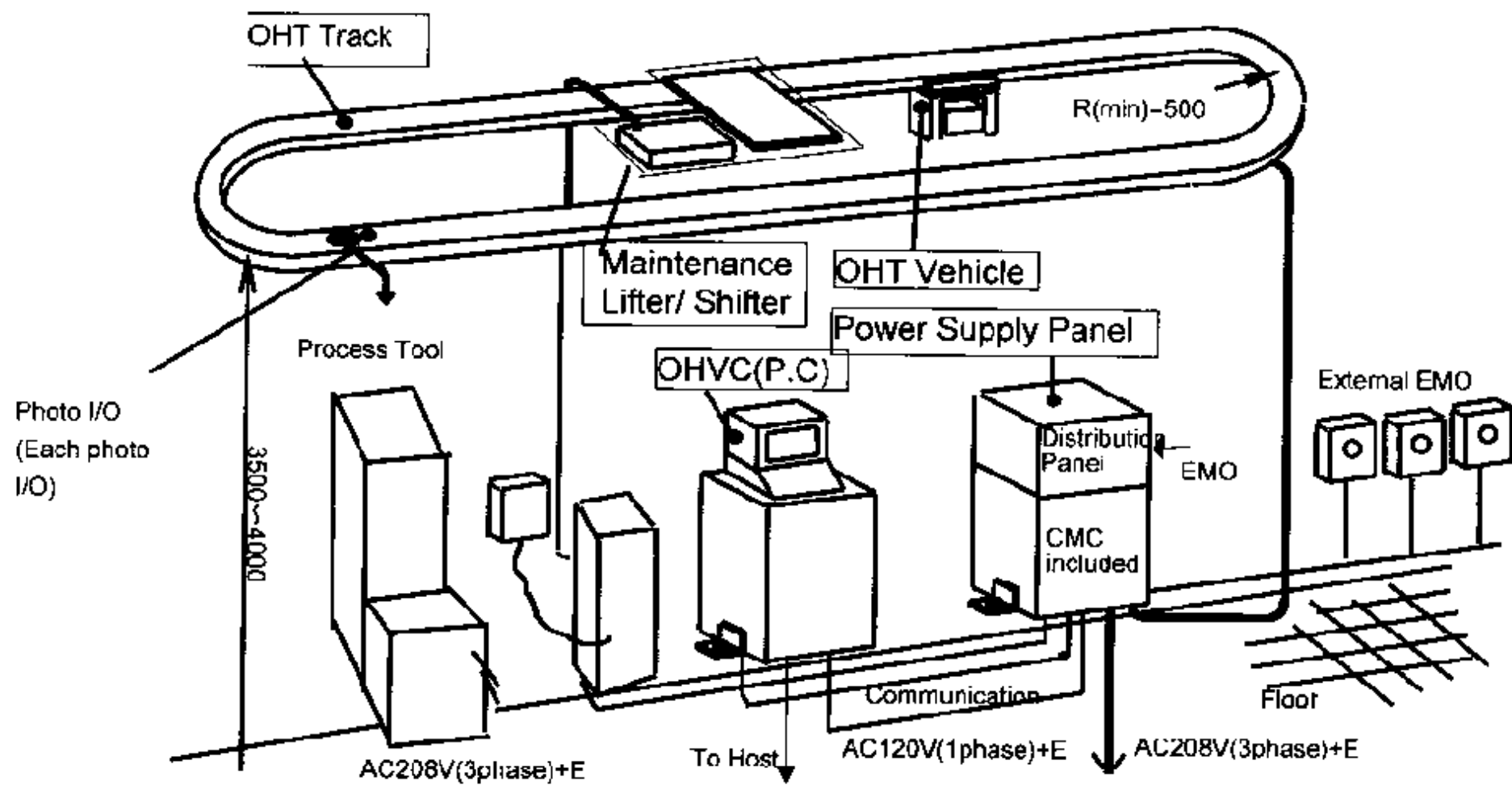


Fig. 2.1 OHT System Construction

2.1 Construction of OHT system

Fig.2.1 shows a typical construction of Shinko OHT system.

As shown in the Fig.2.1, Shinko OHT system is composed from the equipment listed below.

OHT Vehicle

OHT Track

Power Supply Panel

OHVC(Overhead Hoist transportation Vehicle Controller)

Maintenance Shifter/lifter,

Process tool (Stocker)

FOUP, etc.

(1)OHT Vehicle

Main device of the system is an OHT Vehicle, which is hung from the OHT track and travels through the track. OHV has a hoisting mechanism and a FOUP is hoisted down/up to the port of the process tool.

(2)OHT Track

OHT track is supported from the building ceiling, and OHV is hung from the track.

OHV travels by the linear motor power and the electricity is supplied from the track side by non-contact power supply system.

(3)Power Supply Panel

Power Supply Panel is composed from three portion.

(a) Power distribution Panel portion

Power source of the facility in the voltage of 208V is connected to the distribution Panel of the Power Supply Panel. And from here, electric power is distributed to the OHT system components (i.e. Power supply portion of this panel, Maintenance shifter/lifter, OHVC. OHVC is operated in A.C.120 V, so voltage is transformed from 208V to 120 V in this panel.

(b) Power Supply portion:

Power supply panel generate 8.66kHz Alternative Current for the Non-contact power supply system

(c) CMC(Communication Modem Controller) portion

Communication between OHT Vehicle and the ground side controller (OHVC) is realized by power line communication. About 300kHz - 350kHz signals are superimposed on the power line of non-contact power supply power line.

(4) Maintenance Shifter/Lifter

To move in/out the OHT Vehicle to the OHT track, Maintenance Shifter/Lifter is used.

(5) OHVC(Overhead Hoist Vehicle Controller)

OHVC is a ground side controller which control the OHT Vehicle,

(6)Process tool (Stocker)

The port of the process tool is normally called load port. The specification of the load port is defined by SEMI standard.

Stocker is a special case of process tool.

(7)FOUP

Silicon wafers in diameter of 300mm are transferred from the process tool to process tool kept in a specific carrier called FOUP (Front Opening Unified Pod) in the clean room. This specification is defined by SEMI standard.

(8) Load Port

The port is normally called load port. The specification of the load port is defined by SEMI standard.

2.2 Non-contact power supply

The principle of non-contact power supply is an electro-magnetic coupling, and it can be understood as a special style of a transformer, by which electric power is supplied to the OHV.

There is a power cable on the track and alternate current is constantly supplied from the power supply panel on the ground (Normally it is 400V A.C and 5kW output). Shinko uses 8.66 kHz of the alternate current for the main power supply. About 300kHz and 350kHz signals are superimposed on the 8.66 kHz main component for realizing the communication between OHV and ground controller.

Fig. 2.2. is a Cross sectional image of Non-contact power supply.

Fig. 2.2 Cross sectional image