

# TEACH PENDANT

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## ABSTRACT

*This paper aims at presenting the concept of Teach Pendant, a control box for programming the motions of a robot .The main objective of this paper is to present a teaching pendant for controlling a robotic gantry. We will be displaying 99 functions on an GLCD (graphical lcd ) display ,which will be performed by the gantry. Teach pendant also called as "teach box," the robot is set to "learning" or "teach" mode, and the pendant is used to control the robot step by step. Teach pendants are typically handheld devices and may be wired or wireless.*

**Index Terms:** GLCD, robot gantry, Teach box, Teach pendant.

## 1. INTRODUCTION

A teach pendant is a device which can be used to control a robot remotely. Using a teach pendant, someone can work with a robot without being tethered to a fixed terminal. These devices are used to control robots in a wide variety of settings, and by people who research and develop robots.

Several features are included on a typical teach pendant. The device usually has an emergency stop button, so that operations can be immediately shut down if there is a problem, as might occur when a robot appears to be malfunctioning. There is also a display which can be used to see and edit commands, and to look through the history of commands given to the robot.

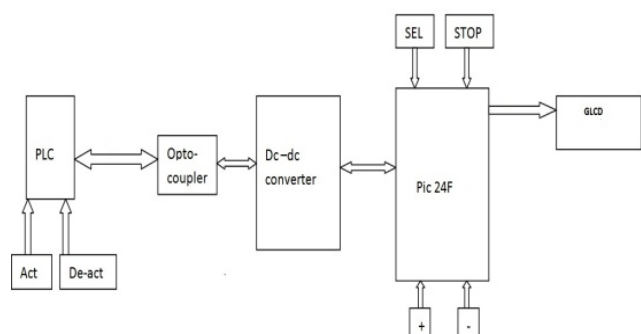
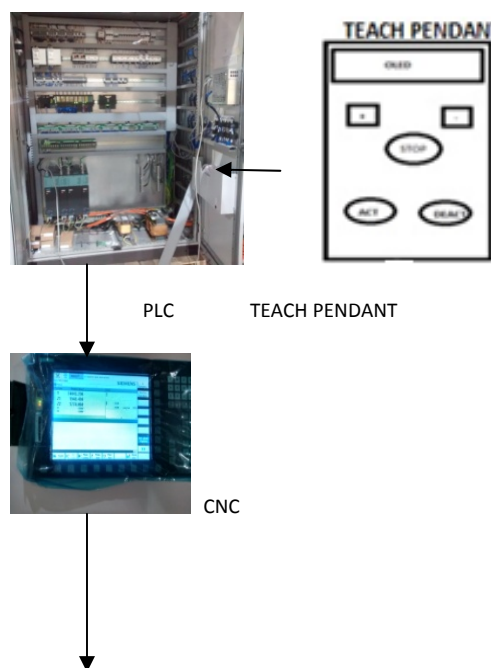
People can walk alongside the robot as it is in operation, using the teach pendant to provide the robot with commands and feedback, and they can also operate the robot from a distance.

The common features of such units are the ability to manually send the robot to a desired position, or "inch" or "jog" to adjust a position. They also have a means to change the speed since a low speed is usually required for careful positioning, or while test-running through a new or modified routine.

## 1.1 SUMMARY

The second part of the paper we have the block diagram, experimental set up and the hardware and software used in the project development. We will also see the step by step operation of the system.

## 2. EXPERIMENT SETUP



**Figure 1:** Block Diagram of teach pendant



**Figure 2:** Experiment set of system

## 2.1. HARDWARE

### TEACH PENDANT

In comparison between the traditional teach pendant we are having GLCD to display 99 functions, unlike traditional teach pendant in which user had to remember all the functions or to refer product manual. Teach pendant is connected to PLC via parallel connection.

### PLC

In our project have used Siemens PLC to give commands to the robotic gantry. A PLC monitors inputs, makes decisions based on its program, and controls outputs to automate a process or machine. PLC also converts the BCD input into analog outputs to control the gantry.

A particular function is selected using the thumbwheel switch which in the teach pendant. The function selected is sent to the PLC. The PLC then sends the instruction to the robot.

GLCD will display the function description which is selected and the function number.

## 2.2 SOFTWARE

For programming part of the project we have used MPLAB software.

MPLAB IDE is a software program that runs on a PC (windows, Mac OS, Linux) to develop applications for Microchip. Microcontrollers and digital signal controllers. It is a compiler as well as debugger.

## 2.3 PROCEDURE

There are 99 different functions saved in the microcontroller (PIC24f), a particular function is selected using the thumbwheel switch. The function is displayed on GLCD and the selected function is sent to the PLC. The PLC then sends the instruction to the robot.

There are total 3 buttons interfaced with the microcontroller, 2 thumbwheel switches and a sel(select). ACT and DEACT buttons are directly connected to PLC. The thumbwheel switches are used to select the function, select button is used to send the command/ function number to PLC. After selecting a particular function, the ACT and DEACT button starts blinking. When ACT button is pressed the robot jogs in the positive axis, while when DEACT is pressed the robot starts to jog in the negative axis. STOP button is used in emergency, if there is some problem in the robot working this button is pressed. Optocouplers are used between the PLC and the teach pendant so as to electrically isolate the PLC from the teach pendant.

## 3. CONCLUSION

The teach pendant sends signals to the PLC connected to the pendant via a cable in the wired phase and via a wireless module in the wireless phase of the pendant.

Thumbwheel switches are used to select the function, and when the select button is pressed the function gets transmitted to the PLC in BCD format. Once the command is received by the PLC, the ACT and DEACT button starts glowing, and when the ACT is pressed the robot must jog in the positive

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