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Introduction

About this Manual

- Before operating, maintaing or servicing any ITW Gema electrostatic coating system, read and understand all of the technical and safety literature for your ITW Gema products. If you do not have the manual s and safety literature for your eystme, contact your local ITW Gema Representative or ITW Gema.
- All text references to diagrams or illustrations will appear as a circled number (as indicated in the Parts Identification Section). i. e.: Item number five in the Parts Identification will appear as O throughout the text and all diagrams and illustrations, except where otherwise indicated.
- In the manual, as in all ITW Gema technical and safety literature, the following advisories will be provided where appropriate:

A DANAGER! States a clear and present hazard to personnel safety!
A WARNING! States information relevant to personnel safety!
A CAUTION! Is information relevant to safeguarding equipment!
A NOTE is information about the procedure in progress!

- The information in this document is intended ONLY to indicate the components and their working relationship in typical use. These are NOT installation instructions. Each installation is unique and should be directed by an ITW Gema representative or made form the ITW Gema installation drawings provided for your particular installation.
- This manual provides information for the Gun Trigger Package. While this booklet, lists standard specifications and service procedures, some minor deviations may be found between theis literature and your equipment. Differences in local codes, plant requirements, and material delivery requirements, etc. make such variations inevitable. Companre this manaual with your ITW Gema system installation drawings and appropriate ITW Gema equipment manuals to reconcile such differences.
- Carefull study and continued use of this manaual

Genesis Trigger Panel Overview

This trigger control package is available for use on Automatic Powder Systems utilizing the Powder Gun Control (PCG1). Using a PLC processor this package will control up to 12 guns with triggering or up to 10 guns with triggering and purging.

The package consists of a main control panel with a processor, one photoeye assembly and conveyor encoder. The processor will provide a pre-loaded program to provide manual style select triggering for up to 3 styles. Each style provides the user with a unique zone-triggering configuration. It will also accommodate up to five additional photoeyes (optional). The panel also has the capability of performing gun purge functions with the purchase of an optional purge package.

Touch screens provide a user-friendly graphical interface for monitoring system operation, style selection, trigger lead / lag, and gun on / off controls.

Equipment Models
- Automatic Powder Systems (APS) using MCP3 / MCP4 control units
- Powder Manager (PMGR) using PM1 control units
- 12 guns with trigger
- 10 guns with trigger and purge

Applications Specifications
- Typical application is solid parts (panels, boxes, etc)
- Maximum conveyor line speed is 20 feet per minute
- Contact ITW Gema for faster line speeds, small parts, wire goods and nonsolid part applications.

Triggering / Photoeye Data
- Triggering Capabilities:
  - Line gap triggering
  - Zone triggering for up to 6 zones
  - Style triggering for up to 3 styles – operator style selection
  - Maximum of 6 photoeyes
- Photoeye gun distance minimum 30" from first gun.
- Photoeye gun distance maximum 300" from last gun.
- Photoeye cable length maximum distance from the control panel is 50 feet.
- Photoeye mounting bracket included for Vortech and Diamond. Other photoeye mounting means provided by user.

Encoder Data
- Customer must supply conveyor drive shaft diameter and pitch diameter of drive sprocket (distance of conveyor travel per one revolution of the drive sprocket).
- Distance not to exceed 100 feet of conveyor travel (with no conveyor take-ups) between the photoeyes and the encoder.
- Contact ITW Gema for special options if application exceeds these specifications.

Electrical Specifications
- 110VAC, 10Amp, 60Hz
- Power source must be a separate 10 Amp circuit
- Power should be maintained on this panel even if the booth is not running.
- UL Recognized
- Panel must be located more than 3 feet from any booth opening.
- Safety Interlocks (requires field wiring of customer supplied dry contacts);
  - Conveyor
  - Fire
  - Exhauster

Package Options
- Additional photoeyes up to six
- Mounting bracket for APS2/ MCP4 and PMGR/PM1 cabinets
- Purge Kits include purge drawer, mounting hardware and necessary tubing / cables

Genesis Panel Connections

- Reference electrical schematic drawing 128814 for specific connections.
- Power Source – 110VAC, 10Amp, 60Hz
  - User supplied wiring
  - User supplied power source
  - Power should not be pulled from the booth electrical panel due to 10 Amp load.
- Encoder – Belden shielded four conductor cable
  - Gema supplied wiring – 100 feet
  - Field wired because the conveyor drive distance to the trigger panel is unknown.
- Safety Interlocks (jumper input if not required)
  - Conveyor
    - Used to turn the guns on and off when the conveyor is turned on and off.
    - Requires field wiring of user supplied dry contacts.
    - A closed dry contact indicates that the conveyor is running.
    - An open dry contact indicates that the conveyor is not running.
    - If this interlock is not used, the TRIGGER INTERLOCK BYPASS on the Setup screen must be set to ON in order for the guns to spray. Please note that the guns will continue to spray even if the conveyor is turned off.
  - Fire
    - Used to turn the guns off if there is a fire signal.
    - Requires field wiring of user supplied dry contacts.
    - A closed dry contact indicates there is a fire signal.
    - An open dry contact indicates the fire detection signal is OK.
    - If the gun control unit power is already interlocked to a fire detection controller, this interlock does not need to be used.
  - Exhauster
    - Used to enable the guns while the exhauster is running.
    - Requires field wiring of user supplied dry contacts.
    - A closed dry contact indicates the exhauster is running.
    - An open dry contact indicates the exhauster is not running.
    - If the gun control unit power is already interlocked and this exhauster interlock is not used, a jumper must placed between terminal 4082 and terminal EXH in order for the guns to operate.
  - Note: Voltage supplied to these inputs will damage the PLC card.
- Trigger Cable
  - Cable between APS or PM cabinet and the trigger panel provided by Gema
  - PGC B-port Trigger Cable required for each gun control unit provided by Gema
- Photoeye Cable
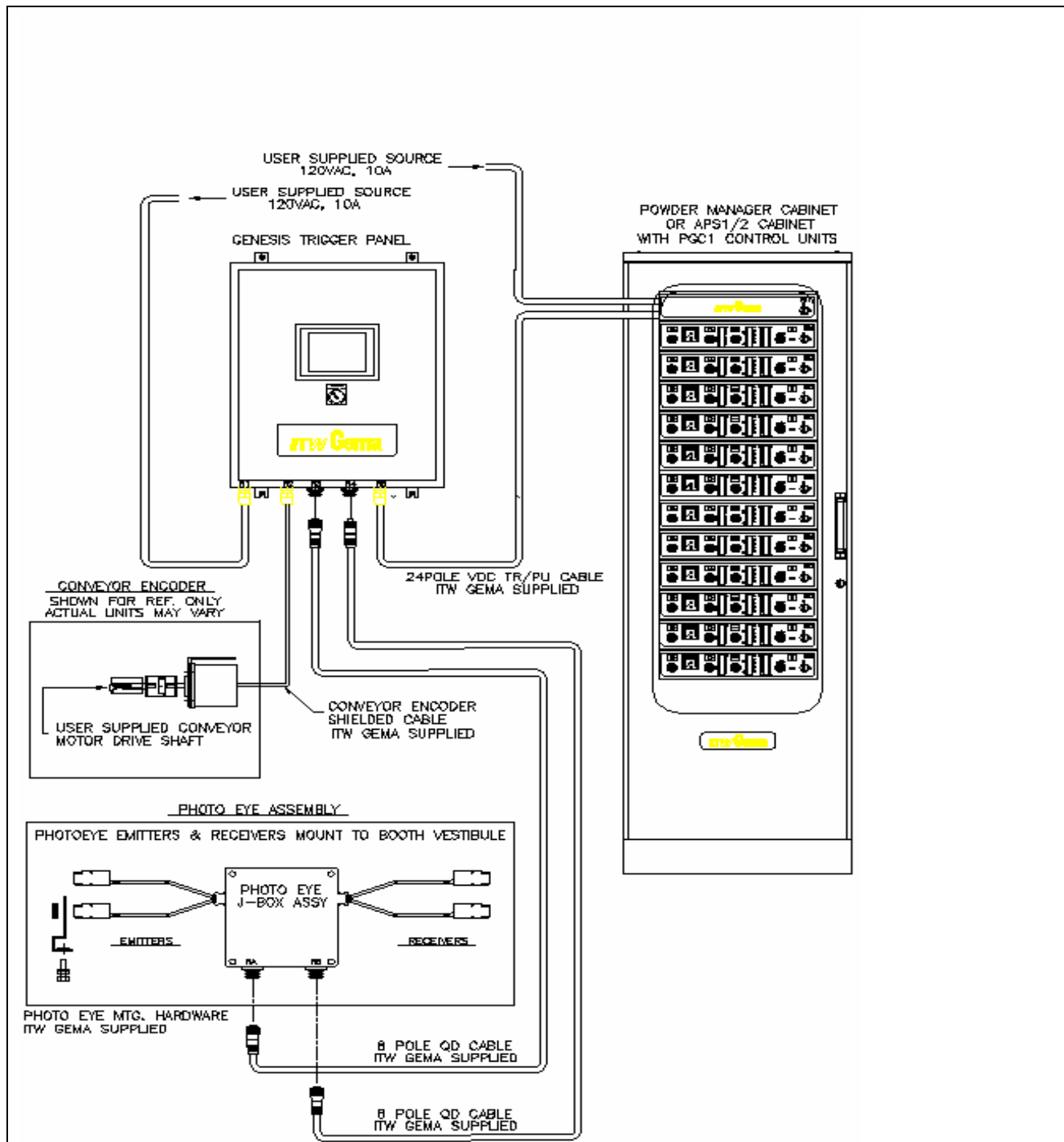 - Provided by Gema
  - Cable length – maximum 50 feet

USER SUPPLIED SOURCE
120VAC, 10A

USER SUPPLIED SOURCE
120VAC, 10A

GENESIS TRIGGER PANEL

POWDER MANAGER CABINET
OR APS1/2 CABINET
WITH PGC1 CONTROL UNITS

ITW Gema

CONVEYOR ENCODER
SHOWN FOR REF. ONLY
ACTUAL UNITS MAY VARY

USER SUPPLIED CONVEYOR
MOTOR DRIVE SHAFT

CONVEYOR ENCODER
SHIELDED CABLE
ITW GEMA SUPPLIED

24POLE VDC TR/PU CABLE
ITW GEMA SUPPLIED

PHOTO EYE ASSEMBLY

PHOTOEYE EMITTERS & RECEIVERS MOUNT TO BOOTH VESTIBULE

PHOTO EYE
J-BOX ASSY

EMITTERS

RECEIVERS

PHOTO EYE MTG. HARDWARE
ITW GEMA SUPPLIED

8 POLE QD CABLE
ITW GEMA SUPPLIED

8 POLE QD CABLE
ITW GEMA SUPPLIED

FIGURE 1

Powder Manager Unit / Automatic Powder System (APS) Unit Connections

- Reference appropriate gun control unit cabinet drawing for specific connections.
- Power Source – 110VAC, 10Amp, 60Hz
  - User supplied wiring
  - User supplied power source
- Trigger Cable
  - Cable between APS or PowderManager cabinet and the trigger panel provided by Gema
  - PGC B-port Trigger Cable required for each gun control unit provided by Gema

- Internal Cabinet Connections
  - PGC B-port Trigger Cable required for each gun control unit provided by Gema
  - PGC CB1 board jumpers must be set to external for triggering
    - WARNING: Applying power to the unit without the jumpers in proper location can damage the CB1 board.
  - Purge Unit (if field installed)
    - Cable connections must be made between the PM1 / MCP4 / MCP3 and the purge drawer according to Figure 2.
    - PGC unit supplemental air connections must be made between each PGC unit and the purge drawer according to Figure 2.
    - Main air must be connected from the cabinet manifold to the purge drawer.
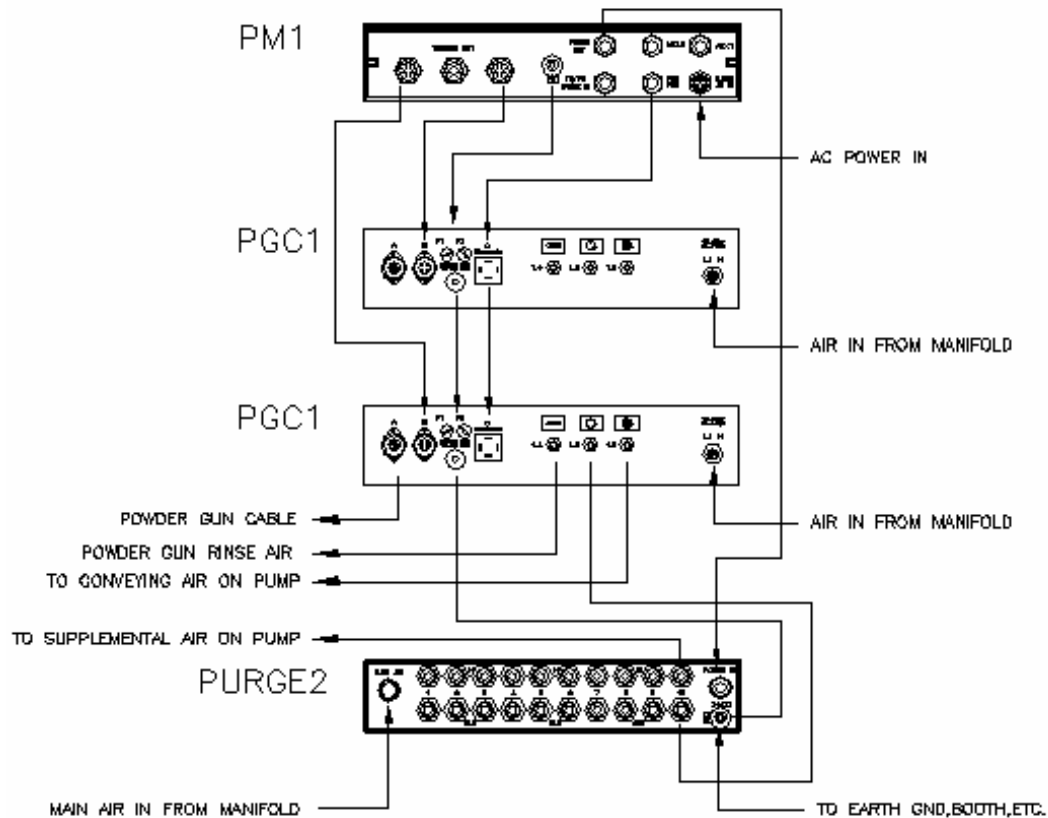
Installation Instructions

Verify that all interlocks are functioning.
- From the MAIN screen, activate the STAT button to open the Status screen.
- The STAT screen displays the status of all the interlocks.
- Fire Detection
    - If PLC input X3 is low, the display will be green and indicate OK.
    - If PLC input X3 is high, the display will be red and indicate FIRE.
- Exhauster Running
    - If PLC input X2 is low, the display will indicate NO.
    - If PLC input X2 is high, the display will indicate YES.
- Conveyor Running
    - If PLC input X4 is low and encoder inputs X5 and X6 are low, the display will indicate NO.
    - If PLC input X4 is high and encoder inputs X5 and X6 are toggling, the display will indicate YES.
- Conveyor Move Forward
    - If the display indicates YES, the encoder signal is correct.
    - If the display indicates NO, the encoder signal is backwards. Turn off power to the panel and reverse the field wires attached to terminals ENC A and ENC B. Apply power to the panel and verify the conveyor direction.

Enter conveyor information
- From the MAIN screen, activate the SETUP button to open the Setup screen.
- Determine the distance (inches) the conveyor travels per revolution of the drive sprocket. By measuring the pitch diameter of the drive sprocket and multiplying this value by 3.14, the resulting circumference is the same as the conveyor travel per revolution of the drive sprocket.
- Enter the number of inches in the CONVEYOR DRIVER INCHES / TURN.
    - Touch the data display to pull up a keypad.
    - Enter the number of inches (must be a value between 1 and 100).
    - Touch the ENT button to save the data and return to the Setup screen.
- Determine the number of encoder pulses per revolution of the drive sprocket. This information is available in the encoder specifications.
- Enter the number of pulses in the ENCODER RESOLUTION CYCLES / TURN.
    - Touch the data display to pull up a keypad.
    - Enter the number of pulses (must be a value between 1 and 100).
    - Touch the ENT button to save the data and return to the Setup screen.
- The CONVEYOR SPEED (ft/min) is displayed on the MAIN screen.
    - When the conveyor is running, verify that the conveyor speed is correct.

Verify that all the guns operate correctly
- With the conveyor off and the exhauster running, the TRIGGER INTERLOCK BYPASS on the Setup screen must be set to ON in order for the guns to spray.
- Adjust the gun outputs based on the PGC Control unit and gun operating manuals.

Enter individual gun information
- From the MAIN screen, activate the SETUP button to open the Setup screen.
- Determine the style number associated to the zone-triggering configuration.
- Enter the style information in the STYLE SELECT.
    - Touch the data display to pull up a keypad.
    - Enter the STYLE number (must be a value between 1 and 3).
    - Touch the ENT button to save the data and return to the Setup screen.
- From the MAIN screen, activate the TRIG button to open the Trigger screen.
- The active Style number is displayed in the upper left hand corner.
- For each gun, enter the LEAD, LAG, and DISTANCE.
    - Lead – Input the distance ahead of the part the gun should turn on.
        - Touch the data display to pull up a keypad.
        - Enter the distance in inches (must be a value between 0" and 20").
        - Touch the ENT button to save the data and return to the Trig screen.
    - Lag – Input the distance after the part the gun should turn off.
        - Touch the data display to pull up a keypad.
        - Enter the distance in inches (must be a value between 0" and 20").
        - Touch the ENT button to save the data and return to the Trig screen.
    - Distance – Input the distance from the photoeyes to that particular gun.
        - Touch the data display to pull up a keypad.
        - Enter the distance in inches (must be a value between 30" and 300").
        - Touch the ENT button to save the data and return to the Trig screen.
    - Note: The program is written to control up to 12 guns. If the application is using less than 12 guns, simply leave the default values for the unused guns. The program will operate as if it were controlling all 12 guns, however, there is nothing attached to the unused outputs to control.
- From the TRIG screen, activate the ZONE button to open the Zone screen.
- The active Style number is displayed in the bottom center.
- For each gun, specify whether that gun should be trigger (ON/OFF) in that zone.
    - Simply touch the appropriate Gun # and Z# to toggle the switch between ON and OFF. The display is green when ON and red when OFF.
    - Each zone is relative to a photoeye. If the part to be coated breaks the photoeye associated with Z1, then all guns set to trigger ON in Zone 1 will be turned on.
    - If only one photoeye is used, all guns must be set to trigger ON in Zone 1.
    - Up to six photoeyes can be used thus six zones can be configured.
    - If less than six zones are required, set the gun triggers to OFF for the unused zones.
- From the TRIG screen, activate the PURGE button to open the Purge screen.
- For each gun, specify the amount of time the powder hose should be purged after the gun is turned off.
    - Touch the data display to pull up a keypad.
    - Enter the time in seconds (must be a value between 0 and 9.9 seconds).
    - Recommended value is 2.0 seconds.
    - Touch the ENT button to save the data and return to the Purge screen.
- Additional style configurations can be setup by following the same process.

Package Screens
Main

- Displays Conveyor Speed (ft/min) – calculated from encoder input
- Displays Current Style (1,2,3) – change style on the Setup screen
- Displays Gun Spray Time (HR/MIN/SEC) – timer is active when the gun triggering is in Auto mode and any gun is on
- Gun Spray Time Reset pushbutton resets this timer
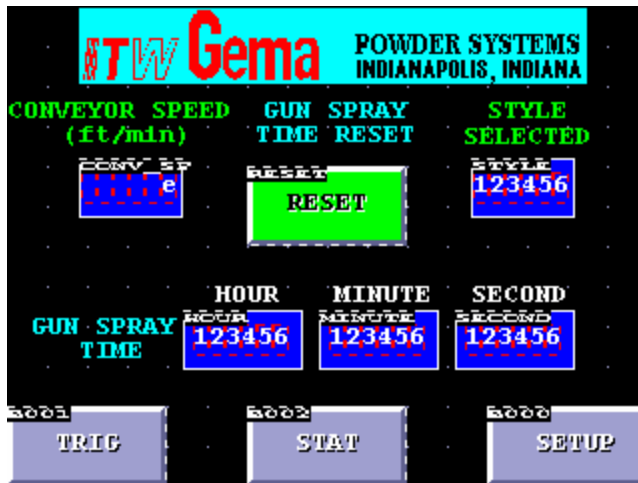
Package Screens
Setup

- Conveyor Drive (In / Turn) – input the circumference of the conveyor drive sprocket (value must be between 1 and 100)
- Encoder Resolution (Cycles / Turn) – input the encoder pulses per conveyor drive sprocket rotation (value must be between 1 and 100)
- Style Select (1,2,3) – input the desired style (value must be between 1 and 3)
- Trigger Interlock Bypass (Yes/No) – pushbutton selection if yes forces the guns to operate while the conveyor is not running if no the guns will turn on and off when the conveyor does

Package Screens
Stat

- Fire Detection (OK/FIRE) – displays fire interlock status
- Exhauster Running (Yes/No) – displays exhauster interlock status
- Conveyor Running (Yes/No) – displays conveyor interlock status
- Conveyor Move Forward (Yes/No) – displays conveyor direction to determine at system startup if the encoder is wired correctly
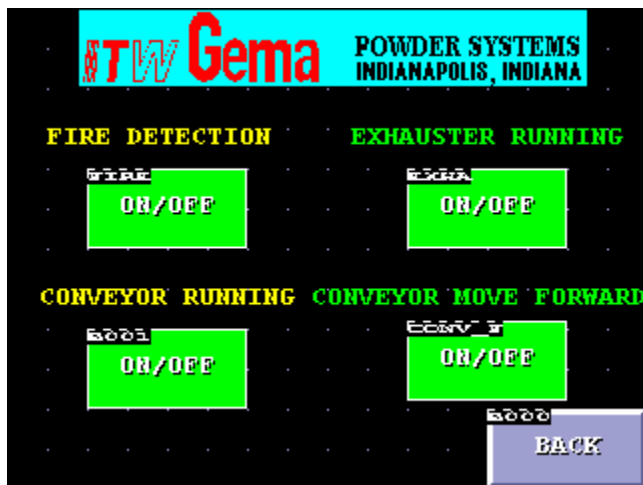
Package Screens
Trig

- Lead – for each gun and selected style, input the distance ahead of the part the gun should turn on (value must be between 0" and 20")
- Lag – for each gun and selected style, input the distance after the part the gun should turn off (value must be between 0" and 20")
- Distance – for each gun and selected style, input the distance from the photoeyes to that particular gun (value must be between 30" and 300")

Package Screens
Purge

- For each gun, specify the amount of time the powder hose should be purged after the gun is turned off (value must be between 0 and 9.9 seconds)

Package Screens
Zone

- For each gun and selected style, specify whether that particular gun should be triggered (ON/OFF) in that zone
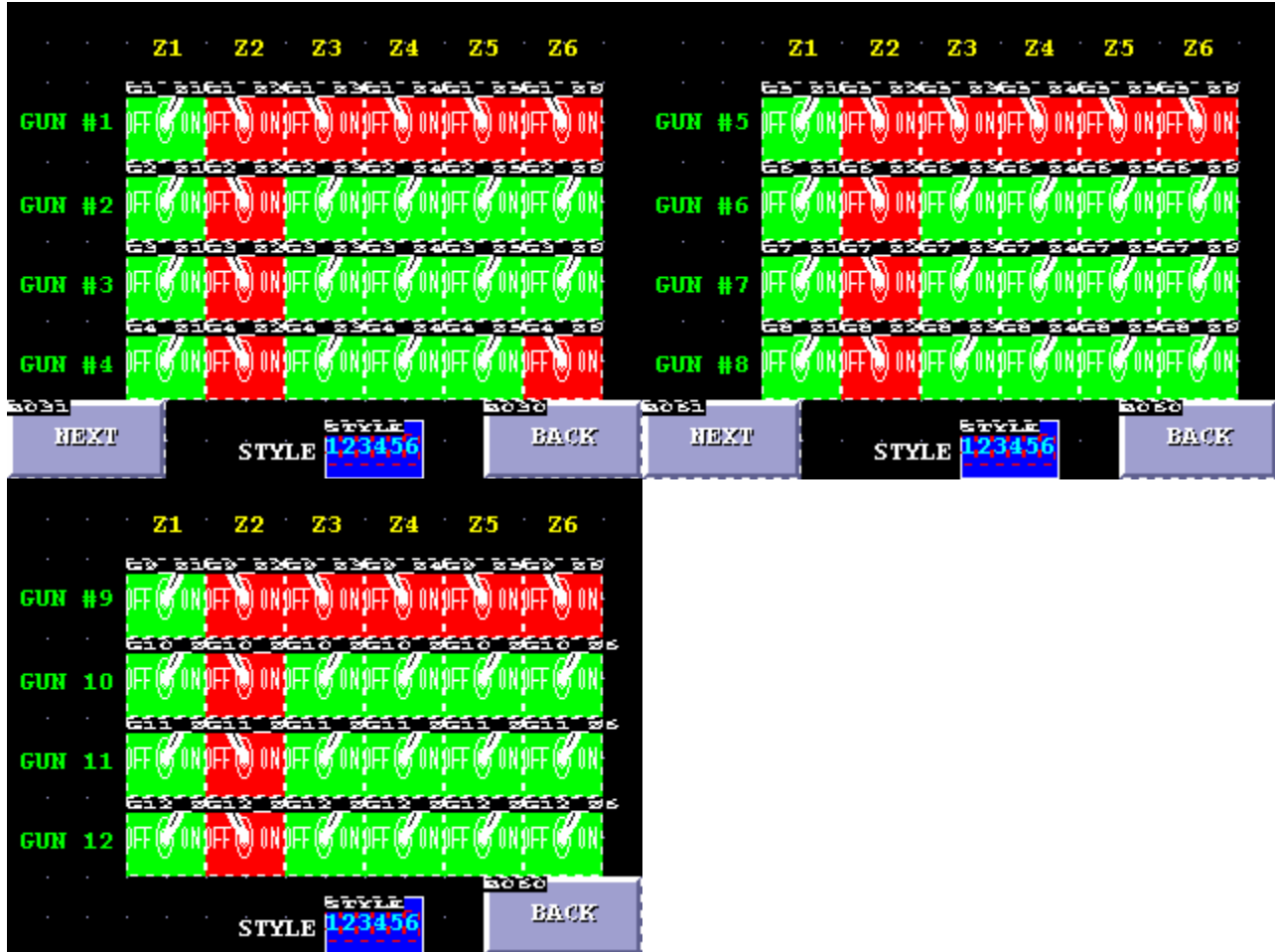
Troubleshooting Guide

No Panel Display Power
- Verify 24VDC power to the display terminals.
    - If 24VDC power is present, see display manual.
    - If 24VDC power is not present proceed.
- Check Fuse 408FU
- Verify 24VDC power supply 405SUP output
- Check Fuse 405FU
- Verify 110VAC on filter output
- Verify 110VAC on filter input
    - With power on filter and green STATUS OK LED is off, replace the filter.
- Check Fuse 300FU
- Verify incoming 110VAC power

Conveyor Speed Not Displayed Correctly
- Verify conveyor is moving
- Verify conveyor interlock PLC input card X4 is active (LED on)
- Verify conveyor encoder PLC input card X5 and X6 are active (LED blinking)
- Verify conveyor encoder shaft is turning
- Verify conveyor encoder wiring is correct
- Verify display conveyor setup parameters are correct

Guns Not Triggering
- Verify Triggering switch is in Auto or Manual
- Verify conveyor is moving or Trigger Interlock Bypass is active
- Verify exhauster interlock PLC input card 1 X2 is active (LED on)
- Verify fire detection interlock PLC input card 1 X3 is not active (LED off)
- Verify conveyor interlock PLC input card 1 X4 is active (LED on)
- Verify conveyor encoder PLC input card 1 X5 and X6 are active (LED blinking)
- Verify part identification PLC input card 1 X10 through X15 are active (LED on when a part breaks the photoeye beam)
- Verify gun trigger PLC output card 2 T1 through T12 are active (LED on)
- Verify display Style selection
- Verify display Zone selections
- Verify gun lead, lag, and distance data
- Verify panel power