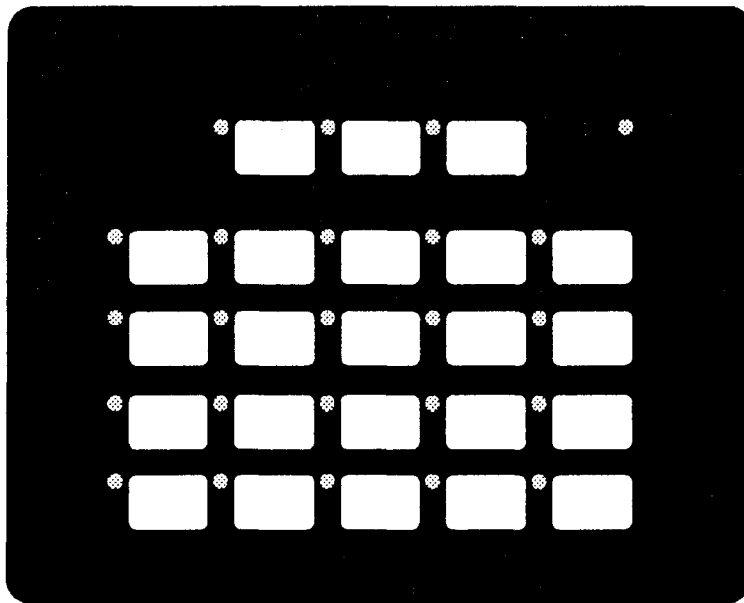


Power Panel Jr.

Programmable Push Button Panel

Operating and Installation Instructions

for KEP Operator Interface Series PPJRPPB



PROPRIETARY NOTICE

The information contained in this publication is derived in part from proprietary and patent data. This information has been prepared for the expressed purpose of assisting operating and maintenance personnel in the efficient use of the instrument described herein. Publication of this information does not convey any rights to use or reproduce or to use it for any purpose other than in connection with the installation, operation and maintenance of the equipment described herein.

Kessler Ellis Products
120 First Avenue
Atlantic Highlands, NJ 07716
Phone: 908-291-0500
FAX: 908-291-8097

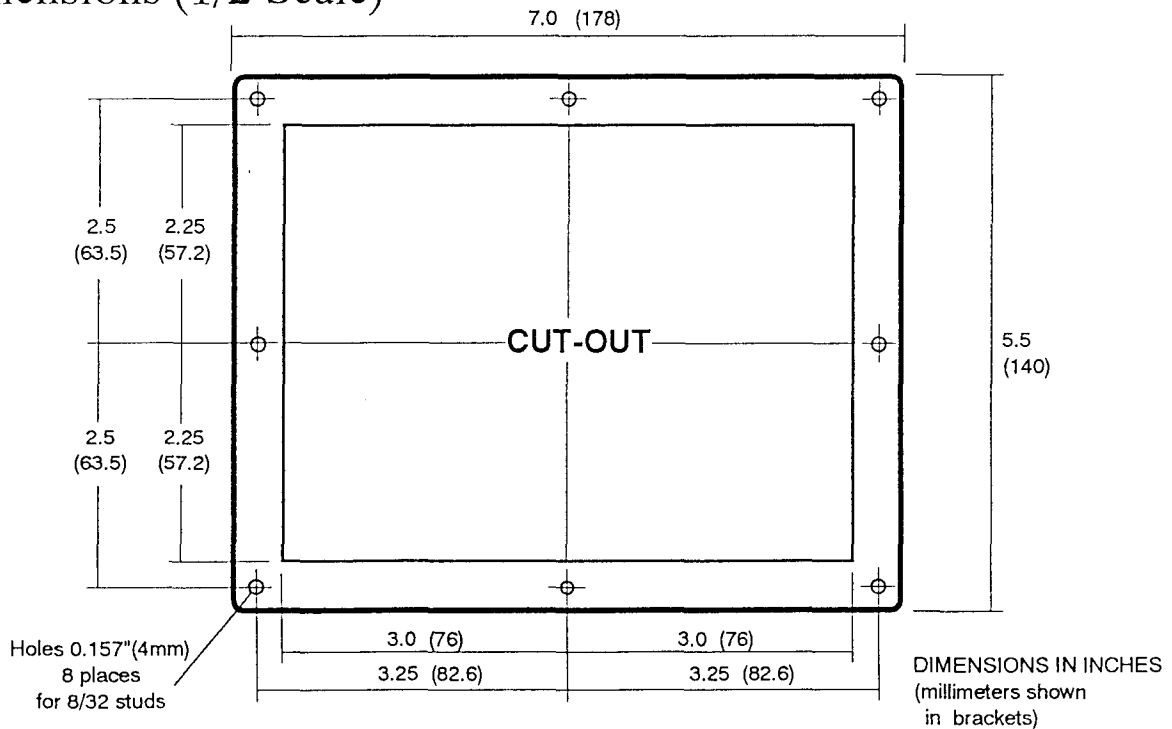
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Dimensions (1/2 Scale)



1.0 INTRODUCTION

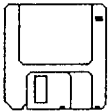
The PPJRPPB is designed to provide:

1. A convenient way for a machine operator to:
 - a. View machine status and parameters.
 - b. Change applicable parameters of operation of the machine.
 - c. Maintain the running of the machine.
2. Enhanced capabilities to the machine through:
 - a) User defined Push-Button interface.
 - b) Annunciation of user defined conditions through LED's.

The PPB, **Programmable Push Button Panel**, is designed to provide these features in a low cost unit. The PPB interfaces to the machine through a single smart cable (typically to a PLC programming port).

We tried to make the PPB a simple, easy-to-use interface. We did this by making the PPB talk to your PLC directly through the programming port. This makes additional communications modules and cumbersome interface ladder logic unnecessary. Just plug in both ends of the smart cable and you are ready to go!

Feature Summary

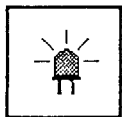


Set up - We made the PPB so that it can be programmed with a Personal Computer. Our user friendly software is free when ordered with the smart cable. You go through the program and set up the parameters described below. Then you download them to the PPB.

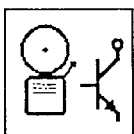


Programmable Push-Buttons - the 20 keys are programmed by the PC software. Programmable Push-Buttons can be used to enter constants and change bit status.

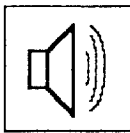
The Push-Buttons can be given custom labels by using the keypad insert cards provided.



Annunciator LED's -- The PPB has 23 LED's for the purpose of annunciation. Each LED corresponds to a bit in user designated registers in the PLC.



Open Collector Output -- The Open Collector Output is controlled by the PLC register that directly follows the register designated for LED annunciation. If both bits 11 and 12 in that register are on, the O.C. is activated. The Open Collector output can also be set to pulse when keys are pressed.



Beeper -- The Beeper is controlled by the PLC register that directly follows the register designated for LED annunciation. If both bits 9 and 10 in that register are on, the Beeper is sounded. The beeper can also be set to beep when keys are pressed.

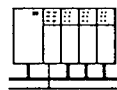


Using the PPB

Once the PPB is programmed, it can be hooked to the PLC programming port.

It can be used to change bit status or download constants into registers. The Operator simply presses the button to initiate the action.

1.1 Getting Started



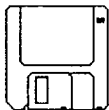
Step 1: It is assumed that the user is familiar with the programming for the particular PLC being used. The PPB asks the PLC for information so it knows what LED to light. You may want to take some time to get familiar with the PLC before getting involved with PPB operations.



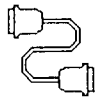
Step 2: Wire power to the PPB as described in Section 2.0 and plug it in.



Step 3: Connect the PPB to a Personal Computer using the cable specified in Section 2.6.1 The PPB is now ready to be programmed.

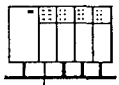


Step 4: The PPB is programmed with the software package provided with the Smart Cable. The demo program gives examples of programming actions and PPB options, and it can be downloaded to the PPB to illustrate it's features.



Step 5: Connect the PPB to the PLC using the Smart Cable.

Step 6: The PPB programmable push buttons are used to change data. The programmed buttons need to be labeled to indicate what they do. To use these buttons just press them and observe their action.



1.2 PLC Requirements.

1.2.1 PLC Compatibility

The PPB is compatible with a given PLC depending on the Smart Cable and programming driver downloaded into it. The PLC model is selected during programming.

1.2.2 Communications

The PPB communicates through the Smart Cable directly into the programming port of the PLC. The PPB cannot be used to program the PLC. The PPB can only be used to change register data and bit status.

1.2.3 Register Requirements

The PPB requires 4 consecutive registers to be reserved for proper operation of the LED's, Beeper, Open Collector Output and Keypad download.

1.3 Mounting on an Enclosure

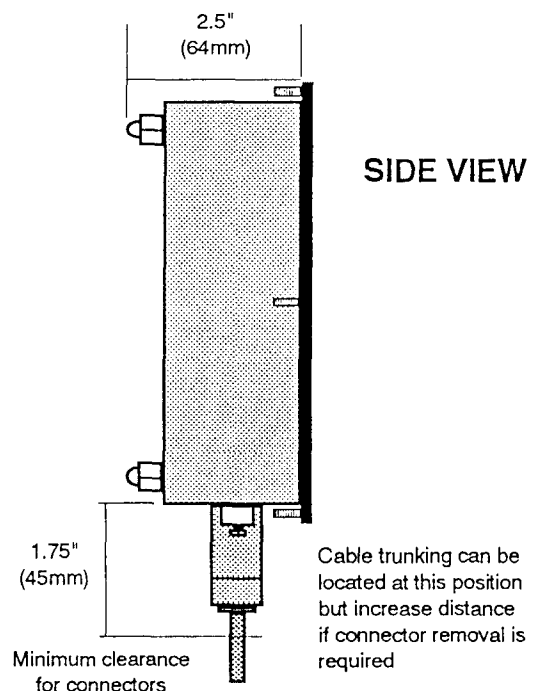
It is recommended that the PPB be mounted on the front panel of a steel enclosure, through a 6"(152mm) x 4.45"(113mm) cut-out, plus eight 0.157"(4mm) holes for mounting studs.

Power and data cable connections are to the bottom edge of the unit, thus minimizing unit depth to 1.95"(50mm) behind panel.

Care should be taken when locating equipment behind the PPB to ensure that AC power wiring, PLC output modules, contactors, starters and relays, and any other source of electrical interference are located away from the back of the PPB.

Particular note should be taken to the position of variable speed drives and switching power supplies, the input and load cables of which should be screened to a central star earth point.

Note: A closed foam neoprene gasket is supplied with all PPB units, which should be used when full sealing between PPB front plate and panel is required for NEMA 4 - IP65.



2.0 WIRING INSTRUCTIONS

— Refer to the label on the PPB for this section.

2.1 Overview

There are three different ways to power up the PPB. This insures compatibility in almost every given situation.

The power conditioning circuitry inside the unit is accomplished by the transformer and a switching power supply. Due to the nature of switching power supplies, a wide range of over and under voltages may be used without affecting the unit adversely.

Note: It is recommended that all input power lines be protected from incorrect wiring or product failure by a 1/4 A fuse or a breaker.

If the display does not come on within 2 seconds of power up, remove power quickly. Incorrect wiring to the transformer will cause it to overheat in about 15 seconds or blow the fuse. If power is removed in time, damage may be avoided. Check wiring to insure proper connections and try to power up again.

All PPB products are wired in the same way, using the same two part, eight pin, removable connector, to ensure compatibility across the range of products. The connector is on the bottom of the unit.

Note: Be sure to provide adequate strain relief to connectors to prevent them from being accidentally pulled apart.

Adequate strain relief must be provided for the power connector, to ensure that vibration or the disturbance of cables during maintenance does not cause the connector to pull-out. Retention of the power cables by a tie-wrap onto the trunking, or an adhesive pad mounted tie-wrap point is normally suitable.

Use five terminals for AC and three for DC power connections. Chassis ground must be used.

To make a connection, strip about 1/4" of insulation off the end of the wire, turn the connector screw counter-clockwise until the gap is wide open, insert the wire all the way in, and turn the screw clockwise until it's tight.

Be sure to provide adequate filtering or noise suppression on AC power lines. Noise on AC power lines may cause the PPB go through the start-up sequence.

Safety Note:

A Hard wired EMERGENCY STOP should be fitted alongside the PPB to comply with ICS Safety Recommendations.

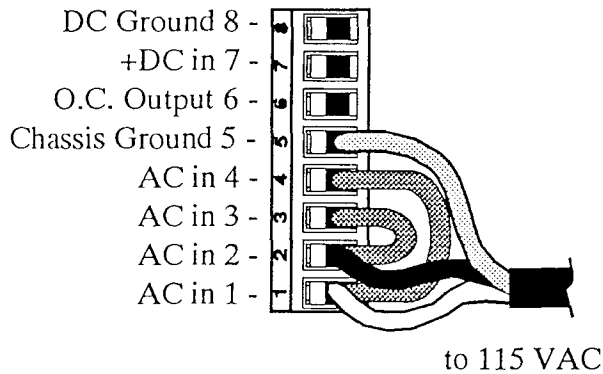
GOOD EQUIPMENT LAYOUT WILL
ENSURE
TROUBLE FREE OPERATION

2.2 Grounding

For safety reasons, and to reduce susceptibility to electrical interference, a separate #14 AWG ground wire should be taken to pin 5 of the power connector. This ground connection should be run directly to the central star earth connection point recommended in the PLC Installation Instructions.

2.3 115 VAC Power Connections

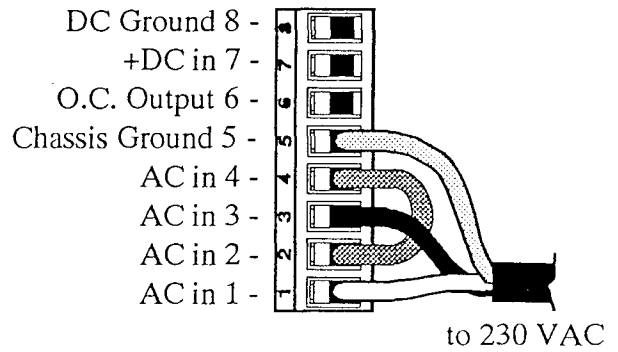
115 VAC: Connect one AC line to terminal 1 and the other to terminal 2, connect terminals 2 and 3 together with a jumper, connect terminals 1 and 4 together with another jumper.



115 VAC Wiring Diagram

2.4 230 VAC Power Connections

230 VAC: Connect one AC line to terminal 1 and the other to terminal 3, connect terminals 2 and 4 together with a jumper.



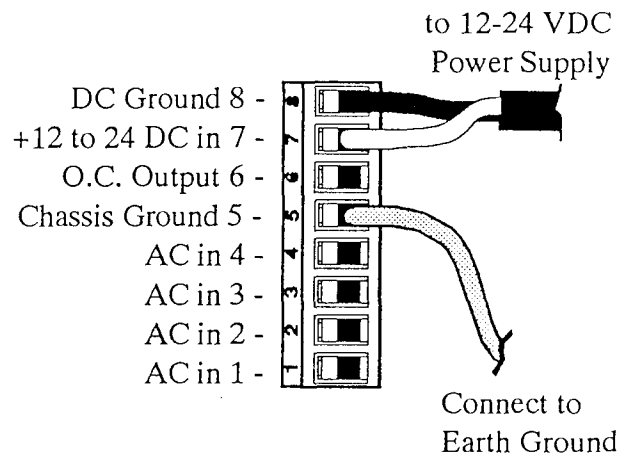
230 VAC Wiring Diagram

2.5 12-24 VDC Power Connections

Do not use the DC power to the PPB to power other DC loads, or input circuitry to the PLC. If the 24 VDC output from the PLC is used to power the PPB the cables should be screened, and not used for other purposes such as to power PLC I/O points.

It is preferable not to ground DC negative return to chassis ground, pin 8, as poor site earths can introduce noise into a system, but if necessary one earth connection only should be made, from the power supply return point to the central star earth point.

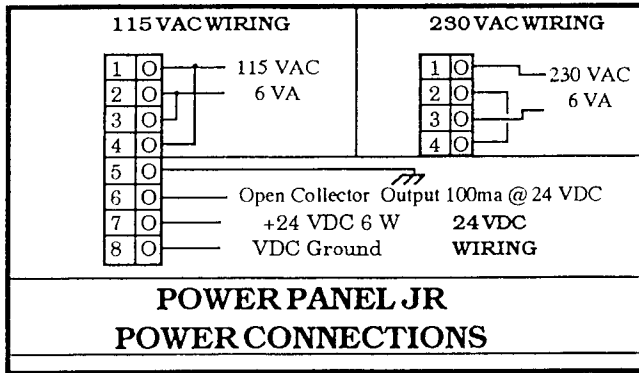
12 - 24 VDC: Connect positive DC line to terminal 7 and the DC ground to terminal 8.



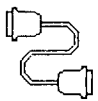
12-24 VDC Wiring Diagram

CAUTION: Connecting high voltage to the DC input will make the PPB unusable.

Note: Terminal 5 chassis ground is connected to the PPB case. Refer to the label on the PPB and on the two piece connector.



The above label, located on the back of the PPB, shows the wiring for the three different ways to power the unit.



2.6 Cable Connections

- Refer to the label on the PPB.

2.6.1 Connecting the PPB to the PLC

The DB9 female port on the bottom of the unit is the communications port.

Attach this port to the PLC Programming port with the Smart Cable adapter provided and an extension cable.

Notes:

Restrict cable length to less than 500 feet for RS485/RS422 communications or less than 50 feet for RS232 communications to avoid communications problems. Communications problems cause the PPB to restart or respond slowly.

It is also suggested that shielded cable be used for long lengths or cables run in an electrically noisy environment.

Do not run cables next to AC power lines or near sources of electrical noise.

Be sure that the cable ends have been inserted all of the way into mating connectors.

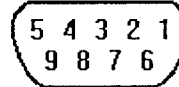
Note: The PPB must be the only thing connected to the PLC programming port for proper operation with the PLC. The PPB does not have networking capabilities.

2.6.2 Connecting the PPB via the RS232 Programming Port to a Computer

The 9 Pin Female connector is also used for connection to a personal computer. This is used for programming the PPB.

Programming the unit requires a 9 pin straight through cable from the computer to the PPB (2 to 2; 3 to 3; 5 to 5). This is available from KEP as Part number [ZA59M9F](#).

View of DB9 connector as seen from back of PPB



5 = Ground
3 = Receive
2 = Transmit

For 25 Pin computer connections use:

| | | |
|---------------|----|------------|
| Computer (25) | to | PPB (9) |
| Transmit 2 | to | 3 Receive |
| Receive 3 | to | 2 Transmit |
| Ground 7 | to | 5 Ground |

A 25 pin female to 9 pin male cable is available from KEP as Part number [ZA59M25F](#)

2.7 Noise Considerations

All electrical systems in an industrial environment can suffer from electrostatic, electromagnetic or directly coupled electrical noise, which can cause malfunction, and destruction of sensitive electronic devices.

For noise immunity, the PPB is housed in a screened case, with double isolated transformer. However, for a reliable system, due consideration must be given to the noise suppression and isolation recommendations described in the PLC installation manual.

2.8 Reducing the Likelihood of Electrical Noise Interference.

Noise can appear on the Power lines or the Communication lines.

Noise on the power lines.

- a. Run communications lines in separate conduits or bundles away from High Voltage lines.
- b. Make sure Power lines have the appropriate filtering on them. Use 0.1uF capacitor for DC power, or GE#V130LA1 MOV for 115 VAC power.
- c. As an alternative, power the PPB with a separate 24VDC supply. Make sure that enough current is available if the 24VDC is used for other purposes as well. The PPB draws a maximum of 200mA at 24VDC.
- d. Be sure to connect terminal 5 of the power connector to earth ground.
- e. Connecting Terminal 8 of the power connector (DC Ground) may or may not help as poor earth sites can introduce noise into the system.

Noise on the communication lines.

Be sure to observe the following precautions when running communications cables that are longer than 10 feet.

- a. Run communications lines in separate conduits or bundles away from High Voltage lines.
- b. Make sure that the shield on the communications cable is connected to earth ground on one end only.
- c. Make sure that earth ground on the PLC is connected.
- d. Make sure that earth ground on the PPB is connected.

Other Noise sources

Care should be taken when locating equipment behind the PPB to ensure that AC power wiring, PLC output modules, contactors, starters, relays, solenoids and any other sources of electrical interference are located away from the back of the PPB. Particular note should be taken of the position of variable speed drives and switching power supplies, the input and load cables of which should be shielded to a central earth ground.

2.9 Safety Guidelines

2.9.1 Hardware Considerations

This section presents recommended installation practices, and procedures. Since no two applications are identical, these recommendations should be considered as guidelines.

WARNING!

The system designer should be aware that control devices in PLC systems can fail and thereby create an unsafe condition. Furthermore, electrical interference in an operator interface, such as the PPB, can lead to sudden equipment start-up, which could result in property damage and/or physical injury to the equipment operator.

If you, or your company, use any programmable control systems which require an operator or attendant, you should be aware that this potential safety hazard exists and take appropriate precautions. Although the specific design steps depend on your particular application, the following precautions generally apply to installation of solid-state programmable control devices. In addition, these precautions conform to the guidelines for installation of Programmable Controllers as recommended in the NEMA ICS 3-304 Programmable Control Standards.

2.9.2 Programming Considerations

Note: To conform with ICS Safety Recommendations, checks should be placed in the PLC program to ensure that all writable registers that control critical parts of plant or machinery should have upper and lower limit checks built into the program, with an out-of-limit safe shut down procedure to ensure safety of personnel.

ICS 3-304.81

Safety Recommendations:

Consideration should be given to the use of an emergency stop function which is independent of the programmable controller.

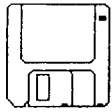
Where the operator is exposed to the machinery, such as in loading or unloading a machine tool, or where the machine cycles automatically, consideration should be given to the use of an electro-mechanical override or other redundant means, independent of the programmable controller, for starting and interrupting the cycle.

If provision is required for changing programs while the equipment is in operation, consideration should be given to the use of locks or other means of assuring that such changes can be made only by authorized personnel.

*These recommendations are intended as safeguards against the failure of critical components and the effects of such failures or the inadvertent errors that might be introduced if programs are changed while the equipment is in operation.**

** The ICS 3-304.81 Safety Recommendations are reproduced by permission of the National Electrical Manufacturers Association from NEMA ICS 3-304, Programmable Controller Standard.*

3.0 PROGRAMMING INSTRUCTIONS



The PPB is programmed through a personal Computer. The computer is connected to the 9 pin PLC Port of the PPB with a 9 to 9 pin, straight through, male to female cable.

Note: The computer must be running DOS Version 3.1 or later. Earlier versions may not work.

Step 1. Turn on your Personal Computer and power up the PPB.

Step 2. Connect the computer to the PPB with the appropriate RS232 cable, as described above.

Step 3. At the DOS prompt, insert the programming disk into drive A:.

Step 4. Make the A: drive the active drive.

Step 5. At the A: prompt type in the .EXE file's name and press enter. The program will boot.

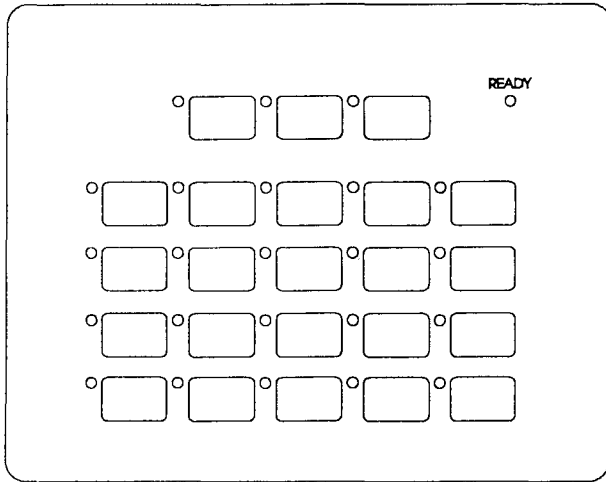
Note: Copying the program to your hard drive and running it from there is suggested. The program is not copy protected and may be copied and distributed freely.

Step 6. Use the cursor keys to move to menu items and use the enter key to select items and program the PPB.

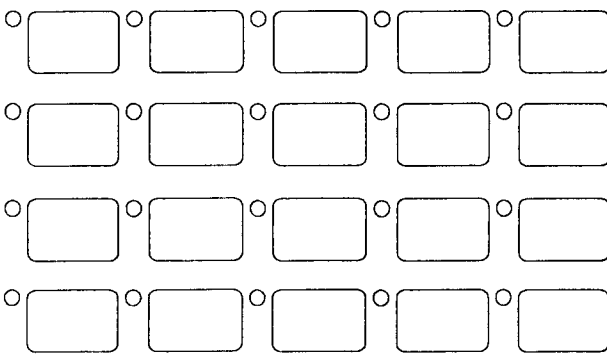
To fully describe every aspect of the PPB software would be quite lengthy. The user is encouraged to run the software and use its on screen help to be guided through the program.

It is suggested that you use the Getting Started procedure, outlined in Section 1.1, to acquaint yourself with the software. Use the Demo program for hints on programming KEY's. Copy and use the worksheets provided at the back of this manual.

4.0 OPERATING INSTRUCTIONS



4.1 Programmable Push Buttons

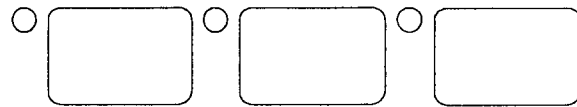


Programmable Push Buttons are pre-programmed via Personal Computer with the software provided with the Smart Interface Cable.

LED annunciation is pre-programmed as well and may correspond to button presses or other functions in the PLC.

To activate their Functions simply press the button. These buttons may be programmed to change bit status, force a constant into a register .

4.2 The Annunciator Lights



The three LED's at the top of the panel have spaces for labels. There are no keys under these labels. They are for annunciation only. They are controlled by bits in the register that follows the LED register. See Specifications for bit assignments.

4.3 The READY Light

The READY light indicates that power has been applied to the PPB. The READY light will flash until communications with the PLC has been established. Once communications has been established the READY light will stay lit.

All of the LED's flashing indicates a communications error. Check the cable connection and power to the PLC.

5.0 SPECIFICATIONS

POWER: 110/220 VAC or 24VDC.

OPEN COLLECTOR OUTPUT:

Sinks 100 mA from 24 VDC when active.

MEMORY: EEPROM (8 Kbytes)

TEMPERATURE: 32° to 122° F
(0° to 50° C).

BEZEL: Membrane keypad with tactile feedback;
NEMA 4 (IP65).

SIZE: 7" W x 5.5" H x 2" D
(177.8 mm W x 139.7 mm H x 50.8 mm D)

PANEL CUTOUT: 6.05"W x 4.5"H

REGISTER DESIGNATIONS:

The PPB uses 4 consecutive words for operation.

| Word 1 | Word 2 | Word 3 | Word 4 |
|-----------------|--------------------------|-----------------|---------------------|
| Bit 1 - LED 1 | Bit 1 - LED 17 | Bit 1 - Key 1 | Bit 1 - Key 17 |
| Bit 2 - LED 2 | Bit 2 - LED 18 | Bit 2 - Key 2 | Bit 2 - Key 18 |
| Bit 3 - LED 3 | Bit 3 - LED 19 | Bit 3 - Key 3 | Bit 3 - Key 19 |
| Bit 4 - LED 4 | Bit 4 - LED 20 | Bit 4 - Key 4 | Bit 4 - Key 20 |
| Bit 5 - LED 5 | Bit 5 - LED 21 | Bit 5 - Key 5 | Bit 5 - 16 Not Used |
| Bit 6 - LED 6 | Bit 6 - LED 22 | Bit 6 - Key 6 | |
| Bit 7 - LED 7 | Bit 7 - LED 23 | Bit 7 - Key 7 | |
| Bit 8 - LED 8 | Bit 8 - Not Used | Bit 8 - Key 8 | |
| Bit 9 - LED 9 | Bit 9 - Beeper Enable | Bit 9 - Key 9 | |
| Bit 10 - LED 10 | Bit 10 - Activate Beeper | Bit 10 - Key 10 | |
| Bit 11 - LED 11 | Bit 11 - O.C. Enable | Bit 11 - Key 11 | |
| Bit 12 - LED 12 | Bit 12 - Activate O.C | Bit 12 - Key 12 | |
| Bit 13 - LED 13 | Bit 13 - 16 Not Used | Bit 13 - Key 13 | |
| Bit 14 - LED 14 | | Bit 14 - Key 14 | |
| Bit 15 - LED 15 | | Bit 15 - Key 15 | |
| Bit 16 - LED 16 | | Bit 16 - Key 16 | |

6.0 REPAIR POLICIES

The PPB is designed to provide years of trouble free service. The PPB is burned in for at least 24 hours and under goes a full functional test before it is released by Quality Assurance for shipment.

The PPB is warrantied for two years under normal use.

The PPB does not require any "Routine Maintenance" by the user. If a problem should occur, and all trouble-shooting procedures have been exhausted, contact your local representative or distributor.



Use our toll free number to contact KEP if persistent problems are encountered.

Phone: 1-800-631-2165.

If the product must be returned for any reason, be sure to call KEP and get a Return Material Authorization (RMA) number first.

We have tried to make helpful notes throughout the manual to act as a guide. If you feel that the manual is lacking in any way we would appreciate your input. Feel free to call us and give us your input.

We hope you will be pleased with our product. If you have any questions concerning our warranty, repair, modification or returned goods process, please contact your local distributor.

WARRANTY

This product is warrantied against defects in materials and workmanship for a period of two (2) years from the date of shipment to Buyer.

The Warranty is limited to repair or replacement of the defective unit at the option of the manufacturer. This warranty is void if the product has been altered, mis-used, dismantled, or otherwise abused.

ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, ARE EXCLUDED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

KEY Definition Worksheet

Make copies before using.

Fill in blanks and circle items as desired.

Key 1: Label: _____
Register or Bit # _____
Bit: ON OFF TOGGLE HOLD ON OFF
Register Constant: _____
SININT DEC BCD HEX BINARY

Key 2: Label: _____
Register or Bit # _____
Bit: ON OFF TOGGLE HOLD ON OFF
Register Constant: _____
SININT DEC BCD HEX BINARY

Key 3: Label: _____
Register or Bit # _____
Bit: ON OFF TOGGLE HOLD ON OFF
Register Constant: _____
SININT DEC BCD HEX BINARY

Key 4: Label: _____
Register or Bit # _____
Bit: ON OFF TOGGLE HOLD ON OFF
Register Constant: _____
SININT DEC BCD HEX BINARY

Key 5: Label: _____
Register or Bit # _____
Bit: ON OFF TOGGLE HOLD ON OFF
Register Constant: _____
SININT DEC BCD HEX BINARY

Key 6: Label: _____
Register or Bit # _____
Bit: ON OFF TOGGLE HOLD ON OFF
Register Constant: _____
SININT DEC BCD HEX BINARY

Key 7: Label: _____
Register or Bit # _____
Bit: ON OFF TOGGLE HOLD ON OFF
Register Constant: _____
SININT DEC BCD HEX BINARY

Key 8: Label: _____
Register or Bit # _____
Bit: ON OFF TOGGLE HOLD ON OFF
Register Constant: _____
SININT DEC BCD HEX BINARY

Key 9: Label: _____
Register or Bit # _____
Bit: ON OFF TOGGLE HOLD ON OFF
Register Constant: _____
SININT DEC BCD HEX BINARY

Key 10: Label: _____
Register or Bit # _____
Bit: ON OFF TOGGLE HOLD ON OFF
Register Constant: _____
SININT DEC BCD HEX BINARY

Key 11: Label: _____
Register or Bit # _____
Bit: ON OFF TOGGLE HOLD ON OFF
Register Constant: _____
SININT DEC BCD HEX BINARY

Key 12: Label: _____
Register or Bit # _____
Bit: ON OFF TOGGLE HOLD ON OFF
Register Constant: _____
SININT DEC BCD HEX BINARY

Key 13: Label: _____
Register or Bit # _____
Bit: ON OFF TOGGLE HOLD ON OFF
Register Constant: _____
SININT DEC BCD HEX BINARY

Key 14: Label: _____
Register or Bit # _____
Bit: ON OFF TOGGLE HOLD ON OFF
Register Constant: _____
SININT DEC BCD HEX BINARY

Continued on next page.

KEY Definition Worksheet

Make copies before using.

Fill in blanks and circle items as desired.

Key 15: Label: _____
Register or Bit # _____
Bit: ON OFF TOGGLE HOLD ON OFF
Register Constant: _____
SININT DEC BCD HEX BINARY

Key 16: Label: _____
Register or Bit # _____
Bit: ON OFF TOGGLE HOLD ON OFF
Register Constant: _____
SININT DEC BCD HEX BINARY

Key 17: Label: _____
Register or Bit # _____
Bit: ON OFF TOGGLE HOLD ON OFF
Register Constant: _____
SININT DEC BCD HEX BINARY

Key 18: Label: _____
Register or Bit # _____
Bit: ON OFF TOGGLE HOLD ON OFF
Register Constant: _____
SININT DEC BCD HEX BINARY

Key 19: Label: _____
Register or Bit # _____
Bit: ON OFF TOGGLE HOLD ON OFF
Register Constant: _____
SININT DEC BCD HEX BINARY

Key 20: Label: _____
Register or Bit # _____
Bit: ON OFF TOGGLE HOLD ON OFF
Register Constant: _____
SININT DEC BCD HEX BINARY

Label 21: _____

Label 22: _____

Label 23: _____

LED REGISTER: _____