M1200 Series Die Protection System with Programmable Limit Switch (PLS)

Instruction & Operation Manual

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1. M1200™ Die Protection System

The M1200 is a user-friendly die protection system. The unit is front panel mounted, measuring 8.7" x 7.6" x 5.25". The enclosure houses the basic package outlined below. However, its modular programming structure provides for individualized selection of optional features. This manual discusses the M1200 basic features including:

- Complete Die Protection with 12 sensor inputs
- Brake Wear Monitor and Motion detector
- Counters for Batch, Quality, Total and Tool (Batch and Quality outputs)
- Five front panel "Hot Keys" for immediate status access
- Optional PLS with six or fourteen output channels

The M1200 monitors input sensors to ensure that proper conditions are established before the die makes a hit. Inputs from up to 12 sensors are monitored within programmed dwells. Each input can be monitored for rising edge, falling edge, position high, position low, or pulse within the programmed dwell. If one or more inputs are outside the programmed window, a fail-safe fault output is de-energized. Each input is user programmable to deactivate a fault output immediately, or to synchronize with a programmable top stop angle.

Figure 1 (shown below) is a functional block diagram of the M1200.

An I-Stop Mute Angle disables the output from deactivating at the bottom of the press stroke (from programmable position angle to 190°) to prevent the press from locking on the bottom.

The unit can store parameters for up to 100 user-named programs. Programs can be given a name or a label and subsequently be referred to.

Four software counters (batch, quality, total and tool) are provided for the user to perform a procedure after a certain number of hits are completed.

- Batch counter is programmable to top stop the press when the preset number of parts are counted.
- Quality Counter is programmable to output, allowing a part quality check.
- Total Counter is an upward counter, counting the number of hits the press has made.
- Tool Counter is an upward counter, counting the number of hits the tool has made.

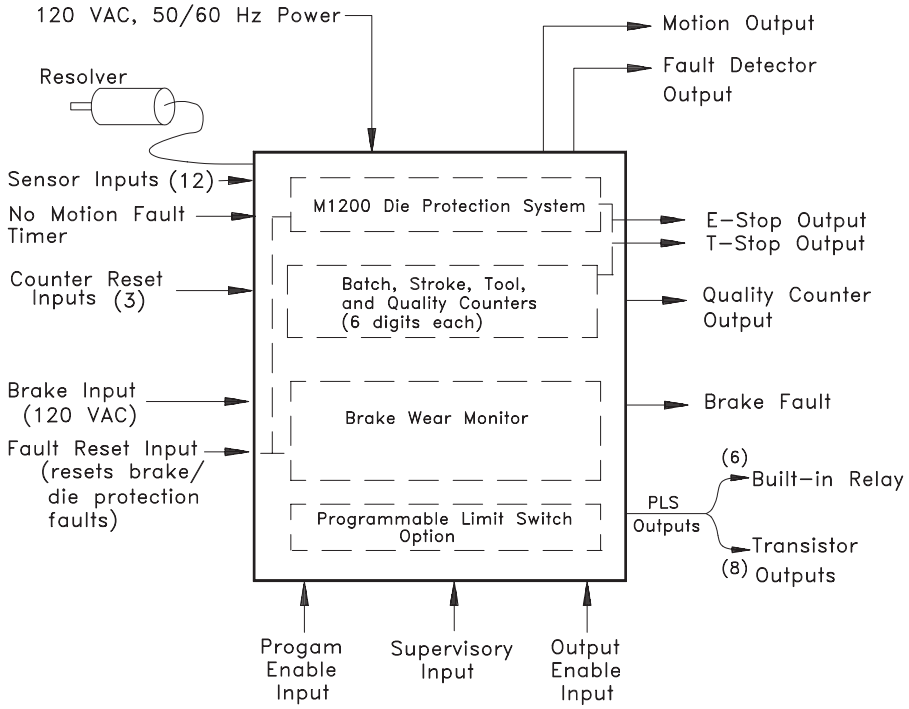


Figure 1 - M1200 Block Diagram

Two-row Display and 22-Key Keypad
The operator interface is provided by the sealed, NEMA 12 keypad with corrosion resistant polyester overlay. The software provides user-friendly menu driven programming and simple English language messages. The two-row character vacuum fluorescent display prompts with clear visibility in plant environments. (Front Panel is shown in **Figure 2**, below.)

Fully Isolated Inputs and Outputs. All M1200 inputs and outputs are fully isolated from user power sources to provide outstanding electrical noise immunity in harsh industrial environments.

Built-In Fault Detection. The Fault Output is normally energized when the M1200 is operating normally and the resolver wiring is intact. If an internal M1200 fault is detected, the power fails, or one or more of the resolver wires is broken or disconnected, the Fault output will de-energize. Under fault conditions all system outputs will de-energize.

Built-In Tachometer and Motion Detector. The built-in tachometer and motion detector are accurate to one (1) RPM and are updated over 68 times per second to provide fast, accurate indication and detection of rotary motion. The motion detector is programmed to energize a power relay output when the machine's RPM is greater than the low limit and less than the high limit. The Motion Output also has a Delay Timer to verify commanded motion is being sensed or detected, and minimum speed has been achieved prior to "time-out" of Delay Timer.

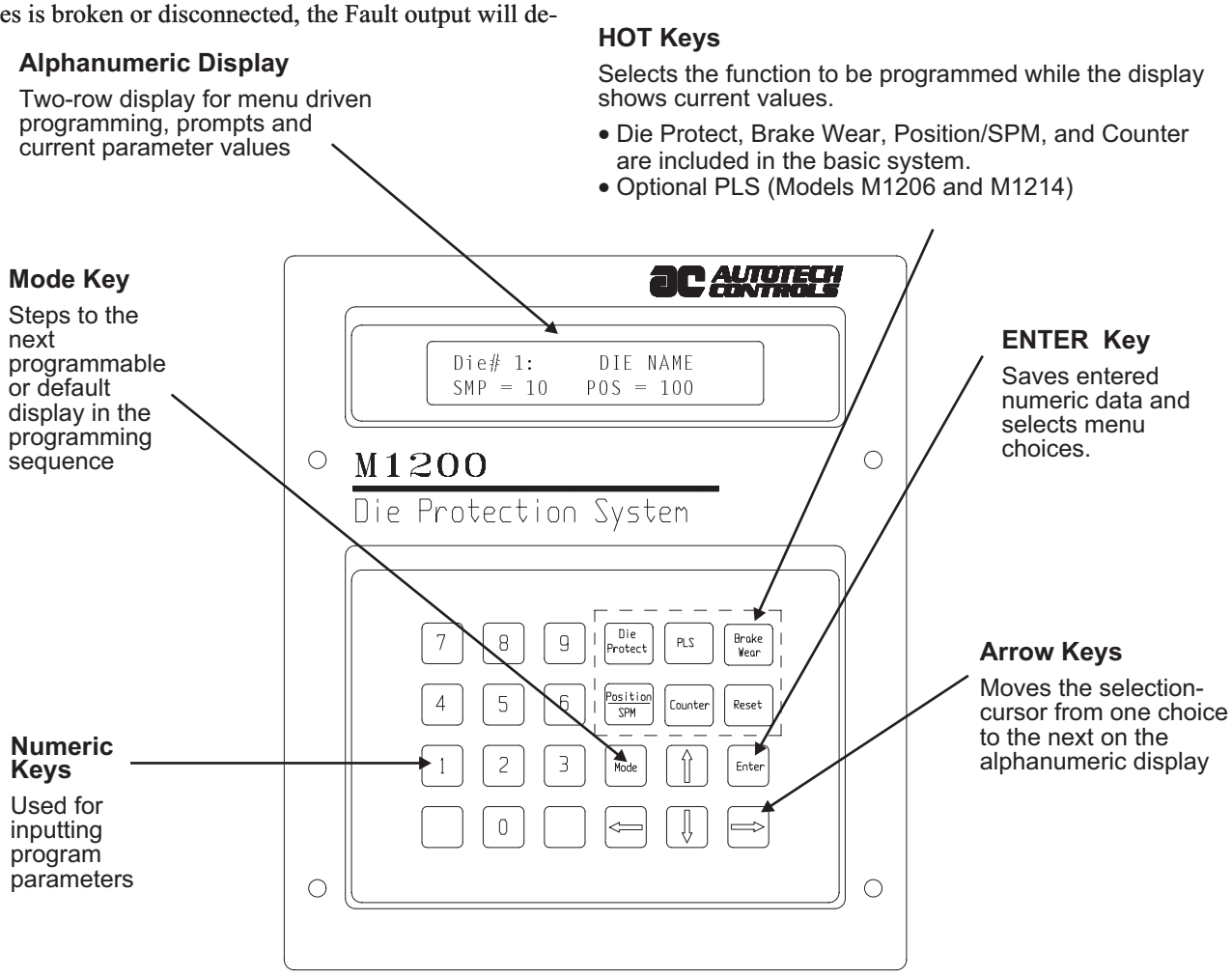


Figure 2
M1200 Front Panel

2. Specifications

Input Power:
105 to 135 VAC, 50/60 Hz, 20 W

Operating Temperature:
-10 to 130°F (-23 to 55°C)

Dimensions:
7.6" W x 8.7" H x 5-1/4" D

RESOLVER INTERFACE

Position Transducer:
Resolver, Autotech's Series RL100 or equivalent

Cable Length between Resolver and M1200:
2500 feet max, foil shielded,

Resolver Cable:
Autotech's CBL-10T22-xxxx, or equivalent

PROGRAMMING

Scale Factor: Fixed at 359

Offset:
Programmable from 0 to 359 and is common to all Die Protection and PLS programs

Die/Tool Identification:
One 8-character name per program. Search by full or partial name.

Number of Programs or Setups
100 programs

DIE PROTECT SPECIFICATIONS

Number of Sensors:
Twelve, 12 sensor setpoints per program

Event Detection:
Programmable Rising Edge, Falling Edge, Pulse, ALL HI, ALL LO, DWL-HI or DWL-LO detection within programmed window. (DWL stands for Dwell.)

Fault Output:
Programmable for each sensor:
I-STOP: Stops the press immediately (Fail-safe) (See I-Stop Mute Angle)
T-STOP: Stops the press at top stop angle (Fail-safe)
Sensors can selectively be disabled.

Sensor Name:
One 8-character name per sensor. Ability to select names from a library or enter a customized name.

Slug Detect Delay:
Programmable number of stroke cycles between the detection of a slug fault and the deactivation of the I-Stop or T-Stop output. Programmable from 0-99.

I-Stop Mute Angle:
Programmable angle from 90 to 190°. I-Stop does not occur between Mute Angle and 190°.

COUNTERS

Batch Counter:
Six digit presettable down counter. Counts down to zero. Top Stop output de-energizes at programmable T-Stop Angle (See Mode POS-13) Resettable from keypad or input.

Quality Counter:
Six digit presettable down counter. Output de-energizes at programmable T-Stop Angle (See Mode POS-13)

Total Counter:
Six digit resettable up counter. Resets at power up or from keypad or input.

Tool Counter:
Six digit tool specific resettable up counter. Resets from keypad.

INPUTS

Electrical Specifications (*all inputs*)
Optical isolation: 1500 V

Logic Levels: (except 120 V Brake Input)
TRUE: < 1.0 VDC @ 7mA (or terminal tied to Sig Ref (J9-1)
FALSE: 20 to 24 VDC (or open circuit)

Fault Reset:
TRUE: Resets all faults including Die Protection, Brake Wear, and Motion

Program and Supervisor Enable:
TRUE: Allows programming of parameters.
FALSE: Parameters can only be viewed.

Output Enable:
TRUE: allows all outputs to function
FALSE: De-energizes all outputs

Batch, Quality, and Total Reset:
Three separate inputs, one for each counter.
TRUE: Resets the desired counter to its preset value
FALSE: No action

OUTPUTS

Fault Output (Fail-safe):
Detects resolver broken wire and M1200 internal faults.
Without Fault: Relay remains energized.
With Fault: Relay de-energized.

Motion Output:
Relay energized when resolver RPM is between programmed high and low motion limits.
See Modes POS-10 through POS-12

I-STOP Output

Fail Safe: Relay de-energized when Die Protection Fault is detected. When no fault detected, relay stays energized.

T-STOP Output

Fail Safe: Relay de-energized when Die Protection Fault is detected. When no fault detected, relay stays energized.

Counter Out:

Relay de-energized when Quality Counter equals zero. Relay energized when counter is non-zero.

TYPES OF OUTPUTS

A. Electromechanical SPST Relay:

10 Amp resistive continuous @ 120VAC

B. Solid-State Relay:

1. AC output: 120 VAC @ 3A;
   ON time: < 3ms after zero cross;
   OFF time: at zero cross;
   Leakage: 2.1 mA @ 120 VAC
2. DC output: Up to 60 VDC @ 3A;
   ON time: 5 μs; OFF time: 35 μs;
   Leakage: 0.01 mA @ 30 VDC
3. DC output: Up to 200 VDC @ 1A;
   ON time: 15 μS; OFF time: 100 μs:
   Leakage: < 0.01mA @ 30 VDC

BRAKE MONITOR SPECIFICATIONS

Brake Danger Limit

Programmable in hundreds of seconds from 0.00 to 9.99 seconds. The Fail Safe Brake Output de-energizes when stopping time exceeds this limit. The press stop time is measured from the time the clutch is disengaged (Brake engages) to when press motion ceases.

Brake Input

Clutch Engaged: 90-120 VAC
Brake Engaged: 0-10 VAC or open input.

PLS SPECIFICATIONS

PLS Setpoints: 16 per program

Speed Compensation
(Available for Channels 1-6 only):

Programmable up to 359 degrees per 100 rpm. Each PLS channel has its own speed compensation.

PLS Outputs:

Number of PLS Outputs: 6 (SAC-1206-xxx)
14 (SAC-1214-xxx)

Type of Outputs:

Channels 1-6: Built in relays

Channels 7-14 (Connector J5): Used for N-Type outputs (sinking 80 mA max). Compatible with Autotech's Relay Chassis (ASY-RLYCH-08xx)

3. Installation and Wiring

Necessary Equipment

See *How To Order* Section of this Manual.

1. M1200 — Die Protection System
2. Single Turn Resolver, such as Autotech's RL100 series.
3. Resolver Interface Cable (CBL-10T22-Cxxx, CBL-10T22-Mxxx or equivalent)
4. Output/Input Cables — 22 AWG with common shield (CBL-10T22-Cxxx, or equivalent)
5. Sensor Power Supply: +24 VDC ± 5%, 2.5 Amp (Customer supplied)
6. Power Relay Chassis, if 14 PLS option used. (ASY-RLYCH-08xx)
7. Interface Cable for Expansion Power Relay Output Chassis, if option used. (such as Autotech CBL-RLYCH-D04 with sub "D" connector on one end or CBL-RLYCH-DA4 with sub "D" connector on both ends)

Front Panel Mounting

The Front Panel Mounting unit has a sealed front plate and is provided with four 0.188" dia. holes (use 8-32 screws) for mounting. The remote power relay output chassis, if used, is mounted inside the customer's control panel. Six 0.196" dia. holes (use two 10-32 and four 6-32 screws) are provided for mounting. See **Figures 3 and 4** (previous page) for Mounting and Cutout Dimensions for Front Panel. See **Figure 5** for ASY-RLYCH-08xx mounting.

Relay Chassis Mounting.

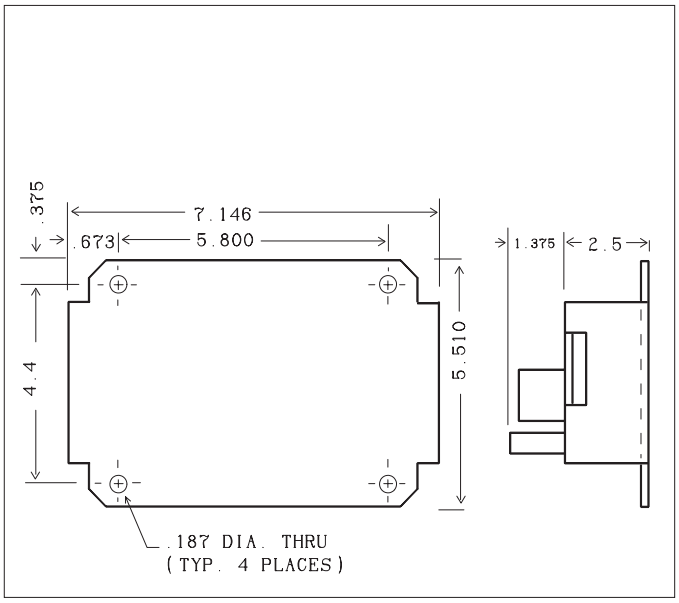


Figure 5 - Power Relay Output Chassis,8-Channel

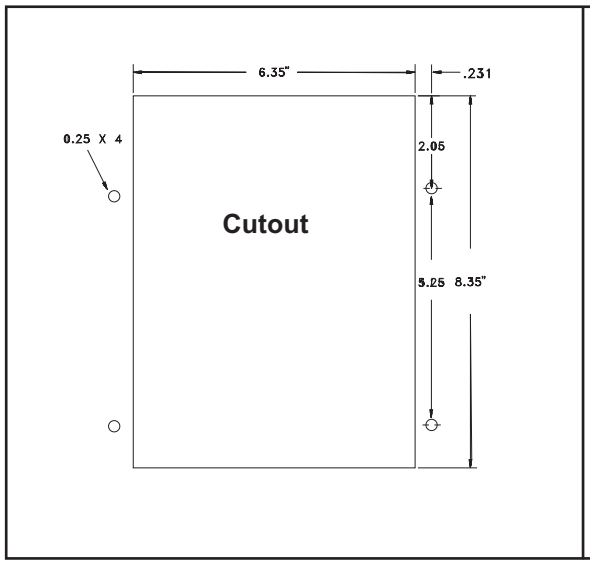


Figure 3 - Cutout Dimensions

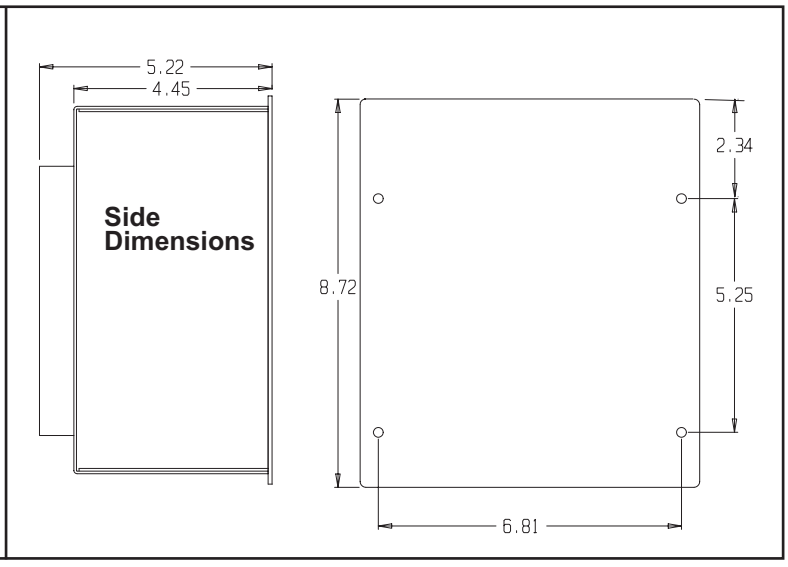


Figure 4 - Mounting Dimensions

Heat Considerations

The enclosure for the M1200 should be at least 6" deep and have a minimum of 4" clearance on all sides. No heat producing control or hardware should be mounted directly underneath the M1200.

Noise Considerations

All motor starters, contactors or any other inductive or noise generating devices should be mounted in either a separate control panel or in a separate section of the M1200 enclosure, at least 12" away.

When the M1200 is mounted in an enclosure or a control panel, use separate conduit entrances for low voltage wiring and 120 VAC wiring.

Grounding Essentials

Grounding is essential to the M1200's operation. Follow the shielding and grounding techniques as shown in **Figure 6**, below.

- Paint should be scraped off of the surface around the mounting holes on BOTH the M1200 and the enclosure.
- A star washer should be used together with the mounting bolt to ensure a good electrical connection between the M1200 chassis and the enclosure.
- Use #10 gauge grounding wire to connect the chassis GND terminal of the M1200 to the earth ground point in the control panel.
- The enclosure itself must have a GOOD EARTH GROUND CONNECTION. Even though metal conduits are excellent conductors, they cannot be relied upon because of poor electrical connection at their termination points. Therefore, a separate #8 or thicker ground wire is essential. Earth ground is recognized as the central building ground for all electrical equipment and AC power (please refer to the National Electrical Code NFPA-70).
- It is always a good idea to "ohm out" the grounding prior to finishing the installation.

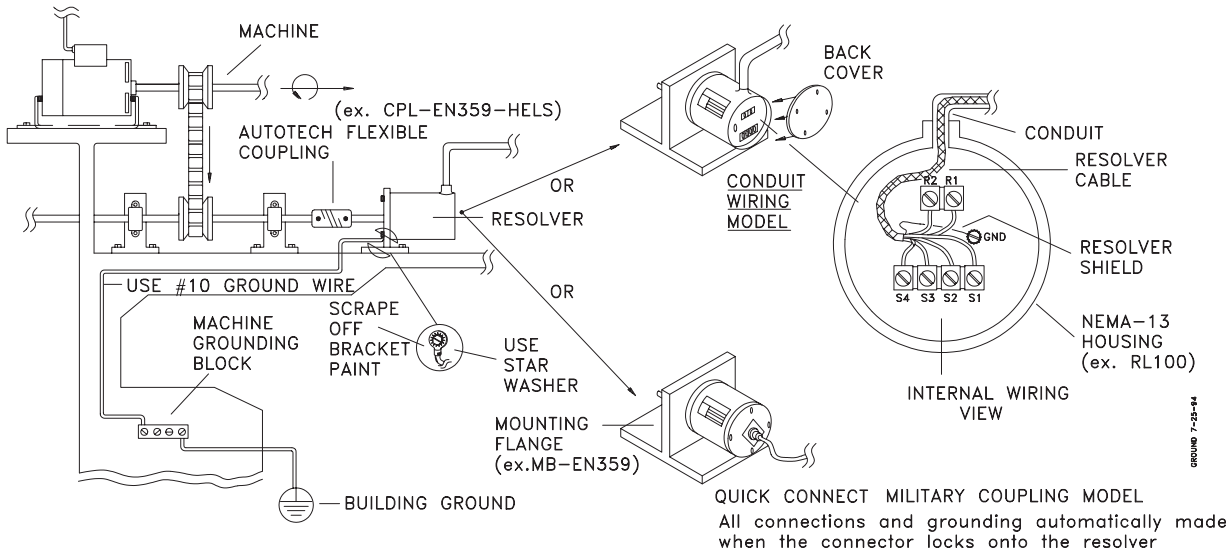


Figure 6 - Grounding Guideline

M1200 BACK PANEL WIRING DIAGRAM

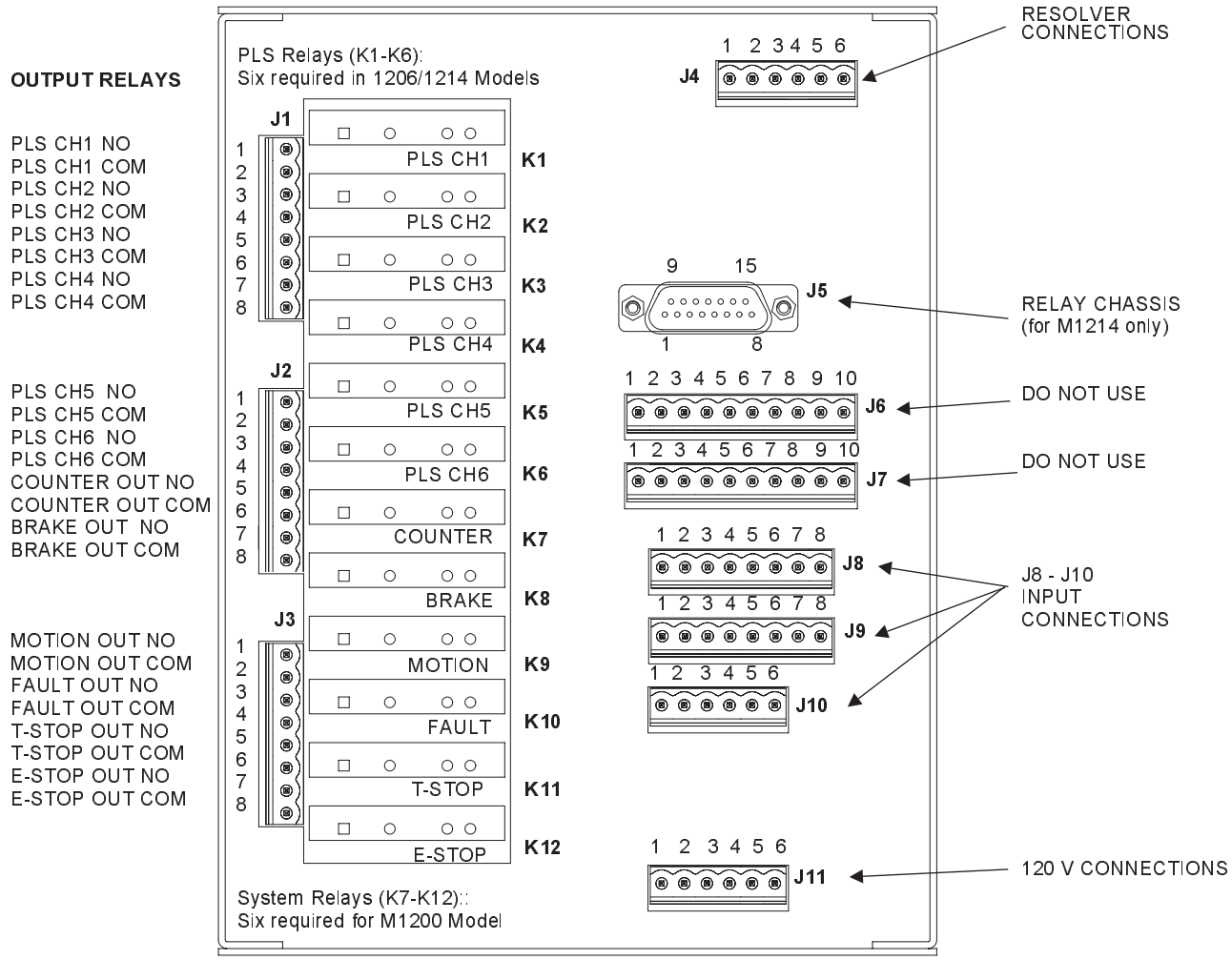


Figure 7 - M1200 Back Panel Wiring

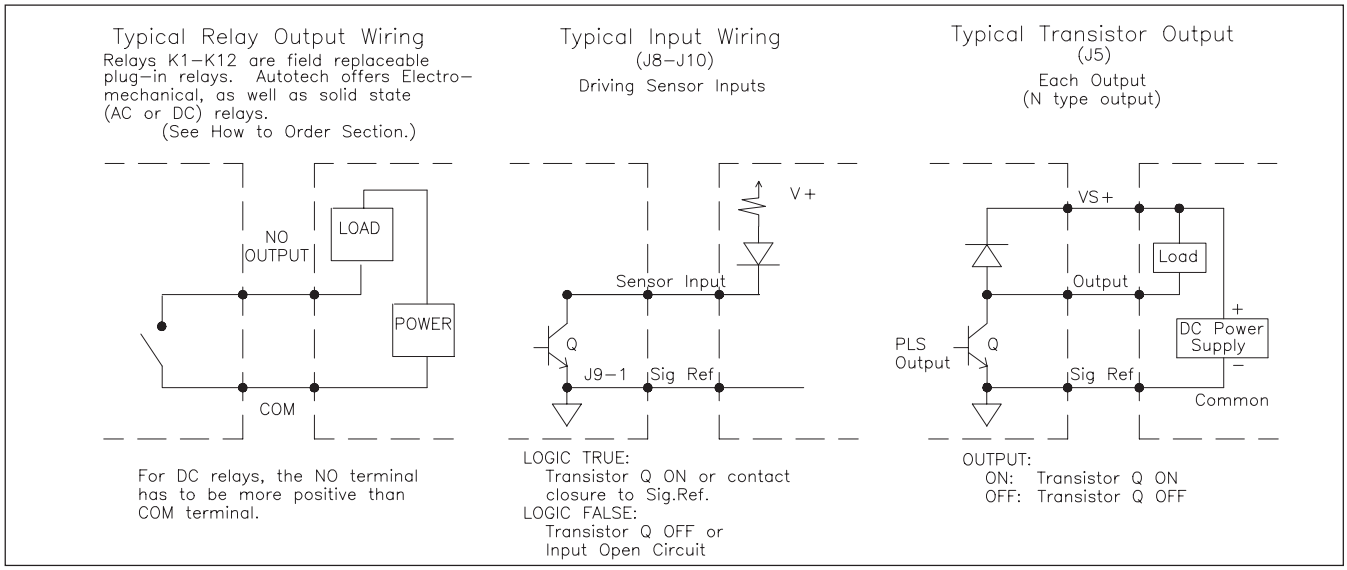


Figure 8 - Input and Output Types

J1: Outputs

All outputs are fail-safe (de-energized at fault output)

Term. #	Function	Relay
1	PLS CH1 NO	K1
2	PLS CH1 COM	
3	PLS CH2 NO	K2
4	PLS CH2 COM	
5	PLS CH3 NO	K3
6	PLS CH3 COM	
7	PLS CH4 NO	K4
8	PLS CH4 COM	

J2: Outputs

All outputs are fail-safe (de-energized at fault output)

Term. #	Function	Relay
1	PLS CH5 NO	K5
2	PLS CH 5 COM	
3	PLS CH 6 NO	K6
4	PLS CH 6 COM	
5	Counter Out NO	K7
6	Counter Out COM	
7	Brake Out	K8
8	Brake Out COM	

J3: Outputs

All outputs are fail-safe (de-energized at fault output)

Term. #	Function	Relay
1	**Motion NO**	K9
2	**Motion COM**	
See POS-10 to POS-12		
3	**Fault NO**	K10
4	**Fault COM**	
De-energized if broken resolver wire or internal processor fault is detected. See Broken Wire Detection		
5	**T Stop NO**	K11
6	**T Stop COM**	
See Die Protect Section		
7	**I Stop NO**	K12
8	**I Stop COM**	
See Die Protect Section		

J4 : Resolver Connections

Use Autotech's overall foil shielded cables for wiring resolver. The following table gives wire colors of cable CBL-10T22-xxxxx used to wire resolver

Term.#	Function/ Connector Pin	Wire Color
Resolver Input (Rotor)		
1	R1/ F	Green-Black
2	R2/ E	Green
Resolver Input (Stator)		
3	S1/ D	Yellow-Black
4	S2/ B	Blue-Black
5	S3/ C	Yellow
6	S4/ A	Blue
Twisted Pairs: R1, R2; S1, S3; S2, S4		
Gnd	Shield	Green

To change the resolver ascending count direction, reverse the S1 and S3 connections

J5: DB9 Connector (From M1214 only)

PLS Channels 7-14 are sinking Compatible with Autotech's relay Chassis (ASY-RLYCH-xxxx) NPN transistor outputs.

Terminal #	Function
1	N/C
2	Sig Ref
3	VS+ (from relay chassis)
4	N/C
5	PLS CH 13
6	PLS CH 11
7	PLS CH 9
8	PLS CH 7
9	Sig Ref
10	VS+ (from relay chassis)
11	N/C
12	PLS CH 14
13	PLS CH 12
14	PLS CH 10
15	PLS CH 8

J8: Sensor Input

Terminal #	Function
1	Sensor 7
2	Sensor 6
3	Sensor 5
4	Sensor 4
5	Sensor 3
6	Sensor 2
7	Sensor 1
8	Total Counter Reset

J9: Sensor Inputs

Terminal #	Function
1	Sig Ref (VS–) Common for Cust.Power Supply)
2	N/C
3	Sensor 12
4	Sensor 11
5	Sensor 10
6	Sensor 9
7	Sensor 8
8	VS+ (11 - 28V)

J10: Input Connections

Function when TRUE

Terminal #	Function
1	Batch Counter Reset
2	Quality Counter Reset
3	Fault Reset
4	Output Enable
5	Supervisory
6	Program Enable

J11: Power and Brake Inputs

Terminal #	Function
1	120 VAC Brake Input. Must be **HOT** and wired to 120VAC. AC ON: Clutch engaged AC OFF: Brake engaged and timing begins (See Brake Stopping Time)
2	120 V Brake In **NEUTRAL**
3	N/C
4	L1, 120 VAC
5	L2, 120 VAC
6	GND

Figure 9 - M1200 Wiring

4. Programming the M1200

Programming Overview

Autotech prides itself in the user-friendly programming which results from display prompted commands. This manual is provided for the user as a complete reference for understanding the M1200 Die Protection System features.

The 22-key keypad and alphanumeric display provides user-friendly programming for the M1200. Programming is menu driven. The display will show several choices. A highlighted choice on the display prompts the user to make changes to the value (if necessary).

Choices are selected as follows:

- **ARROW** (cursor) **LEFT/RIGHT** keys will move the selection from one choice to the other. The cursor is not available when resolver is moving for Offset.
- **ENTER** key must be pressed to save newly programmed data or to select a menu choice.
- **MODE** key will step to the next programmable or default display in the programming sequence.

The numeric values may be entered in two ways:

- Enter the number directly using number keys; entry is accepted after pressing of **MODE key.** Numeric entry is not operable when the resolver is moving.
- Up /Down **ARROW** keys to increment or decrement values. Values are modified immediately.

☞ The Up/Down Arrow keys may be used while the resolver is moving for fine tuning programmable values.

Alpha characters (when programming die names) are entered by pressing the Up Or Down ARROW keys.

Display Time Out

The M1200 display will return to the default display of the current program after one minute of no keyboard activity unless a fault is detected (except PLS and DIE). Default displays are the first display of the Hot Key. See Hot Keys Section on **Page 10**. The display will also dim to a lower intensity after one minute of inactivity.

Broken Wire Detection

Since the reliability of any control system depends heavily on its position devices, the broken wire detection alerts the control system if this position is in error. The resolver, being inherently rugged, is in most cases not the cause of failure.

The cable connections and broken wire within the cable represent a majority of problems.

Upon detection of a wire fault, a sinking (NPN) transistor will activate and behave as an open circuit . This “fail-safe” circuit output will shut down the outputs. The external output **(Connector J3-Terminals 3 & 4)** may be used to control a relay or programmable controller input to perform a chosen function such as press shutdown. The message to the user is displayed on the front panel:

```
BROKEN RESOLVER WIRE
     DETECTED
```

This message will be displayed until the cabling connection is made.

Die ID (Programs)

The unit stores up to 100 die setups or die name/number programs. Each program is given a **name** not exceeding eight characters and is called **Die ID** on the display. A program includes the complete setup information for Die Protect, Counters, and optional PLS. When a die is changed in the press, entering the right Die ID will automatically load all the setup information, which has been previously programmed for that Die ID.

Program Management

To manage programs, copy, rename and delete operations are supported. In case of Die Protect inputs, name or labels may be assigned to the inputs for the user's convenience.

☞ Program Enable (J10, Pin 6) must be true (tied to Sig Ref) to program any parameters.

Program and Supervisor Enable

PE (Program Enable) and SE (Supervisor Enable) inputs must be TRUE (tied to Sig Ref) to manage programs. They may be installed as remote “key switches”:

- Program Enable allows the user to program parameters. Must be used in Setup.
- Without Supervisor Enable active,the system only allows the user to view the displays, not program them. Must be used in Setup. In conjunction with PE, SE allows user to view and program setup parameters.

Default Displays

The M1200 identification display is viewed when the unit is first powered on. The display below is only an example and will vary per model , version and checksum value.

```
M1200 SERIES
VER: 1.02          CS: 3CE7
```

The display has an automatic screen saver option. If at any time the keypad has not been used for approximately one minute, the display will dim to a lower intensity.

Upon a fault or a key stroke, the display will brighten to a brighter intensity.

The identification display shows the model number of the M1200 on the first line. The second line displays the version number of the current software and checksum value for the ROM of the system.

```
M12XX-PRO DIE +xx PLS
CHECKSUM: 10CF
```

Hot Key Status Displays

The "orange-colored" Die Protect, PLS, Brake Wear, Position/SPM, and Counter keys are hot keys. These status screens are immediately accessed after pressing a hot key. The Default Display being viewed when the unit is turned off, will again be the current program when the unit is re-powered.

The following displays are the viewed after the press of the correlating hot key or upon power-up of the unit after the identification display. This manual provides instructions for key sequences within each hot key program.

Position/SPM Hot Key (See below)

```
DIE# 1:   DIE NAME
SPM: 10   POS: 100
```

DIE Hot Key (See page 17)

```
DIE INP:  - - -   ■ - -
POS: 359    - ■ -   - - -
```

COUNTER Hot Key (See page 22)

```
BATCH 123456  QLTY 123456
TOTAL 123456  TOOL 123456
```

BRAKE MONITOR Hot Key (See page 24)

```
   BRAKE STOPPING TIME
         1.23 Sec
```

PLS Hot Key (Optional) (See page 25)

```
PLS OUT  - ■ - -  - -
At 359 - - ■ -  - - - -
```

5. Position/SPM Hot Key

Mode POS-1. Default Status Display

The Position/SPM Hot Key calls up the following display to view:

```
DIE# 1:   1234ABC
SPM: 10   POS: 100
```

This is the Position/SPM (strokes per minute) default display. No programming is made on this display. The display shows:

- Current die number and name (shown as 1234ABC in the example to the left)
- Shaft speed in SPM (strokes per minute), and
- Shaft position (angle in degrees with relation to the resolver zero reference definition.

Figure 9 shows the complete Position/SPM key sequence.

Press **MODE** to move to Mode POS-2, Change/Setup Program Menu if PE is TRUE.

Position - SPM Hot Key Menu

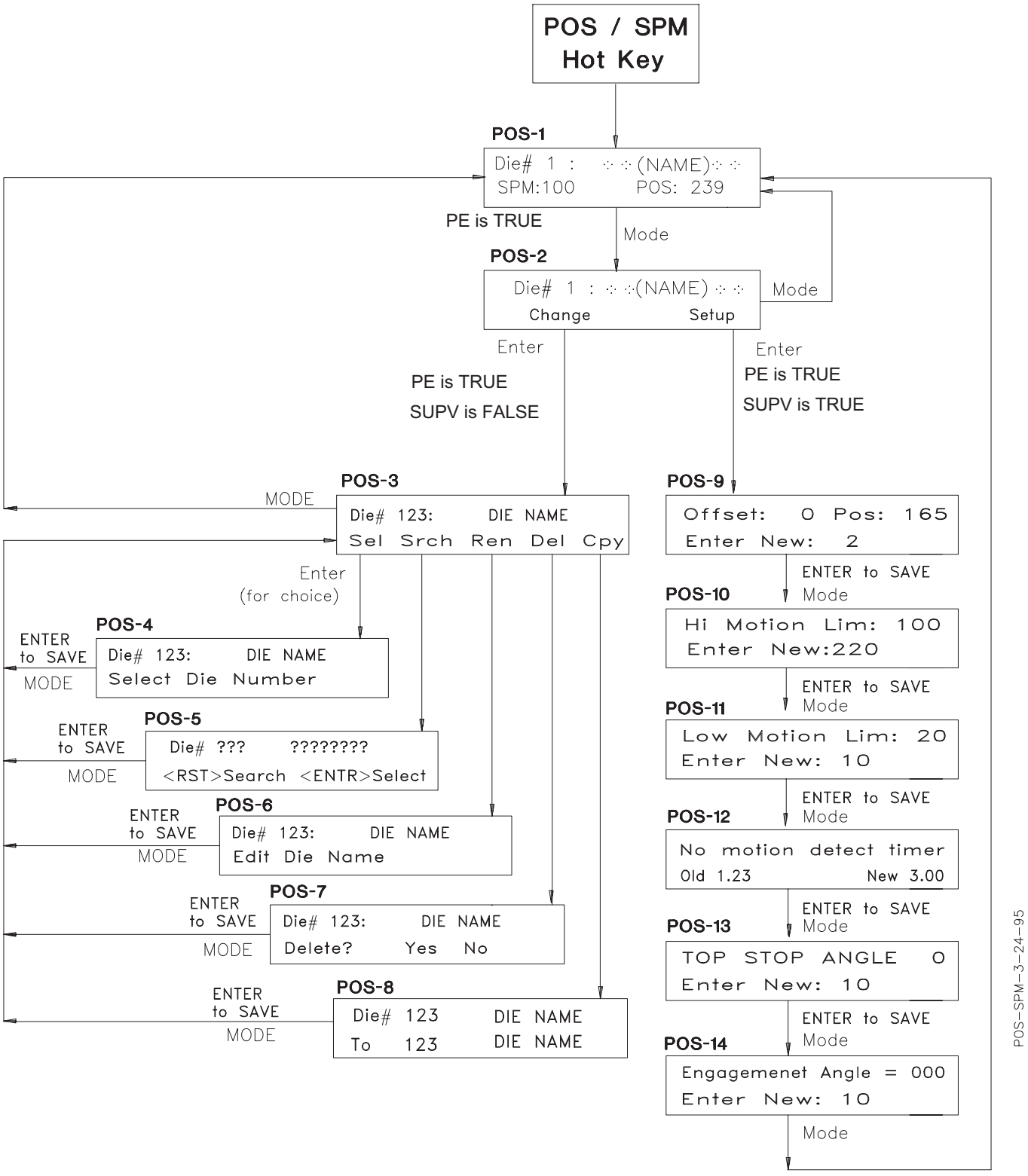


Figure 10 - POS-SPM Hot Key Menu

Mode POS-2. Change/Setup Program Menu

Previous Mode: POS-1

Program Enable must be TRUE for Change Mode.

```
DIE#  1 : 1234ABCD
Change          Setup
```

This display allows you to choose the programming menu path to be followed. The blinking selection may be moved between Change and Setup:

CHANGE:

- **Changing the Die ID:** Die#; searching for a Die # or name; renaming, deleting,or copying a Die.

SETUP:

- **Setting the programmable points** for offset, HI and LO motion limits, no motion detect timer top stop position, and engagement angle.

Key Press/Response:

Right/Left Arrow
Moves blinking selection to "Change" or "Setup" menu choice

Enter
With Change Blinking:
Selects the menu choice and advances to Mode POS-3, Change Die ID Program Menu
With Setup Blinking:
Selects the menu choice and advances to Mode POS-9, Setup Program Menu

Mode
Returns to POS-1 Display

Mode POS-3. Change Die ID Program Menu

Previous Mode: POS-2 ("Change/Setup Program Menu").

```
DIE#    1:  1234ABCD
Sel Srch  Ren  Del  Cpy
```

Die ID Names are programmable up to eight (8) alphanumeric characters.

This display allows for:

- Selecting a new or existing program
- Searching for an existing program
- Renaming the program
- Deleting the entire program, or
- Copying the entire program from one Die # to another Die #

Key Press/Response:

Right/Left Arrow
Moves blinking menu choices on second row of the display

Enter
Selects menu choice and advances to next display (depending upon choice): Mode POS-4 through MODE POS-8

Mode
Returns to Mode POS-1, Position / SPM Default Display

Mode POS-4. Select Die ID

Previous Mode POS-3 ("Sel"). (PE)

From this display, select the current program or a new Die # (1-64) :

```
DIE#   1:  1234ABCD
Select Die Number
```

Key Press/Response:

Up/Down Arrow or Numerical
Scroll Die Number selection (1-64)

Enter
Saves Selected Die ID Number. Display will read "Please wait, programming data", then return to POS-1 Display with newly saved Die #.

Mode
Returns to Mode POS-3, Change Die ID Program Menu

Mode POS-5. Die Name Search

Previous Mode: POS-3 (“Srch”). (PE)

```
DIE#???:    ?????????
<RST>Search <ENTR>Select
```

Key Press/Response:

Reset
Searches for a Die by its Name. Dies may have up to 8 characters. The search may be made by partial name search for any of the 8 characters. If no match is made, display remains unchanged. Continued pressing of the Reset Key will scroll through the die names found and will loop back to the first die name found.

Up/Down Arrow
Scrolls through characters in the name to be searched.

Numerical
Enters numbers into name being searched

Enter
Saves name of the selected die. The display will read “please wait programming data” until the search is completed. If no name is found, the display does not change.

Mode
Returns to Default Mode POS-3, Change Die ID

Mode POS-6. Rename Die ID

Previous Mode: POS-3 (“Ren”). (PE - SE)

Enter Die # to be renamed and press Enter.

This display allows for renaming the program.

```
DIE# 1:     _
Edit Die Name
```

Only one blinking cursor space will be viewed . After the first character of the die name is entered, the display changes to (example only):

```
Die # 1:  3
<ENTER> To Save
```

Continue entering the name using the following keystrokes:

Right ARROW
Adds an additional blinking cursor (max. 8)

Right and Left ARROW
Moves through display and toggles between Die # and Name (for Right Arrow: after second press of not entering an additional character).

Up/Down Arrow
Scrolls through the characters for the new die name — Hyphen (“-”), “?” , blank space and alpha characters. Upon any change of the display, a new display will prompt the user to “Press <Enter> to Save”.

Numerical
Enters Numerical characters into Die Name. (Up to 8 characters are accepted for the die name.)

Enter
Must be pressed to SAVE the Die ID Must also be pressed after selecting die number to enter the die name.

Mode
Returns to Default Mode POS-3, Change Die ID Program Menu

Mode POS-7. Delete Die ID

Previous Mode POS-3 (“Del”). (PE - SE)
Delete an entire program from this display:

```
DIE# 1:    1234ABCD
Delete?   Yes  No
```

Key Press/Response:

Right or Left ARROW
Moves the cursor between Die # and “Delete?” rows.

Up Arrow
Scrolls through the die number selection

Numerical
Enters Numerical characters into the Die Name selection. (Numbers move to the left place value after a new number is pressed.)

Enter
With the cursor on **YES** , press **ENTER** to delete all of the program values. “Please wait Deleting Program” will be viewed. Returns to Default Mode POS-7. With the cursor on **NO** , press **ENTER. The display will remain for any further deleting that the user may require.**

Mode
Returns to Default Mode POS-3, Change Die ID Program Menu

Mode POS-8. Copy Die ID

Previous Mode POS-3 (“Cpy”). (PE - SE)

Copy an entire program to another Die # from this display:

```
DIE# : 60
TO ???
```

Key Press/Response:

Right or Left Arrow
Moves the cursor through the menu

Up /Down Arrow
Scrolls the Die Number selection

Numerical
Enters Numerical characters into the Die Name selection

Enter
Press Enter to copy the program to the selected die. Second display is viewed. Use right or left ARROW key to select yes or no.
NO selection: Returns to POS-8 display.
YES selection: Displays “Please wait, Programming new data”, then returns to POS-8 display.

```
Overwrite Program?
   NO   Yes
```

Mode
Returns display to Mode POS-3, Change Die ID Program Menu

2nd press of Mode
Returns to Mode POS-1, POS/SPM Program Menu

Mode POS-2 . Setup Program Menu

Supervisor and Program Enable must be TRUE.

Previous Mode POS-1 (“Pos/SPM”), press **MODE** , with cursor on Setup, to move to POS-2. This program (Modes POS-9 through 13) allows for system setup: offset, high and low motion limits, no motion detect timer, top stop angle, and engagement angle. See **Figure 9** for the programming flowchart.

Mode POS-9. Offset Display

Previous Mode POS-2 (“Setup”) (PE-SE)

```
Offset:   0 Pos: 112
Enter New:   0
```

Offset is a number added to the resolver position to align it electronically to any desired machine position, such as machine zero. The offset is common to all programs. The allowed range for the offset is 0 to 359.

☞ For safety reasons, Offset may not be programmed while the machine is in motion.

The display shows current offset and position (which includes offset).

Key Press/Response:

Up/Down Arrow
Scrolls the new offset value

Numerical
Changes the new offset value

Enter
Saves value (Offset and POS will be updated to new value after completion of save)

Mode
Moves to Mode POS-10,High Motion Limits

Modes POS-10 and POS-11. High and Low Motion Limits

Previous Mode: POS-9, Offset Display. (PE-SE)

```
Hi Motion Lim:  100
Enter New:   220
```

Motion Output wiring is supplied through **Connector J3, Terminal Pins 1 and 2**. Both the High and Low Motion Limits are programmed through the Setup Program Menu. **(**See **Figure 10)**

☞ If the resolver shaft SPM is greater than the low limit and less than the high limit, the output will energize.

```
Low Motion Lim:  10
Enter New:  20
```

Key Press/Response:

Up/Down Arrow or Numerical
Changes the motion limit

Enter
Saves new motion limit. Top row Limit will be updated to new value after completion of save.

Mode
From Hi Motion Limit display, moves to Low Motion Limit Display.
From Low Motion Limit Display, moves to Mode POS-12, No Motion Detect Timer.

Mode POS-12. No Motion Detect Timer

Previous Mode: POS-11, Low Motion Limit. (SE - PE)

The M1200 provides the user with detection and warning of resolver movement below the LOW MOTION LIMIT. This timer is activated through the following display:

```
No motion detect timer
Old 1.23          New 3.00
```

NOTE: The Motion Output and Brake Input must be wired into the press circuit to monitor. See Figures 11 and 12, below:

Key Press/Response:

Up/Down Arrow
Scroll through the timer value to a maximum of 9.99 seconds. (Note: Both old and new values will scroll.)

Numerical
Changes the timer value to a maximum of 9.99 seconds. New value will change, while old value will remain on display.

Enter
Saves new value. (Note: Old and new will be the same values on the display.

Mode
Moves to the Top Stop Angle display, Mode POS-13.

The fault is output through **Connector J3, Pins 1 and 2.** This fault is reset externally through **Connector J10, Pin 3.**

Under normal operating conditions, motion will de-energize when the strokes per minute (SPM) falls below the motion Lo Limit. Once the SPM reaches zero, the motion output will energize to allow the press to start up again. When the falling edge of the brake input occurs, the motion timer begins timing.

- If the press reaches an SPM in between the motion high and motion low (before the motion time delay times out), the motion output will remain energized.
- If the SPM does not fall between motion high and motion low limits (before the motion timer times out), the motion output will de-energize and the unit will display "No Motion".

```
No motion detect
SPM 18
```

The strokes per minute that were achieved during the timed period will appear on the second line of the display.

In order to monitor for motion with the resolver, you must wire the motion output into your press stop circuit. Failure to do so could result in the press continuing to run without die protection.

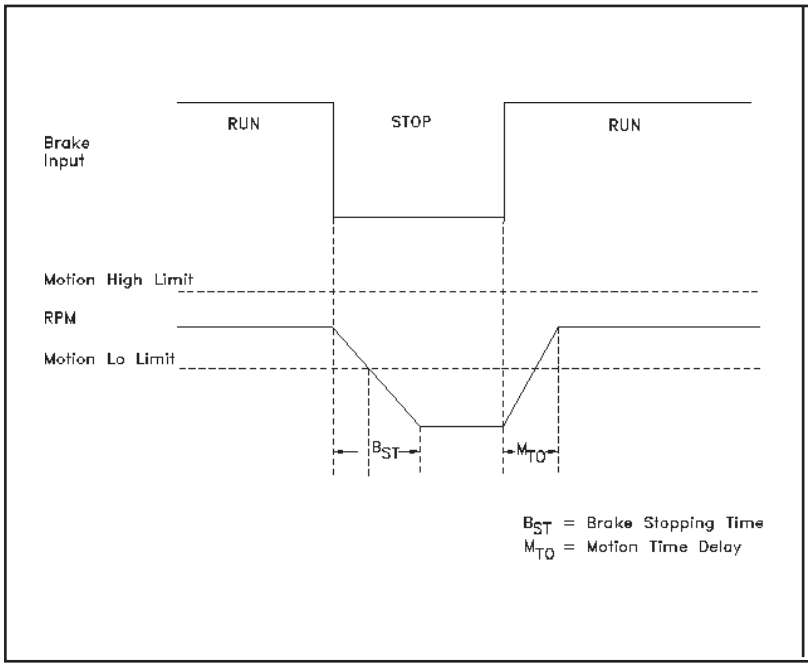
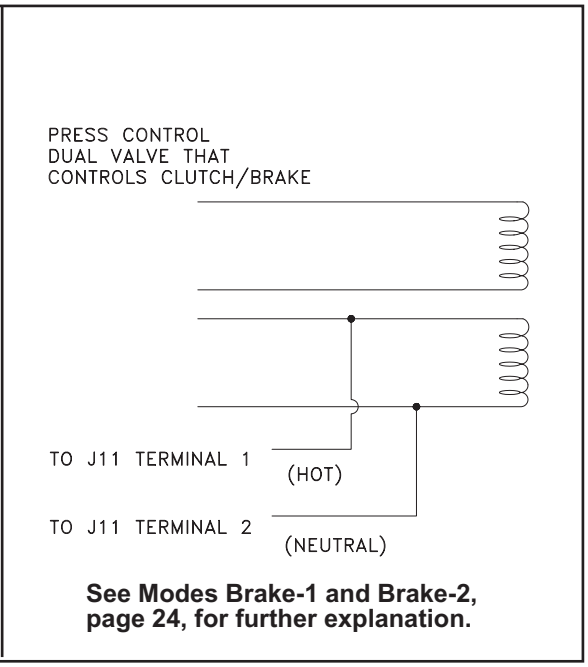


Figure 11 - Brake Stopping Time and No Motion Detect Timer



See Modes Brake-1 and Brake-2, page 24, for further explanation.

Figure 12 - Brake Wiring

Mode POS-13. Top Stop Angle

Previous Mode: POS-12, No Motion Detect Timer. (SE - PE)

The M1200 allows the user to program the resolver shaft angle value to stop at a predetermined point to ensure that the die is in its uppermost position when movement stops. The T-Stop output will de-energize at this angle.

The Top Stop is enabled through the Die Hot Key program in the Edit Display. See **page 16.**

The angle programmed includes the offset, if any, as explained in Offset Display, Mode POS-9.

```
TOP STOP ANGLE:    100
Enter New:  175
```

Key Press/Response:

Up/Down Arrow
Changes the angle value. (First and second row values will be same if value has not been saved.)

Numerical
Changes the angle. New value will change, while old value will remain on display.

Enter
Saves new value. (First and second row values will be identical).

Mode
Moves to the Engagement Angle Display, Mode POS-14.

Mode POS-14. I-Stop Mute Angle

Previous Mode: POS-13. (SE - PE)

The mute angle is the range defined by the user between 90° and a preset value of 190° . If a fault occurs within this window, the I-Stop Output (J3, Pins 7-8) will be inhibited until the press moves past 190° to prevent die lockup. (Refer to **Figure 13**)

```
Engagement Angle
Old = 140  New = 120
```

Key Press/Response:

Up/Down Arrow
Changes angle (90° to 190°) for I-Stop Mute

Numerical
Changes angle (90° to 190°) for I-Stop Mute

Enter
Must be pressed to SAVE new value. (Old and new values will become identical).

Mode
Moves to Mode POS-1 Mode.

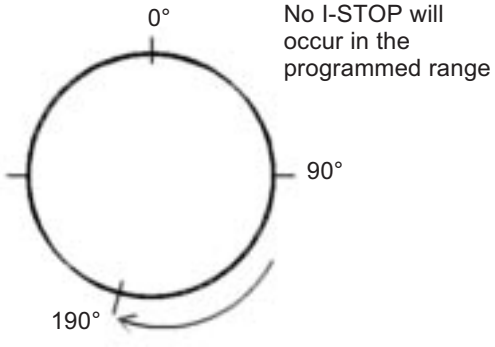


Figure 13 - Mute Angle

6. Die Protect Hot Key Menu

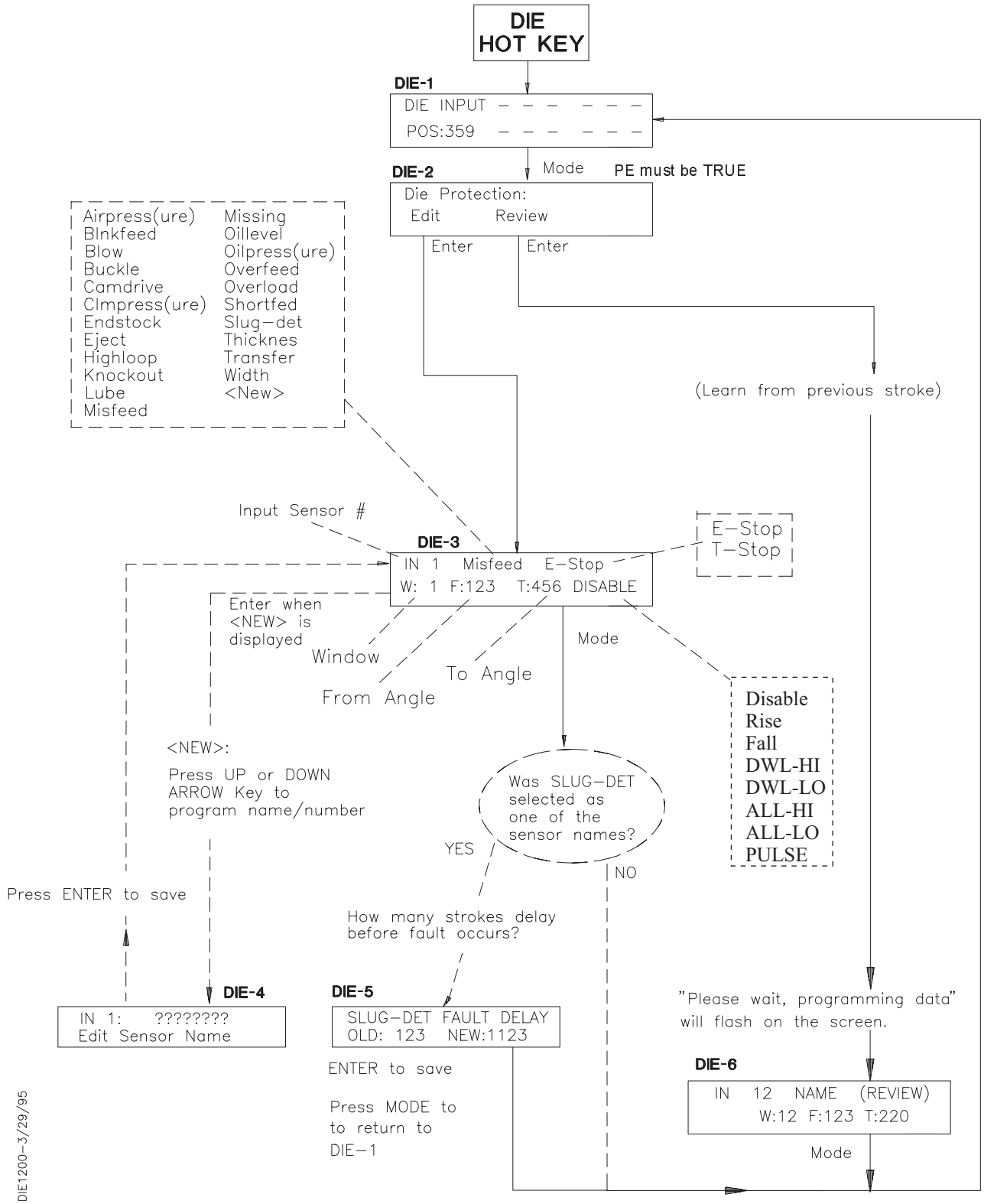


Figure 14 - Die Protect Program Menu

Mode Die-1. Sensor Input Status Display

Press the "Die" Hot Key on the front panel to access the Die Protection Menu, Mode DIE-1. This Mode allows you to program die protection parameters for that job. **Figure 10** (on the previous page) illustrates the Die Protect display program flow.

```
Die Input:  - - -   ■ - -
POS: 359    - ■ -   - - -
```

The first row on this display shows die inputs 1 through 6. A dash (–) is viewed if the input is OFF, a box ■ is viewed if the input is ON.

The second row shows the position of the resolver and die inputs 7 through 12. The "dash (–) " is viewed if the input is OFF, a "box ■ " is viewed if the input is ON. No programming is done in this display.

Die Protection Programming

☞ *To change a Die Protection parameter, the Program Enable must be TRUE (low).*

Event Types

☞ *Event Type is common for all windows of a particular sensor.*

Figure 15 illustrates the die fault detection types:

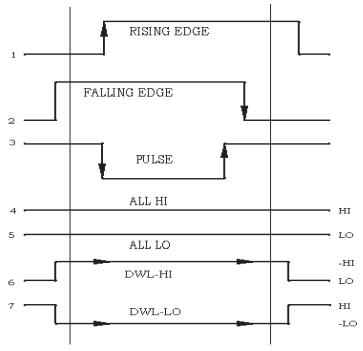


Figure 15 - Event Types

1. If the input is programmed as **RISING**, and **RISING EDGE** of this input occurs within the programmed FROM-TO window, no fault will be generated. If no rising edge is detected within the window, fault output will be generated per T or I-Stop selection after the TO setpoint of the window is reached.

2. If the input is programmed as **FALLING,** and no **FALLING EDGE** is detected within the window, the fault output will be generated per T or I-Stop selection after the TO setpoint of the window is reached.

3. If an input is programmed as **PULSE**, both rising and falling edges have to be detected within the window. If either rising edge or falling edge, or both are missing, fault output will be generated per T or I-Stop selection.

4. If an input is programmed as **ALL-HI**, this inp**u**t has to remain high throughout the whole stroke. If the input goes low at anytime throughout the stroke the unit will either I-Stop or T-Stop depending upon what was programmed.

5. If an input is programmed as **ALL-LO**, this input has to remain low throughout the whole stroke. If the input goes high at anytime throughout the stroke, the unit will either I-Stop or T-Stop depending upon what was programmed.

6. If an input is programmed as **DWL- HI**, this input has to stay high throughout the whole window. If it goes LOW anywhere within the window, fault output will be generated per T or I-Stop selection. (Must go LO outside window during cycle.)

7. If an input is programmed as **DWL-LO**, this input has to stay low throughout the whole window. If it goes HIGH anywhere within the window, fault output will be generated per T or I-Stop selection. (Must go HI outside window during cycle.)

NOTE: If the input collected during the Review is low through the stroke, "ALL-LO" will appear for that input in the F (From) and T (To) windows. If an input is high through the stroke, "ALL-HI" will appear in the F (From) and T (To) windows.

Each input can be disabled through the front panel. If an input is disabled, it is not monitored during operation of the press, and thus cannot generate any faults. There can be more than one window programmed per input. The input will be monitored in each and every programmed window if monitoring is enabled.

Key Press/Response

MODE

Moves to the next display, DIE-2, Edit, Review, Fault.

Die Protection Faults

When a Die Protection Fault occurs, a T-Stop or I-Stop is initiated. The M1200 displays the following die protection fault:

```
Fault  In      1     Feed
       at      30
```

First line displays sensor number and sensor name. Second line displays the degree at which the sensor went high or low.

If a sensor does not change state due to it being blocked by oils, dirt, etc., the unit will display:

```
Sensor    2    Short feed
          Failed
```

The display shows the sensor number, sensor name and that it failed.

All Hi/Low

```
Fault In    4    Buckle
       at   270
```

The display shows sensor number, sensor name and the degree at which the sensor changed state.

Rise/Fall/Pulse

```
Fault In    4    Eject
       at   270
```

The display shows the sensor number, sensor name and the degree programmed for the T = indicating unit did not see the event up to the end of the viewing window.

If monitoring a sensor for position hi or low (ALL HIGH or ALL LOW), you must make sensor TRUE to clear a fault. Otherwise, see Bypass Wiring in the enclosure section of this manual.

Key Press/Response:

RESET
Clears the fault.
(or use the Remote Fault Reset — **J10, Pin 3**)

Mode Die-2. Edit or Review Menu

Previous Mode: Die-1, Die Input. (PE is TRUE)

"**Edit**" allows modification of the Die Protect parameters manually. (Mode Die-3)

"Review" Allows user to view what information the M1200 read on the last hit. The information is shown in the Die Protection Review (Mode Die-4)

NOTE: To change a Die Protection parameter, the Program Enable must be TRUE (low).

```
Die Protection:
Edit  Review  FLt: NO
```

Key Press/Response:

Right/Left Arrow
Moves cursor through display

Enter
With "Edit" blinking, access the Edit mode, Mode Die-3.
With "Review" blinking, access the Review mode, Mode Die-7

Mode Die-3. Edit Display

Previous Mode: Die-2, Edit or Review Menu. (PE is TRUE)

```
IN 3  AIRPRESS   T-STOP
W: 1 F: 20 T: 35  DISABLE
```

The display allows the user to view where the die protect input transitions are taking place. For example: F=20, T=35 means that this input begins to look at 20° and stops looking at 35°.

EDIT MODE Die-3 Die Protect Display Explanation

IN: Refers to the chosen programs: Input Sensors 1 through 12 (TB-J8 and J9).

Library of Sensor Names:

AirPress(ure)	Blnkfeed	Blow
Buckle	CamDrive	ClmPress(ure)
Endstock	Eject	HighLoop
Knockout	Lube	Misfeed
Missing	OilLevel	OilPress(ure)
Overfeed	Overload	Shortfed
Slug-Det	Thicknes	Transfer
Width	**<New>**	

Choose from 22 predefined sensor names or customize the sensor name by selecting <NEW>.
See **Slug Detect Delay, Mode Die-5.**

I-Stop, T Stop
Type of Output (may be programmed to I-Stop or T-Stop the press in the case of a fault)**. (See Die-6 and POS-13)**
Top Stop for any die fault detected. Output will de-energize at Top Stop Angle (See Mode POS-13)
Immediate Stop for any fault detected. Output will de-energize, but not within I-Stop Mute Angle. (See POS-14, Mute Angle)

W: Window Number - multiple windows may be monitored from the same sensor input

F: Setpoint **F**ROM Angle - Angle at which unit begins to look for the sensor input

T: Setpoint **T**O Angle - Angle at which unit ends look for the sensor input

Note: The maximum number of Setpoints is 12.

Disable , Rise, Fall, Pulse, ALL-HI, ALL-LO, DWL-HI, DWL-LO
"Disable" or Die Protection Type is displayed.

Key Press/Response:

Right/Left Arrow
Moves to next field

Up/Down Arrow
Increments or Decrements Values
Scrolls library of names
Scrolls through alpha characters when programming the "new" name INC & DEC of die protection type (rise, fall, etc.)

Numerical
Changes numerical values

ENTER
Saves programming in each field

Mode
If Slug-Det is not the sensor name, moves to Mode Die-1.
If Slug-Det is the sensor name, moves to Mode Die-5.

Mode Die-4. NEW Input Sensor Name

Previous Mode: Die-3. Edit Display

There are 22 predefined sensor names. However, the user is allowed to enter a "customized" name. When <NEW> is displayed as the Sensor Name in the Die-3 Display, press ENTER. The following display will appear:

```
IN 1:   ????????
Edit Sensor Name
```

User is now allowed to enter a new sensor name one character at a time.

Key Press/Response:

Right/Left Arrow
Moves cursor through the question marks (?) to add characters to the new name.

Up/Down Arrow
Scrolls through numeric and alpha characters

Numerical
Changes the character

Enter
To SAVE the new name and returns to Die-3, Edit Display

Mode Die-5. SLUGDET Sensor

Previous Mode: Die-3. Edit Display

If any sensors are named " SlugDet(ect)" , after MODE is pressed, another mode will come up on the display:

```
Slug Det Fault Delay:
Stroke Old= 5    New=5
```

The value programmed into this display reflects the number of strokes completed before the fault output is activated. If this fault is removed before the stroke count expires, the fault output will not activate.

Key Press/Response:

Up/Down Arrow
Changes number of strokes delay before fault output is activated. (Old and new values will be different if value has not been entered.)

Numerical
Changes number of strokes delay before fault output is activated

Enter
Must be pressed to SAVE new value. (Old and new values will become identical).

Mode
Moves to Mode Die-6, Review Mode

Mode Die-6. Review Mode

Previous Mode: Die 2, Edit or Review Mode

This display is used for viewing the information that the M1200 has collected:

```
IN _12  NAME  (REVIEW)
W:12  F:123  T:220
```

Press the Up or Down Arrow key to scroll through each sensor input to review the angles at which the sensor was high during the previous stroke. There may be several Windows in which the sensor was high. This information is very helpful in determining how and at which angles to monitor an input sensor.

WARNING: While in the Review Mode, Die Protection is DISABLED. Caution should be taken when running the press in this mode!

Key Press/Response:

Right/Left Arrow
Toggles cursor between IN(Die #) and W: (window)

Up/Down Arrow
Changes the Input Number or Window selected for viewing

Numerical
Changes the Input Number or Window selected

Mode
Moves to Mode Die-3, Edit display.
Note: If the input collected during the Review is low through the stroke, ALL-LO will appear for that input in the F (From) and T (TO) windows. If an input is high through the stroke, ALL-HI will appear in the F(From) and T (To) windows.

M1200 Die Protection Setpoints Worksheet Die ID:_____

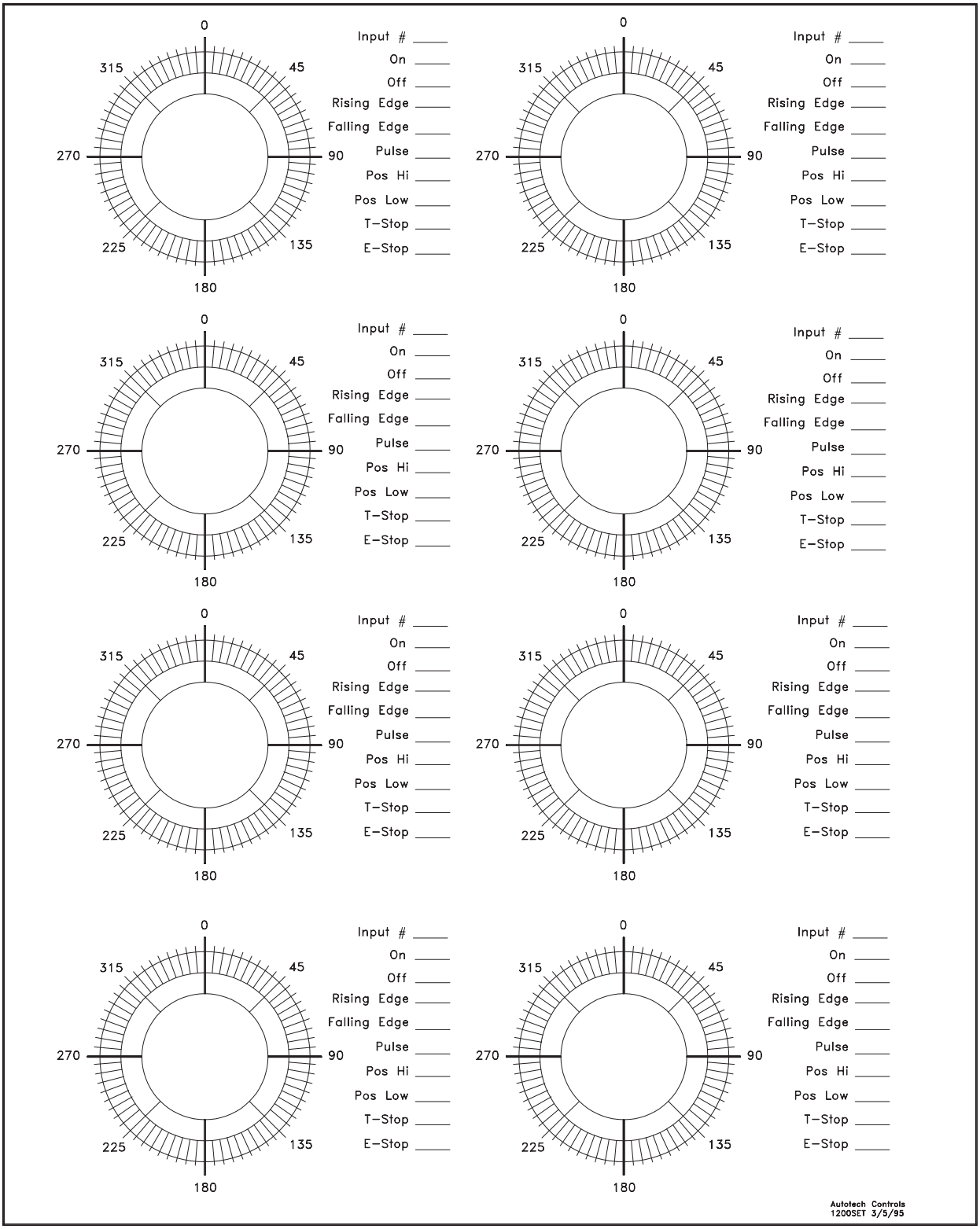


Figure 15 - Die Protect Setpoints Worksheet

7. Counter Hot Key Menu

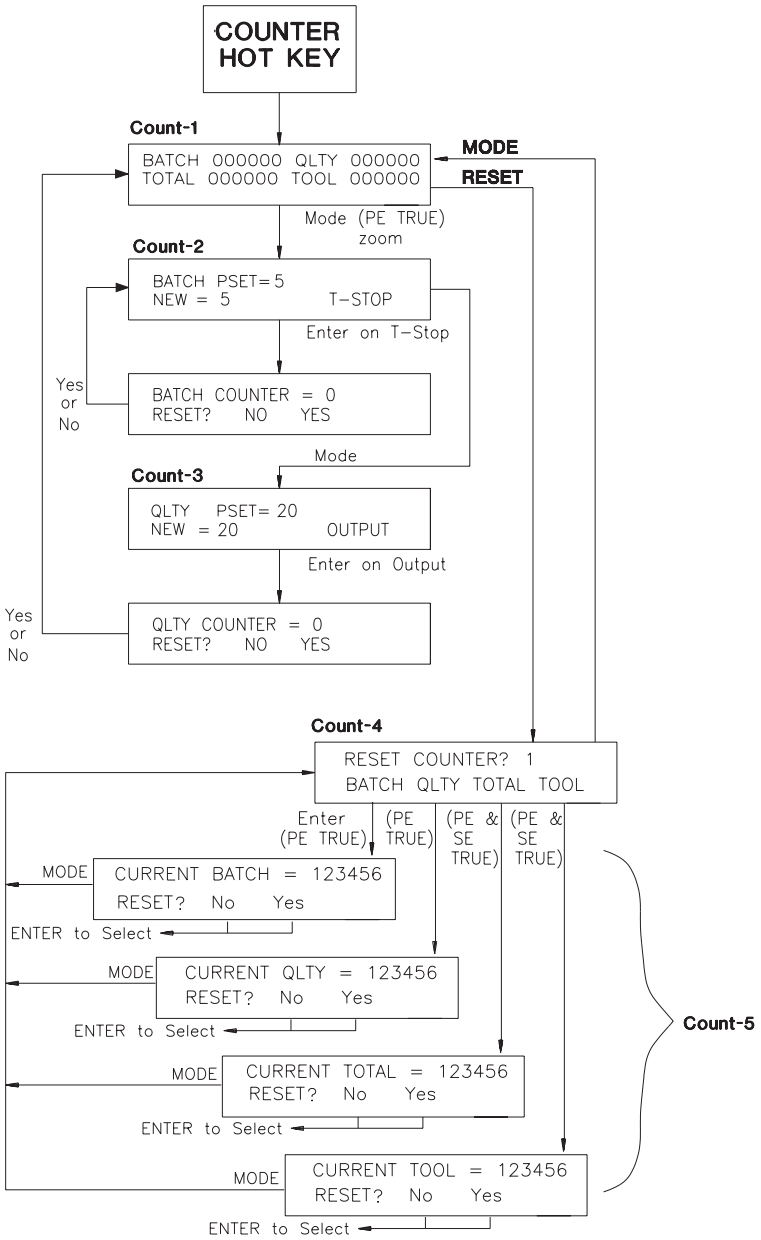


Figure 16 - Counter Hot Key Menu

Mode Count-1. Counter Status Display

```
BAT  123456   QLTY 123456
TOT  123456   TOOL 123456
```

The Counter Mode is accessed by pressing the "Counter" Hot Key on the front panel. This display shows the current count values. See **Figure 16** (previous page) for the Counter Menu.

All counters may be reset from the front panel RESET key.

The counters are defined as follows:

Batch
Six digit pre-settable DOWN counter. Counts down to zero. Displays T-Stop output at the count of zero. Resettable from keypad or input **(TB-J10-Pin 1)**.

Qlty
Six digit presettable DOWN counter. Counts down to zero. Display output to relay at the count of zero **(TB-J2, Pins 5, 6).** Resettable from keypad or remote input **(TB-J10, Pin 2**).

☞ While the press is running, down-counter values are decremented at the T-Stop angle (See Setup, Mode POS-13 for programming the T-Stop angle).

Total
Six digit resettable UP counter. Resets with a remote input **(TB-J8, Pin 8)** or from the keypad RESET key.

Tool
Six digit tool specific resettable UP counter.
The Tool Counter allows the user to count how many hits were made on that tool. It counts up and is reset to a count of zero from the keypad RESET key.

NOTE: The tool count is retained in memory for each tool number until reset.

Key Press/Response:

Mode
Moves to Mode Count-2, Batch Preset Mode

Reset
Moves to Mode Count-4, Counter Reset Menu

Mode Count-2. Batch Preset

Previous Mode: Count-1, Counter Status Display. (PE)

This display is used to set the Batch down-counter to the starting value.

```
BATCH PSET=123456
NEW   123456 T-STOP
```

Key Press/Response:

Up/Down Arrow or Numerical
-Changes Batch Down Counter starting number: number of strokes delay before output is activated. (Old and new values will be different if value has not been saved.) OR
- Toggles between Disable and T-Stop

Right/Left Arrow
Moves cursor between PSet value and Disable/T-Stop

Enter
Must be pressed to SAVE new value and Activate Enable. (Old and new values will become identical.)

Mode
Moves to Mode Count-3, Quality Preset.

When the counter has reached "0", the following display will be viewed:

```
BATCH COUNTER = ZERO
 Reset?     NO     YES
```

Right/Left Arrow
Moves between No and Yes

Enter
If Yes, resets counter to PSET Value

If No, the counter will be disabled and the T-Stop output will energize.

☞ **IMPORTANT:**
When this counter is not used, it must be disabled.

Mode Count-3. Quality Preset

Previous Mode: Count-2, Batch Preset (PE)

This display is used to set the Quality down-counter to the starting value.

```
QLTY  PSET=123456
NEW   PSET=123456 Output
```

NOTE: The Quality output may be tied into the T-Stop circuit of the press or to a device designed to segregate this part from the batch. If wired to the press circuit, the counter must be reset or disabled to restart the press.

Key Press/Response:

Up/Down Arrow or Numerical
-Changes Quality Down Counter starting number: number of strokes delay before output is activated. (Old and new values will be different if value has not been Entered.) OR
- Toggles between Disable and Output

Right/Left Arrow
Moves cursor between PSet value and Disable/Output

Enter
Must be pressed to SAVE new value. (Old and new values will become identical). Also used to Activate Enable.

Mode
Moves to Mode Count-1, Count Mode Default Display.

When the counter has reached "0", the following display will be viewed:

```
 QLTY COUNTER = ZERO
  Reset?     NO     YES
```

Right/Left Arrow
Moves between No and Yes

Enter
If Yes, resets counter to PSET Value
If No, the counter will be disabled and the counter output will energize.

Mode Count-4. Counter Reset Menu

Previous Mode: Count-1. (PE)

```
     RESET COUNTER?
 BAT   QLTY   TOT   TOOL
```

Key Press/Response:

Right/Left Arrow
Moves cursor through counter name choices: Batch, Quality, Total and Tool

Enter
Selects counter to be reset.

Mode
Moves to Mode Count-1

Mode Count-5. Reset Current Counter

Previous Mode: Count-4

One of the following displays will be viewed, depending on the Reset-1 selection made:

```
CURRENT BATCH = 123456
RESET?       NO     YES
```
PE

```
CURRENT QLTY  = 123456
RESET?       NO     YES
```
PE

```
CURRENT TOTAL = 123456
RESET?       NO     YES
```
PE & SE

```
CURRENT TOOL  = 123456
RESET?       NO     YES
```
PE & SE

Right/Left Arrow
Moves between No and Yes

Enter or Remote Reset (See Count-1 Mode)
Resets counter and returns to Count-1, Default Display.

PE needed to reset Batch and Quality
PE and SE needed to reset Total and Tool.

8. Brake Monitor Hot Key

Mode Brake-1. Brake Monitor Status Display

This display shows the time elapsed for the drive or crank shaft to stop turning after the brake was applied.

```
BRAKE STOPPING TIME
      1.23 Sec
```

When the clutch is engaged, 90-120 VAC must be across J11 terminals 1 and 2. When brake is engaged, 0 to 10 VAC or open must be across J11 terminals 1 and 2. Brake stopping time is activated on the falling edge of this input.

Key Press/Response:

MODE
To program the Brake Danger Limit. (Mode Brake-2)

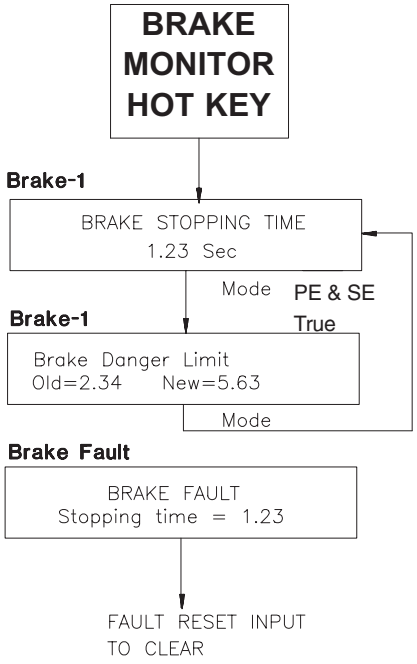


Figure 17 - Brake Monitor Hot Key Menu

Mode Brake-2. Brake Danger Limit

(PE and SE)

The Brake Danger Limit is the maximum number of SECONDS allowed for the crank shaft to stop turning after the brakes are applied.

The Brake Monitor can warn the press operator that the brake may need service.

```
  Brake Danger Limit
Old=2.34   New=5.63
```

The 120 VAC signal comes from the clutch/brake circuit and must be wired into the Brake Input (**Connector J11, Pins 1 and 2**) on the M1200:

- OFF (90-120 VAC power): clutch is engaged
- ON (0-10 VAC power): Brake engaged and timing begins

Upon receiving the ON signal, the Brake Stop Timer begins counting. It continues to count until motion has stopped.

Key Press/Response:

Up/Down Arrow
Increments/Decrements value

Numerical
Changes the value

Enter
To **SAVE**

Mode
To move to return to the Brake-1 Display.

Brake Fault

```
     BRAKE FAULT
Stopping time = 1.23
```

If the drive or crank shaft fails to stop before reaching the Brake Danger Limit, the relay output (**Connector J2, Terminals 7 and 8**) de-energize. When stopped, the brake fault may only be cleared by asserting the Fault Reset Input (**Connector J10, Pin 3**).

9. PLS Hot Key Menu

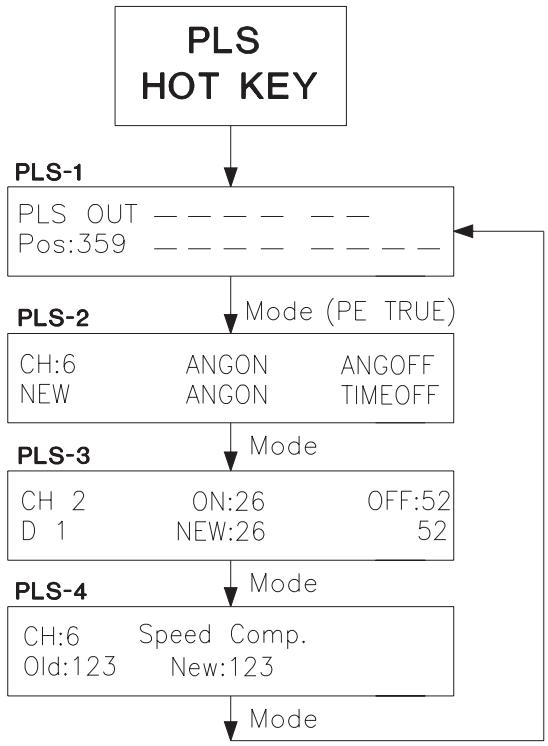


Figure 18 - PLS Program Displays Flow Chart

Mode: PLS-1. PLS Output Status Display

The selection of PLS from the front panel calls up the default screen for the PLS menu. (See **Figure 10** for a flowchart of the PLS Program displays).

The first display viewed after pressing the PLS Hot Key is shown below.

```
PLS OUT  - ■ - -  - -
Pos: 359 - - ■ -  - - - -
```

The first row shows output channels 1 through 6 (Model 1206). The second row shows the current position of the resolver and Channels 7 through 14 (Model 1214). A dash (-) is viewed if the channel is OFF, a "box ■" is viewed if the channel is ON. (See PLS-2)

No programming is performed while viewing this display.

Press the **MODE** key to move to the next display, Mode PLS-2, Programming Setpoints.

Mode PLS-2. Time-Off or Angle-Off (Channels 1-6 only)

Previous Mode: PLS-1, Default. (PE)

These channels may be programmed to turn off based on angle (ANG-OFF) or time (TIME-OFF). The following display is used to change between these two options:

```
CH = 6  ANGON    ANGOFF
NEW     ANGON    TIMEOFF
```

Key Press/Response:

Right/Left Arrow
Toggles between Channel Number (CH=) and ANG-OFF/TIME-OFF.

Up/Down Arrow
Toggles between ANGON and TIMEOFF options or scrolls through the channel numbers

Numerical
Changes the channel number

Enter
Must be pressed to SAVE new value

Mode
Moves to Mode PLS-3, Setpoints

Mode PLS-3. Programming Setpoints

Previous Mode: PLS-1.

SETPOINTS are the shaft positions (angles) at which a channel is turned "ON" or "OFF". The current values of the setpoints are viewed on the top row and are not programmable.

A DWELL is composed of an "ON" and corresponding **"OFF"** setpoints.

- **On and Off** values are angle values 0 to 359. Values may cross "0".
- **Time-Off** (T-Off) values are programmable from 0 to 9.99 seconds (**See Mode PLS-2**)

The maximum number of setpoints are as follows:

Setpoints	Maximum Number
Per Unit	**1600 selectable over 100 Programs**
Per Program	16 Selectable Dwells

Channels (1-14) Setpoints (On,Off,T-Off) are programmed by using the following display. Move through this display by using the right **ARROW** key:

```
CH 2  ON:26   OFF:52
D1   NEW:26      52
```

☞ When the resolver is moving, only the up and down **ARROW** keys are active to allow for fine-tuning of setpoint values on the fly.

The display is explained below:

TOP ROW:

CH: Select the Channel number by using the **numeric** or **UP or DOWN ARROW** keys.

ON/(Off) Setpoints: Current values are viewed

SECOND ROW:

D#: The consecutive dwell numbers are accessible after each dwell is programmed.

☞ It is advisable to write the setpoint values down as they are entered. The chart on the next page may be copied and used for this purpose.

NEW: The new dwell setpoints are programmed by using the **numeric keys** or the **UP ARROW key**.

☞ **ENTER must be pressed to save newly programmed values before moving to next display**

*** (ASTERISK):** Viewed if there are multiple setpoints programmed for one Dwell

ON SETPOINT
FIRST PRESS of the RIGHT ARROW KEY after the Dwell number moves the cursor to the ON setpoint. Use the numeric key or the UP or DOWN arrow key to change the value.

OFF/T-OF(Time-Off) SETPOINTS
SECOND PRESS of the RIGHT ARROW KEY moves the cursor to the OFF/T-OFF setpoint for programming. Use the numeric key or the UP or DOWN arrow key to change the value.

NOTE: Press ENTER to save, Press MODE to move to the next display OR

☞ The **THIRD PRESS** of the RIGHT ARROW KEY causes **BOTH** the **ON** and **OFF** setpoints to be moved at the same time while retaining the span of the dwell relationship.

TO CLEAR ALL THE DWELLS ON A CHANNEL:
Program the "On" and "Off" setpoints to the same number (All Off).

"ALL OFF" if small "ooo" values are viewed.
"ALL ON" if large "000" values are viewed.

To change from "ALL OFF" to "ALL ON", place the cursor on the ON value and press the down arrow for one full revolution until "000" "000" is displayed, or place cursor on the OFF value and press the up arrow for one full revolution until "000" "000" is displayed. Press "ENTER."

To change from "ALL ON" to "ALL OFF", place the cursor on the ON value and press the up arrow for one full revolution until "ooo" "ooo" is displayed, or place the cursor on the OFF value and press the down arrow for one full revolution until "ooo" "ooo" is displayed. Press "ENTER."

Key Press/Response:

Right/Left Arrow
Moves cursor through display.

Up/Down Arrow
Scrolls through values.

Numerical
Changes the values, even while resolver is moving (used for fine-tuning)

Enter
Must be pressed to SAVE new values.

Mode
Moves to Mode PLS-4 Speed Compensation

Mode PLS-4. Speed Compensation
(Channels 1 - 6 Only)

Previous Mode: PLS-2, Programming Setpoints. (PE)

```
CH=1  Speed Comp.
Old= 0  New= 7
```

In the M1200 speed compensation is programmable for Channels 1 through 6 individually.

Speed Compensation compensates for the response time of field devices such as solenoids, relays, etc. It is a programmable advancement in degrees per 100 RPM. This is a linear advancement from "0" to max. RPM.

☞ Care should be taken not to advance dwell over 360° at max press speed.

The following example is explained through the formulas below and **Figure 19.** The example assumes that Channel 1 is programmed with the ON setpoint at 50 and the OFF setpoint at 120. The Speed Compensation M1200 PLS Setpoints Work sheet for this channel is programmed for 7 degrees. The resulting "compensated ON and OFF angles" may be calculated using the following formulas:

$$Comp.OFF\ Angle = OFF\ Setpoint - [SpeedComp \times \frac{RPM}{100}]$$

$$Comp.ON\ Angle = ON\ Setpoint - [SpeedComp \times \frac{RPM}{100}]$$

Figure 19 illustrates the result of the 7 Degree speed compensation at 50 RPM, 100 RPM and 200 RPM

Key Press/Response:

Right/Left Arrow
Toggles between Channel and New Value fields.

Up/Down Arrow
Changes the values, even while resolver is moving (used for fine-tuning).

Numerical
Changes values.

Enter
Must be pressed to SAVE new value. (Old and new values will become identical).

Mode
Moves to Mode PLS-1, Default Screen

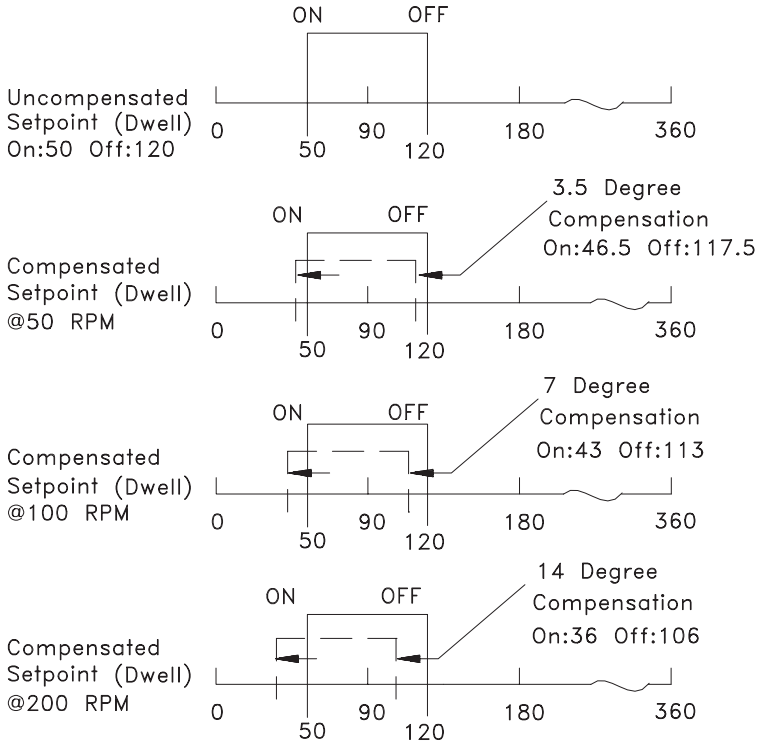


Figure 19 - Speed Compensation

M1200 PLS Setpoints Worksheet

Die ID: _____

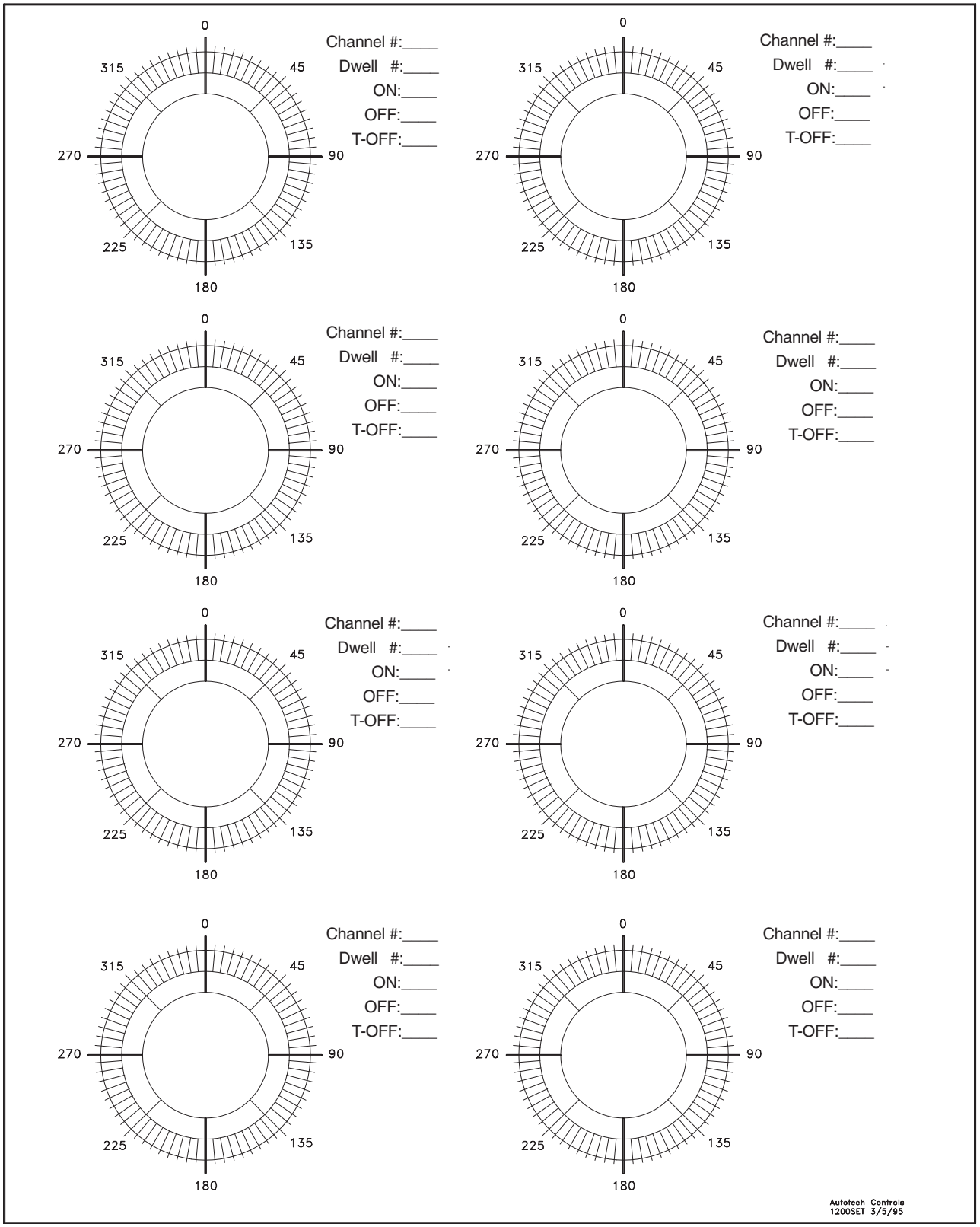
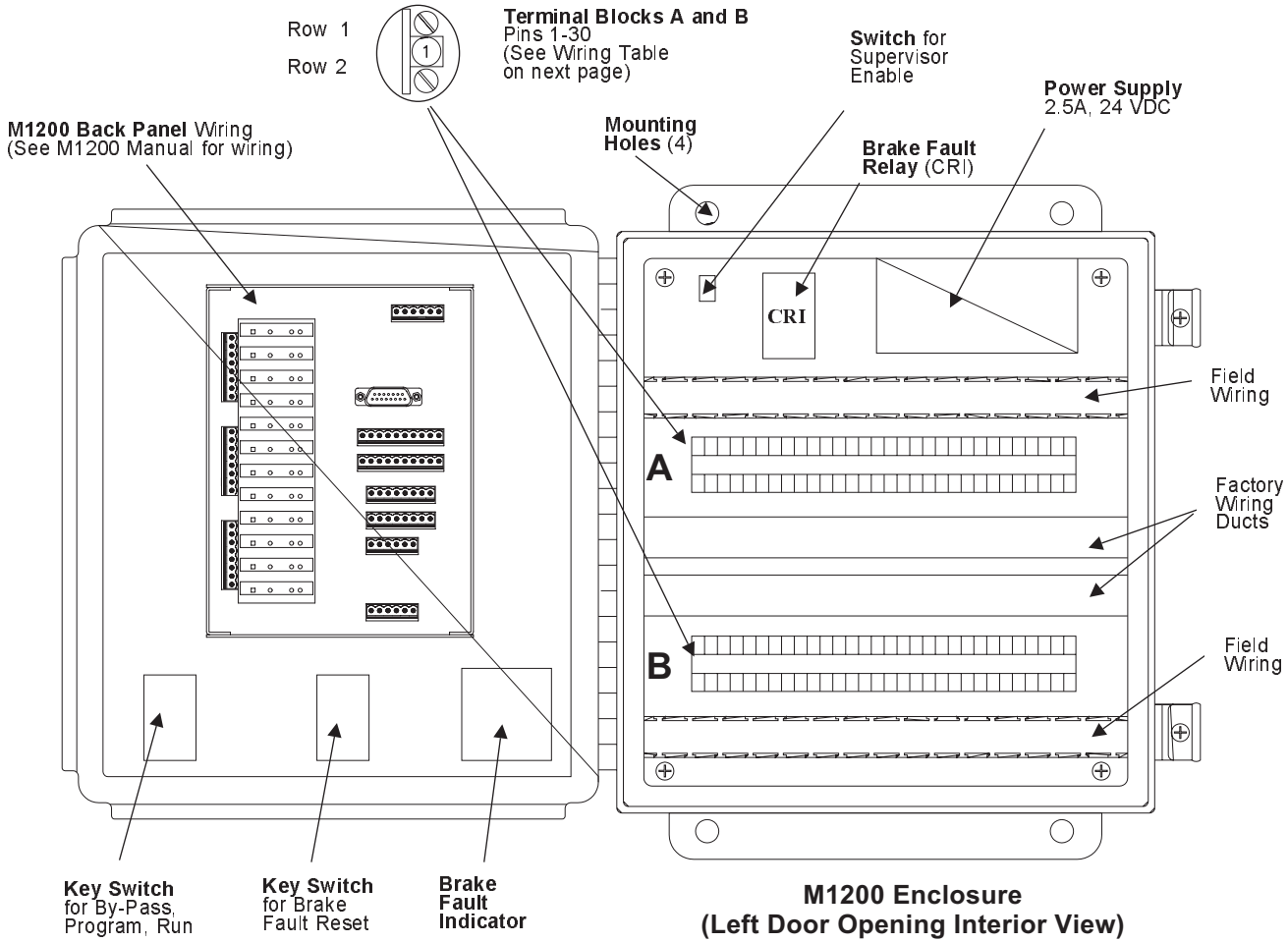


Figure 20 - PLS Setpoints Worksheet

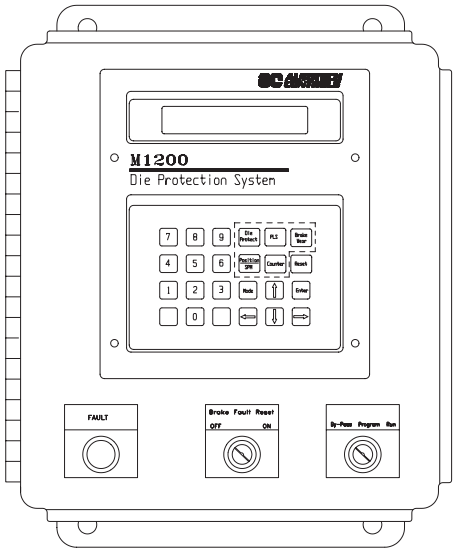
10. M1200 Series Optional System Enclosure

The M1200 pre-wired "plug-n-play" enclosure offers quick field installation. The following pages provide wiring information for the enclosure system.

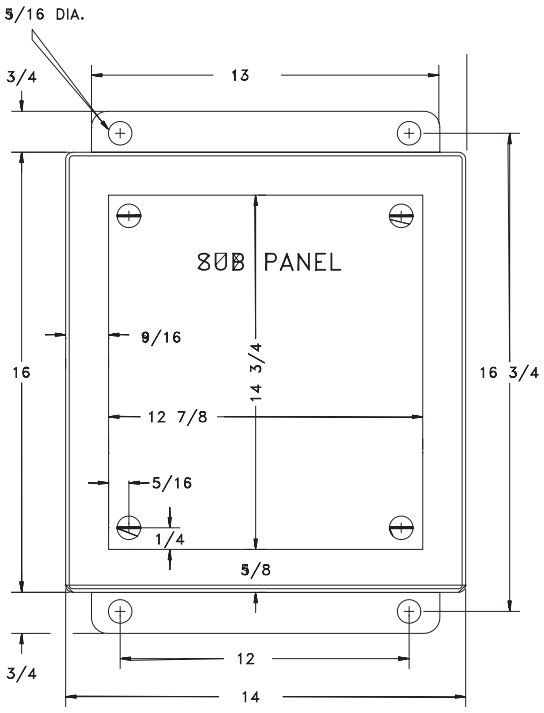
M1200 Die Protection System Enclosure



M1200 Enclosure
(Left Door Opening Interior View)

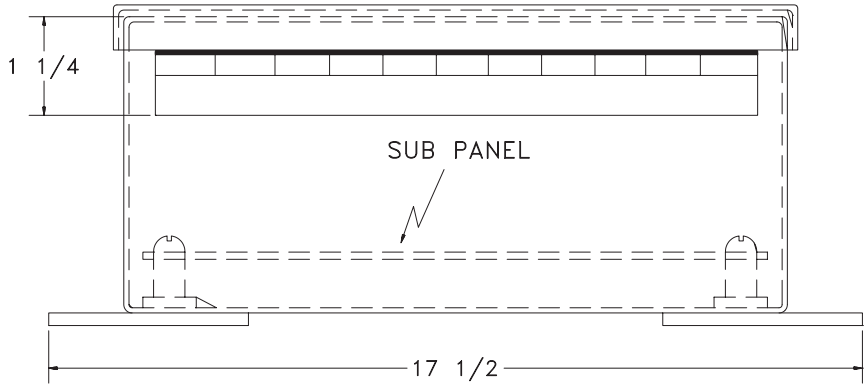


M1200 in Enclosure

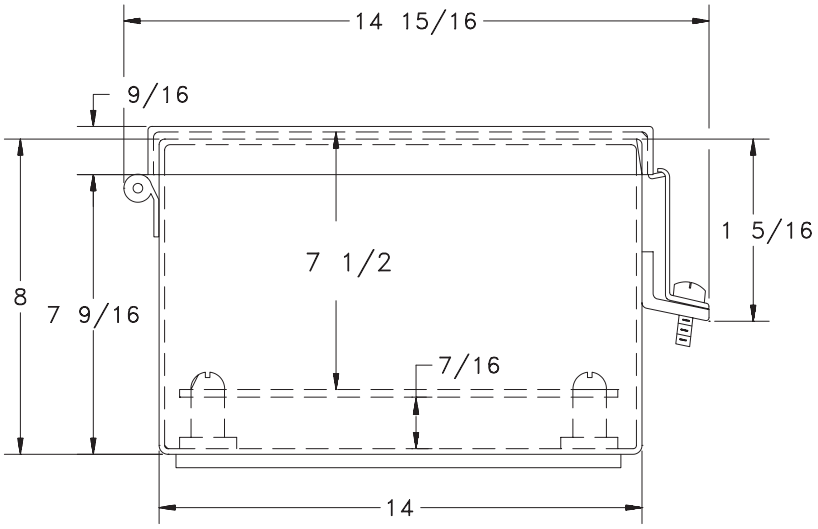


M1200 Enclosure Mounting Dimensions

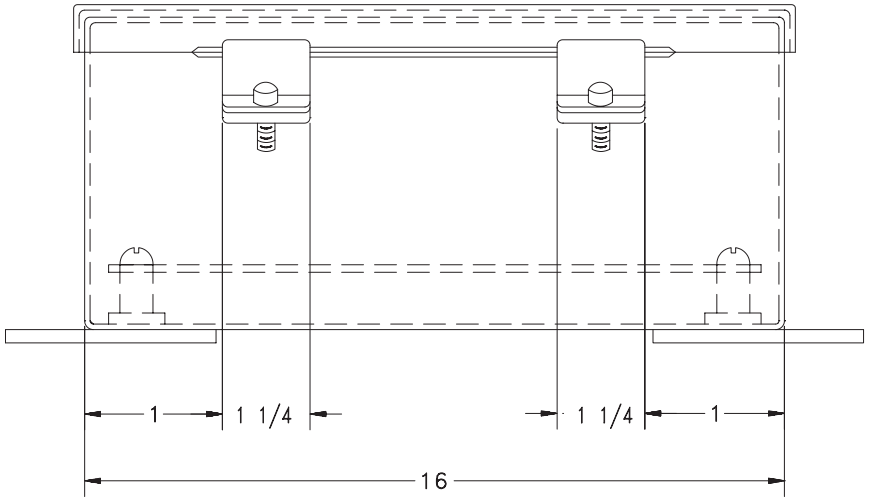
M1200 Enclosure Dimensions (continued)



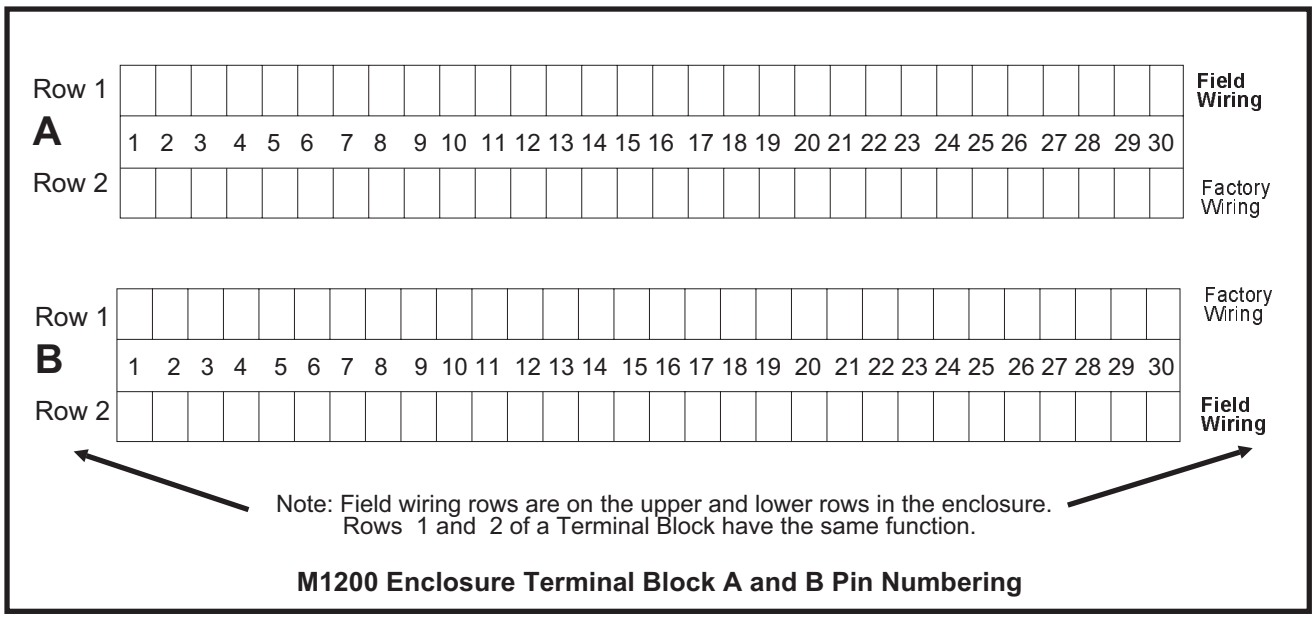
Overall Side View Including Mounting Brackets



End View with Screw Clamps



Side View with Screw Clamps

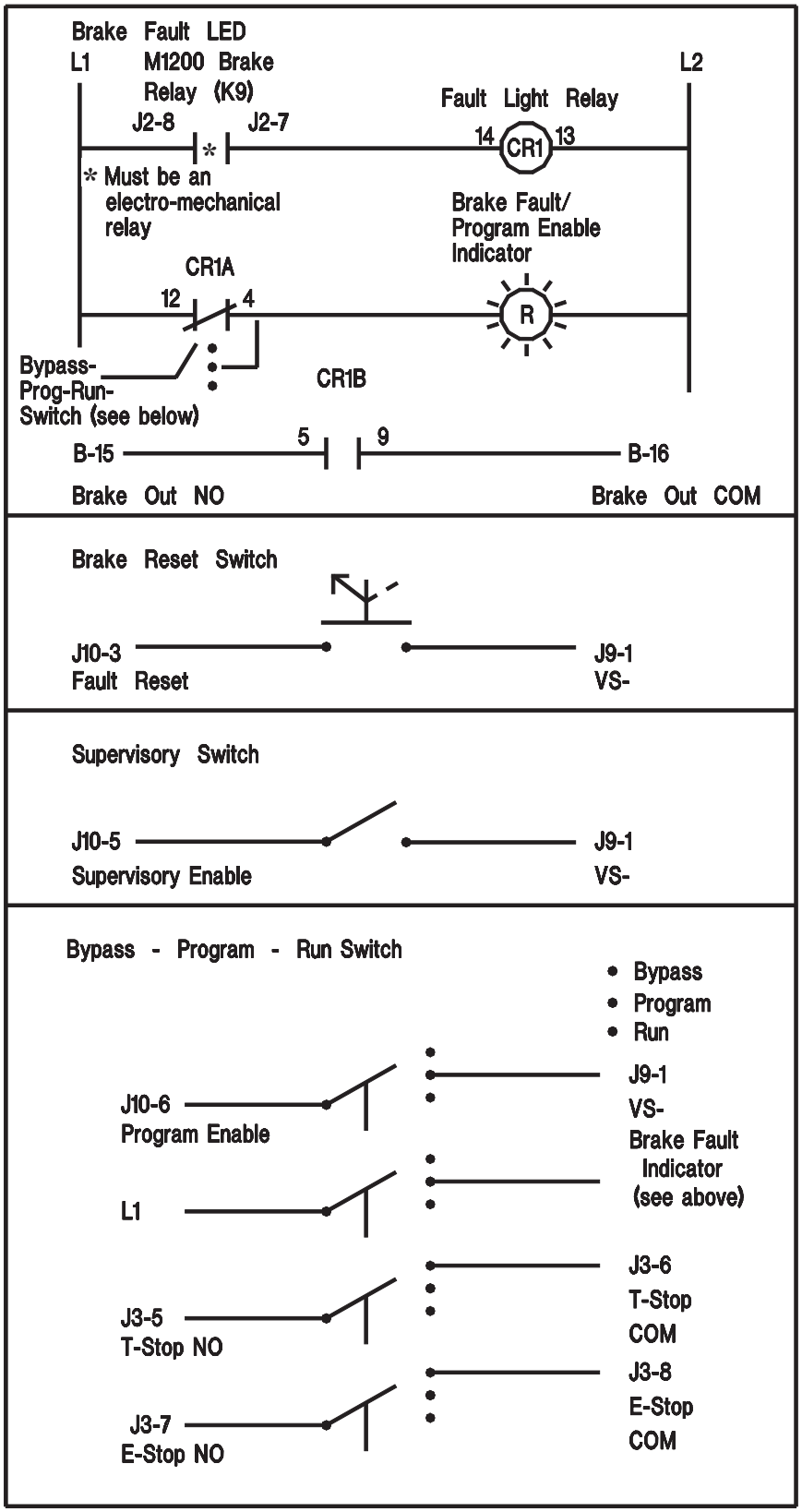


M1200 Enclosure Terminal Block A and B Pin Numbering

M1200 Enclosure and Back Panel Wiring			
Terminal Block A	**Function**	**M1200 Back Panel**	
Pin #		**Terminal Block #**	**Pin #**
1	Shield	Chassis GND	
2	R1	J4	1
3	R2		2
4	S1		3
5	S2		4
6	S3		5
7	S4		6
8	Sensor 1	J8	7
9	Sensor 2		6
10	Sensor 3		5
11	Sensor 4		4
12	Sensor 5		3
13	Sensor 6		2
14	VS+		
15	VS–	J9	1
16	Sensor 7	J8	1
17	Sensor 8	J9	7
18	Sensor 9		6
19	Sensor 10		5
20	Sensor 11		4
21	Sensor 12		3
22	VS+		
23	VS–	J9	1
24	Program Enable	J10	6
25	Supervisory Enable		5
26	Output Enable		4
27	Not Used	Not Used	Not Used
28	Not Used		
29	Not Used		
30	Not Used		

Jumpered in Enclosure

M1200 Enclosure and Back Panel Wiring			
Terminal Block B	**Function**	**M1200 Back Panel**	
Pin #		**Terminal Block #**	**Pin #**
1	PLS CH 1 NO	J1	1
2	PLS CH 1 COM		2
3	PLS CH 2 NO		3
4	PLS CH 2 COM		4
5	PLS CH 3 NO		5
6	PLS CH 3 COM		6
7	PLS CH 4 NO		7
8	PLS CH 4 COM		8
9	PLS CH 5 NO	J2	1
10	PLS CH 5 COM		2
11	PLS CH 6 NO		3
12	PLS CH 6 COM		4
13	Counter Out NO		5
14	Counter Out COM		6
15	Brake Out NO		Brake Fault Relay
16	Brake Out COM		
17	Motion Out NO	J3	1
18	Motion Out COM		2
19	Fault Out NO		3
20	Fault Out COM		4
21	T-Stop Out NO		5
22	T-Stop Out COM		6
23	E-Stop Out NO		7
24	E-Stop COM		8
25	120 V Brake Neutral	J11	1
26	120 V Brake Hot		2
27	Not Used		NC
28	L1, 120 VAC		4
29	L2, 120 VAC		5
30	GND		6


Brake Fault LED
L1
M1200 Brake Relay (K9)
L2
J2-8
J2-7
Fault Light Relay
14
CR1
13
* Must be an electro-mechanical relay
Brake Fault/ Program Enable Indicator
CR1A
12
4
R
Bypass-Prog-Run-Switch (see below)
CR1B
B-15
5
9
B-16
Brake Out NO
Brake Out COM
Brake Reset Switch
J10-3
Fault Reset
J9-1
VS-
Supervisory Switch
J10-5
Supervisory Enable
J9-1
VS-
Bypass - Program - Run Switch
Bypass
Program
Run
J10-6
Program Enable
J9-1
VS-
Brake Fault Indicator (see above)
L1
J3-6
T-Stop COM
J3-5
T-Stop NO
J3-8
E-Stop COM
J3-7
E-Stop NO

M1200 Enclosure Specifications

- The M1200 Enclosure is fabricated from 14T gauge steel and has external screw clamps for securing the neoprene-gasketed cover.
- Continuous hinge may be ordered so that box opens from either the right or left side.
- Screw clamps have no loose parts.
- Panel screws are #10-32 pan head.
- All seams are continuously welded with no holes or knockouts.
- External feet are furnished for mounting.
- Finish is gray hammertone enamel inside and out over phosphatized surfaces.
- Weldnuts are provided for mounting the optional panels and terminal kits which must be ordered separately.

11. Troubleshooting

Cause / Effect Guidelines

System Problem	Possible Solution
Unable to program unit. Parameters (Scale Factor. Offset, etc.)	✓ Program Enable must be tied to Sig Ref to program values ✓ Machine must be at rest for several parameters: (Scale Factor and Offset - numerical entry) are locked if the resolver is turning faster than 3 RPM. ✓ Replace unit
Position and Tach readings are incorrect.	✓ Proper grounding and shielding has been applied. ✓ Resolver is correctly wired: 1) Turn power off to M1200 unit 2) With main terminal block connected to unit, measure with an ohm meter the following: a) Term. 4 t o Term. 6 = about 100-150 ohms b) Term. 3 to Term. 5 =about 100-150 ohms c) Term. 1 to Term. 2 = about 10-50 ohms These may vary due to length of cable.
Mechanical Zero Drifts	✓ Ensure that mechanical Resolver linkage is not loose. ✓ Check internal linkage: 1. Make mark on resolver's housing that lines up with the keyway. 2. Make note of position on PLS. 3. Run machine until zero drift is noted. 4. Realign resolver keyway with scribe mark. 5. If position is different than previous displayed value, internal linkage is loose. 6. Replace resolver.
Cursor not visible on display	Cursor is not available when resolver is moving
Position does not count in correct direction	Resolver count should increase with counterclockwise rotation. If not, swap S1 and S3.
Fault is visible on display. Programming disallowed.	Reset the fault with the remote reset,if installed, or see appropriate fault section of manual to see how to clear.
Display changes when unit is left unattended.	Screens time-out after one minute of no keyboard activity. Display returns to default (Hot Key Default Display).

12. How to Order

1. M1200 Die Protection System

SAC-M1206-x x x . . . . . Standard unit with 12 programmable sensor inputs,
1 2 3 built-in brake wear monitor, 4 counters, and 6 Cam (PLS) outputs

1. Enclosure Type
   - 0: Panel mount, without enclosure (if chosen, make "xxx" = "010")
   - F: Face mount enclosure
   - S: Side mount enclosure

2. Door Opening (Hinge Location)
   - 0: N/A
   - L: Left
   - R: Right

3. Relay Type (Brake Fault Relay must always be electromechanical)
   - E: Electromechanical relays, SPST, Form A, 120 VAC @ 10 amp
   - A: AC Solid State relay, 120 VAC @ 3 amp (6 required)
   - D: DC Solid State relays, 60 VDC @ 3 amp (6 required)
   - I: DC Solid State relays, 200 VDC @ 1 amp

SAC-M1214-x x x . . . . . Standard unit with 12 programmable sensor inputs,
1 2 3 built-in brake wear monitor, 4 counters, and 14 Cam (PLS) outputs

1. Enclosure Type
   - 0: Panel mount, without enclosure (if chosen, make "xxx" = "010")
   - F: Face mount enclosure
   - S: Side mount enclosure

2. Door Opening (Hinge Location)
   - 0: N/A
   - L: Left
   - R: Right

3. Relay Type (Brake Fault Relay must always be electromechanical)
   - E: Electromechanical relays, SPST, Form A, 120 VAC @ 10 amp
   - A: AC Solid State relay, 120 VAC @ 3 amp (6 required)
   - D: DC Solid State relays, 60 VDC @ 3 amp (6 required)
   - I: DC Solid State relays, 200 VDC @ 1 amp

   NOTE: If specifying base units ("010") user must specify relays separately, See Section 3.

2. Remote Power Relay Output Chassis (for SAC-M1214-xxx Units only)

ASY-RLYCH-08RL. . . . . Chassis for 8 Electromechanical SPDT relay outputs (Note: Use only with KSD-012DC-10 SPDT Relay)

ASY-RLYCH-08SS . . . . . Chassis for 8 solid-state relay outputs or electr mechanical SPST outputs using KSD-A12DC-10AMP relays

3. Select type and number of Output Relays (required for M1200 Series DPS)

Select the number and type of relays required. Cable for wiring to external devices:

KSD-A12DC-10A. . . . . Electromechanical relay, SPST, Form A, 120 VAC, @ 10 Amps resistive

KSS-120AC-3AMP . . . . . AC Solid State relay, 120 VAC @ 3 Amps

KSS-200DC-1AMP . . . . . DC Solid State relay, 200 VDC @ 1 Amp

KSD-012DC-10A . . . . . Electromechanical relay, SPDT, 120 VAC @ 10 Amps resistive (For use with ASY-RLYCH-08RL relay chassis only)

4. Position Transducers

RL100 . . . . . The M1200 Series requires a single turn resolver as an input device, such as Autotech's RL100 or E7R Series of resolvers. Please see Position Transducer Manual (MAN-RPXDU-000) or Master Price List for ordering information on these resolvers and appropriate accessories.

5. Cables

CBL-10T22-Cxxx. . . . . 22 AVG, 10 conductor (5 twisted pairs) overall foil shielded cable, without connector

CBL-10T22-Mxxx . . . . . 22 AVG, 10 conductor (5 twisted pairs) overall foil shielded cable, with 10-pin MS connector

CBL-RLYCH-D04. . . . . 15 conductor cable with overall foil shield, 4 feet length and sub "D" connector on one end, open on the other

CBL-RLYCH-DA4 . . . . . 15 conductor cable with overall foil shield, 4 feet length and sub "D" connector on both ends

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