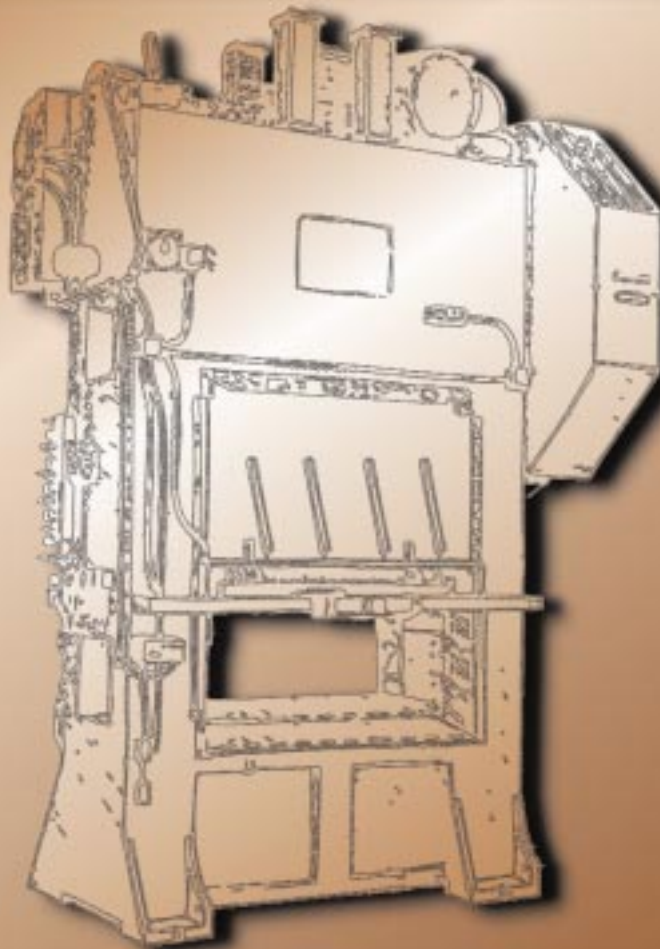
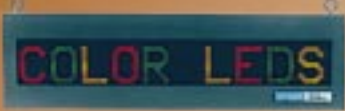


WIDEST SELECTION OF PRESS AUTOMATION/PROTECTION CONTROLS



PRESS AUTOMATION CONTROL AND MONITORING SYSTEMS

Inside you will find solutions for:

- Material Feed, lubrication, part blow off, etc.
- Monitoring material progression
- Load Monitoring with Signature Analysis
- Monitoring chain/coupling break
- Brake Wear Monitoring
- Die Protection
- Automatic Shut-height (Ram) adjustment



Automation
"Innovation & Quality by Design"



PG98R003.PDF

AVG Autotech



"The Leader and Innovator in Press Automation Products"

AVG Autotech, the Press Products division of AVG Automation, has been producing control solutions for the metal stamping industry since 1975. Autotech's innovative products help the industry to:

- **Increase PRODUCTIVITY**

Autotech's resolver-based PLS's provide highly repeatable timings for press automation, allowing the press to run with greater consistency, resulting in more parts per hour. The Shut Height indication and control products provide fast and accurate set-ups that quickly reduces the "Hit to Hit" time associated with product change-overs. Our Die Protection and Load Monitoring Systems reduce scrap as well as down-time by indicating material, die, or press problems before they become too serious.

- **Improve QUALITY**

Highly repeatable press timing allows us to monitor the process variations that directly affect the quality of the stampings being produced. Variations in set-ups, materials, lubrication, and die condition are detected and compared by our signature load monitoring against a standard for that process. Shut Height set-ups are made repeatable with precise positioning so the process will produce consistently good parts.

- **Protect costly PRESS and DIE INVESTMENT**

The Die Protection products from Autotech monitor events like proper feed, part placement, part ejection, tooling components, etc., to protect die and automation from costly damage. Press Load Monitoring products collect and compare tonnage information for every cycle and provides the appropriate alarms when it deviates from the reference profile. These two products together help to protect your huge investment in press and tooling.

About this Press Catalog...

This catalog outlines the salient features and specifications of the wide variety of press automation control and monitoring products offered by AVG Automation.

The following groups of products are covered: Programmable Limit Switches, Die Protection Systems, Tonnage Monitors, Position Sensors, and some miscellaneous products. Further, these products are categorized in stand alone, integrated, and PC-PLC plug-in groups.

The catalog provides an overview of press applications, AVG products, and a convenient selection guide for locating products of interest quickly.

For several products, a single part number is provided for a "ready-to-install" package, making ordering simple.

In addition to the product information, the catalog includes a comprehensive glossary of technical terms (an excellent reference) for your use. The glossary contains not only the terms used in this catalog, but also the terms that are useful in press rooms.

Please note that this catalog highlights only the salient features of the products covered.

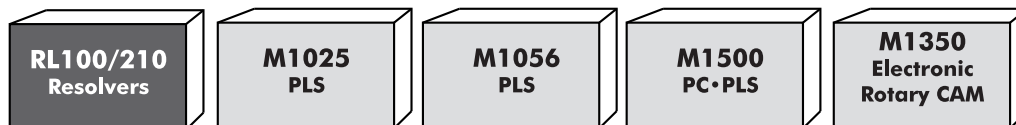
For complete information, please refer to that product's instruction manual.

Autotech Resolvers and PLS's are standard equipment on most Fortune 100 companies such as Ford, GM, Chrysler, Miller, Reynolds Metals, etc. More than 100 different types of Autotech controls have been applied on over 25,000 presses worldwide. For technical assistance in all aspects of product application, selection, customization, availability and price, we have a team of Press specialists at the factory available to you at:

1-800-TEC-ENGR

AVG Automation's Press Automation & Monitoring Products

POSITION SENSOR PRESS AUTOMATION, BRAKE MONITOR, MOTION DETECTOR



DIE PROTECTION

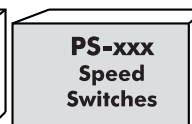
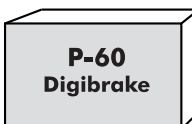


SHUT HEIGHT

LOAD MONITORS

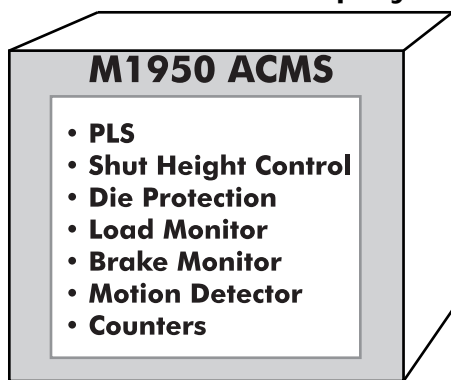


MISCELLANEOUS

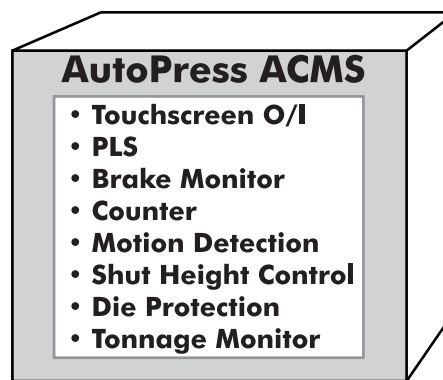


Press Automation Control & Monitoring Systems (ACMS)

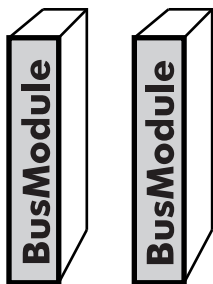
Modular with 2x20 character LCD Display



Touch Screen Operator Interface



BusModules™ are available for many popular PLC's and PC's



PLC*/PC Platform	PLS	Resolver Decoder	Shut Height	Die Protection	Tonnage
AB 1771	x	x			
Modicon 800	x	x			
TI 5x5	x	x			
Modicon Compact 984	x	x	x	x	x
Modicon Quantum	x	x	x	x	x
GE 9030**	x	x	x	x	x
PC (ISA Bus)	x	x	x	x	x

* If you do not see your PLC on this list, consult factory for availability

** Forthcoming

Table of Contents

Introduction

Press Automation Control and Monitoring Systems-	4-7
Product Selection Guide-	8-9

Stand Alone Controls

<i>Programmable Limit Switches-</i>	
M1025-P10 PLS	10-11
M1056-P10 PLS	12-13
M1500-P10 PLS	14-17
<i>Electronic Rotary Limit Switch-</i>	
M1350 Mini•CAM	18-19
<i>Die Protection System-</i>	
M1200 DPS	20-23
<i>Tonnage Monitoring-</i>	
M1030-P10 MINI-PLM	24-25
M1030E-P10 MINI-PLM	26-27
<i>Shut Height Indication/Control-</i>	
M1150-M10 & M1151-M10A	28-29
M1450-P10	30-31
M2020/2022 Series	32-33

Integrated Control Systems

<i>Programmable Limit Switches, Die Protection, Tonnage Monitoring, Shut Height Indication/Control-</i>	
M1950 ACMS	34-37
AutoPress ACMS	38-43

PC-PLC Plug-in BusModules™

<i>PLS and DPPLS Modules-</i>	
M8251 PLS Series	44-45
M7251 PLS & DPPLS Series	46-47
<i>Position Feedback Modules-</i>	
M8350 Series	48-49
M7350 Series	50-51
<i>Shut Height Module-</i>	
M7350 Dual Decoder	52
<i>Load Monitor Module-</i>	
M7450 Series	53

Position Transducers

Resolvers (E7R, RL100 & RL210) ...	54-55
LT-140 Linear Transducer	56-57

Miscellaneous

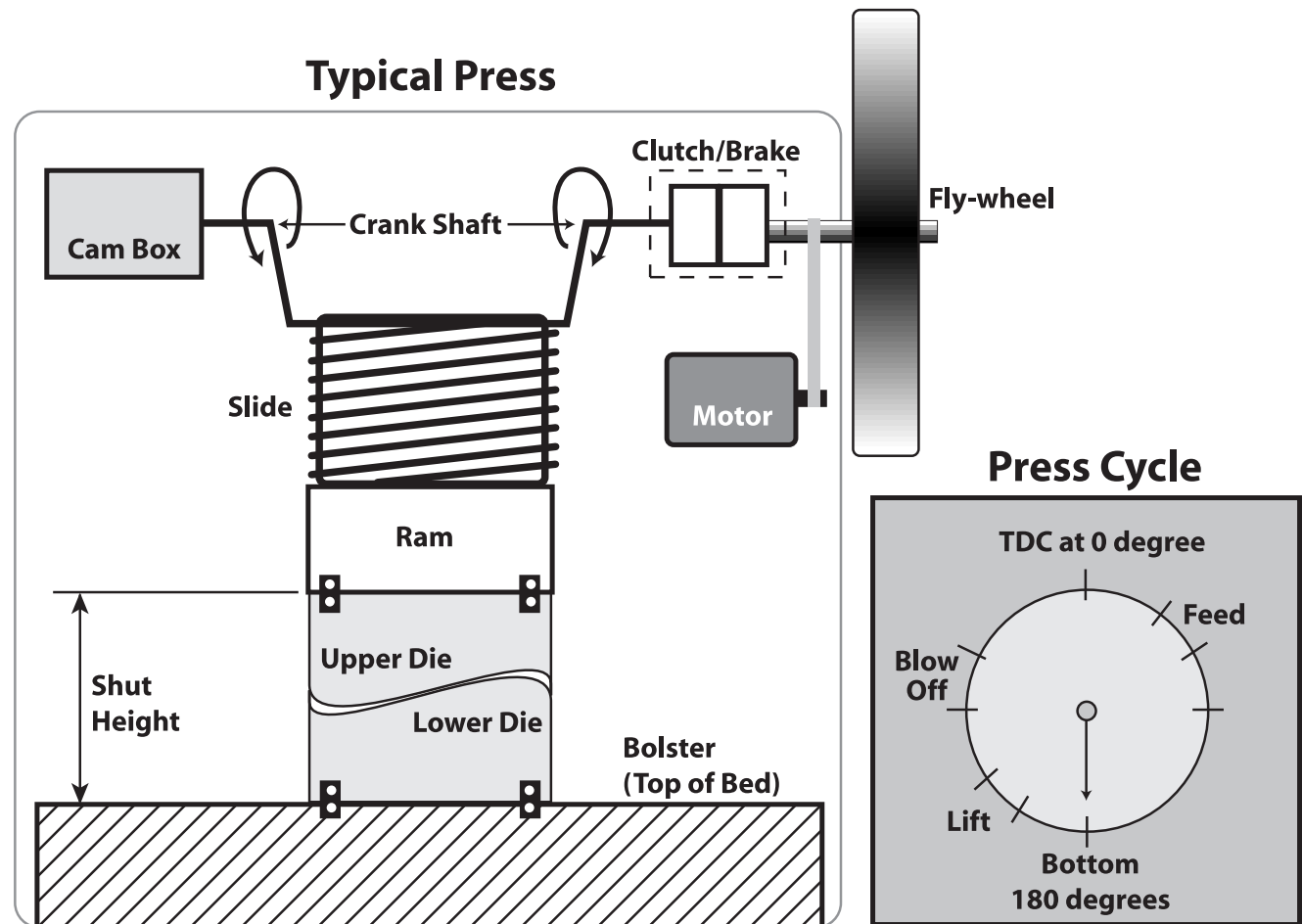
<i>Motor Controls-</i>	
P-40 SoftStart	58-59
P-60 DigiBrake (Electronic Motor Brake) .	60-61
<i>Speed Switches-</i>	
PS-111 & PS-112	62
PS-119	63
PS-127A	64
<hr/>	
Network Products	65
Additional products from AVG	66
<hr/>	
Glossary of Terms	67-72

Introduction

Press Automation Control & Monitoring Systems (ACMS)

The illustration below identifies the major components of a typical mechanical press. The motor/flywheel combination drives the crankshaft, which causes vertical movement of the ram. The material to be stamped is placed between the two die halves. The bottom half of the die is bolted to the bolster, while the top half is mounted to the ram. The part is formed/stamped when the two die halves come in contact with the material and press it.

Modern electronic controls help increase press productivity, improve part quality, and protect costly dies and presses from damage. AVG-Autotech offers several such controls as discussed below.

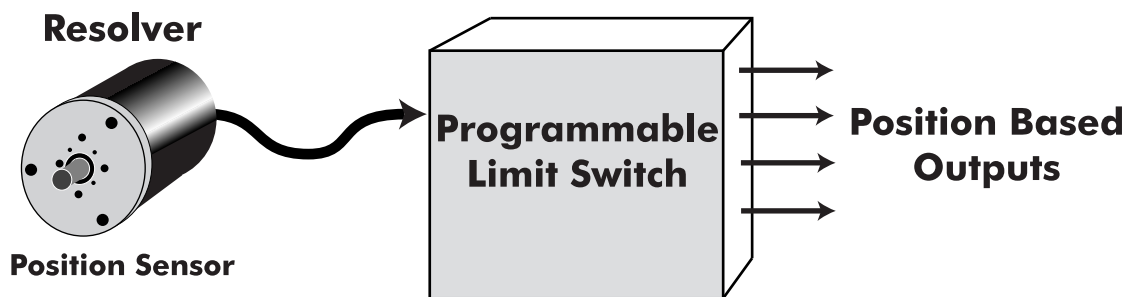


...Press Automation Control & Monitoring Systems (ACMS)

PRESS AUTOMATION

A programmable limit switch (PLS) provides press-position-based timing outputs for automation functions such as Feed, Eject, and Lubrication. In addition, position window outputs from these products are used by PLC's for Die Protection and other control functions.

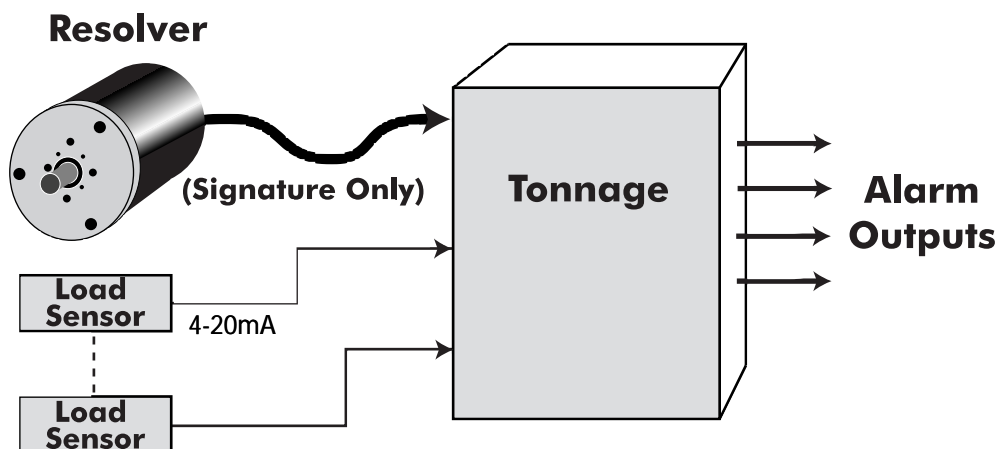
AVG offers the widest variety of PLS products containing several unique features that benefit press operations. For example, some of the PLS's have built-in brake monitor and motion detection eliminating the need for separate units. Motion detection supports programmable "detect-delay" to allow the press to ramp up to speed without tripping a motion fault. The Reverse-motion-disable feature provides safeguards by disabling outputs if the press moves in reverse direction. Many of these products provide press position and SPM display to eliminate separate displays for the press.



PRESS LOAD OR TONNAGE MONITORING

The Stamping industry has been using peak load monitors to protect presses from overload for several years. Now, stamping plants are moving towards signature tonnage analysis. Each stamped part has a unique tonnage signature (tonnage vs. press angle data). The signature of a stamped part is compared to a reference signature, not only to protect the press, but also to protect dies and detect bad parts.

AVG offers two types of tonnage monitors: peak load and signature. These products are available as stand alone as well as in modular form. Load monitors from AVG offer many unique features. These include sensors with 4-20mA output (to simplify wiring), over and under tonnage detection, and load trending.

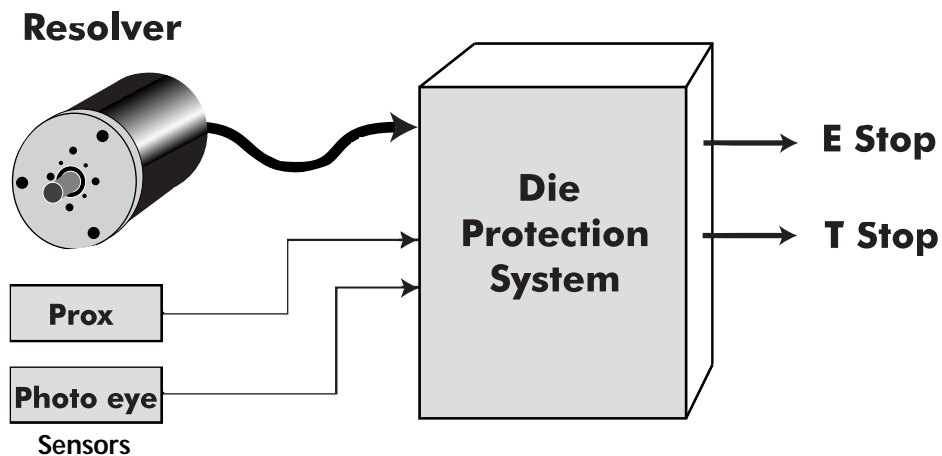


Press Automation Control & Monitoring Systems (ACMS)...

DIE PROTECTION SYSTEMS

Die Protection Systems from AVG, protect expensive dies from damage by monitoring proper material progression throughout the press stroke. AVG offers several products with varying features to meet different application needs.

AVG's Die Protect products are available as stand alone as well as in modular form with many unique features such as slug detect, sensor names, review mode, and built-in PLS option.

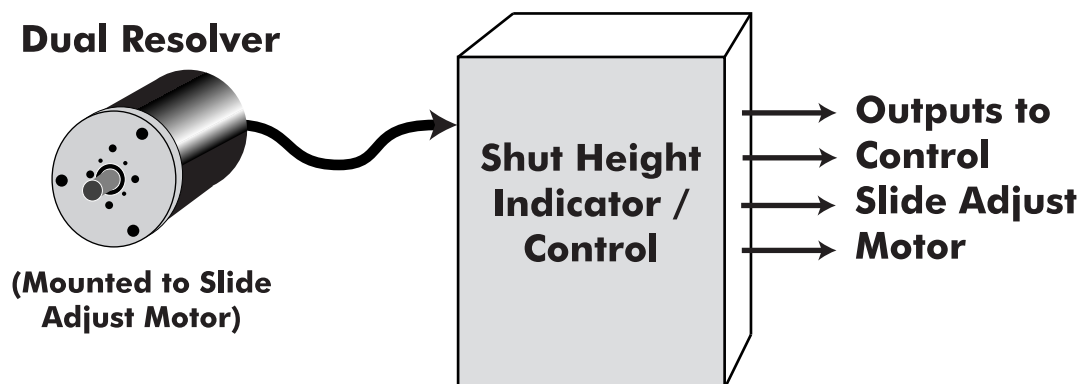


SHUT HEIGHT INDICATION / CONTROL

Shut height of a press is die dependent, and must be set precisely to produce quality parts, and to safeguard dies. The traditional method of Die Setting uses a trial and error approach: the Shut Height is changed, measured using blocks, verniers, etc., and readjusted based on the measurement. This makes Die Setting a time consuming process.

Shut Height Indicator products from AVG eliminate the need for measuring Shut Height. Once calibrated, these products constantly display/monitor Shut Height making die changeover quick. In addition, these products detect any Shut Height drift during operation.

Shut Height control products, in addition to indication, store Shut Height setup information for several dies, and can automatically adjust the Shut Height for the selected die. AVG offers several products for Shut Height indication/control.



...Press Automation Control & Monitoring Systems (ACMS)

POSITION SENSORS

Position sensors are at the heart of AVG-Autotech's position-based press automation products including PLS's, Die Protection, Signature Load Monitoring, and Shut Height Monitoring and Control. Autotech uses resolvers as rotary position sensors because of their reliability in extreme environments.

AVG-Autotech offers several resolver packages to meet different mechanical requirements such as radial/axial load and mounting options. AVG also offers many resolver/decoder products to feed press position to PLC's.

MOTION DETECTOR

Many press controls need to detect press motion. AVG-Autotech's PLS's offer motion detection as a standard feature. The motion detector offers a programmable "detect delay." At start up, this delay gives time for the press to ramp up without tripping a motion fault. An input is provided to clear motion fault without requiring to cycle power to the motion detector.

BRAKE MONITOR

For safety reasons, it is important to monitor press stopping time. Most AVG PLS's offer a built-in brake monitor that allows the user to set a stopping time limit, and activate an output if the press stopping time exceeds that limit. The stopping time is displayed and an input is provided to clear brake-time related faults.

PLANT COMMUNICATION

At times, it is required to communicate/ display press related information to plant personnel. For example, production rate, target, etc., may be need to be displayed clearly. AVG-Uticor's products fulfill plant communication needs. AVG-Uticor offers bright, LED based marquees for clear visibility on plant floor.

Unique AVG Features

Common across the entire product line.

All Autotech Press Products are characterized by the following unique features:

- ▶ *Maximum Processing Power & Features Per Cubic Inch*
- ▶ *Simplest Human Machine Interface*
- ▶ *Highest Processing Speed and Accuracy*
- ▶ *Smallest Footprint Conserving Panel space*
- ▶ *Highest Environmental Immunity and Field Proven Reliability*

Product Selection Guide:

PROGRAMMABLE LIMIT SWITCHES- (All PLS models include Brake Monitor & Motion Detector)

Product	Features	Page No.
M1025	6 PLS Outputs, Brake Monitor, Motion detector; Relay outputs	10-11
M1056	16 PLS Outputs, Brake Monitor, Motion detector; Relay outputs, multiple dwells, multiple setup, speed compensation, Angle ON- Time Off feature	12-13
M1350	Electro-optical, 8 or 16 Cam outputs, optional built-in resolver	18-19
M1500	PLS & PLC integrated in one box; 16 channel PLS with advanced features & 16 In/12 Out PLC	14-17
M1950 ACMS	Modular unit with 5 slots, 2x20 char LCD & 4 digit LED; 16 PLS outputs per PLS module - Advanced features, Logic level outputs; Other slots may be used to insert more PLS modules or other Press control modules	34-37
AutoPress ACMS	Integrated Press Automation Control & Monitoring Systems (ACMS) and touch screen operator interface for ACMS, PLC, Press feed & clutch brake control in one compact box. 5" Color, 6" Mono, 10" Color Display options. Available in many configurations providing PLS & other press functions.	38-43
BusModules (Plug-in Modules for PLC's and PC's)	PLC Plug-in PLS Modules for Major PLCs and PC (ISA Bus), 8-16 outputs depending upon PLC; Advanced features	44-47

DIE PROTECTION SYSTEMS-

Product	Features	Page No.
M1200	12 sensor input, brake monitor, motion detector, with optional 6 PLS outputs; Relay outputs; 2 x 20 char VFD display	20-23
M1950 ACMS	Modular unit with 5 slots; 8 sensor inputs per Die Protect module; Slots may be used for additional Die protect modules or for other Press controls, such as PLS	34-37
AutoPress ACMS	Integrated Press Automation Control & Monitoring Systems (ACMS) and touch screen operator interface for ACMS, PLC, Press feed & clutch brake control in one compact box. 5" Color, 6" Mono, 10" Color Display options. Available in many configurations providing Die Protection & other press functions.	38-43
BusModules (Plug-in Modules for PLC's and PC's)	Plug-in Die Protection Modules for Modicon 984 Compact PLC, GE 9030 and PC (ISA Bus)	46-47

Product Selection Guide:

PRESS LOAD MONITORING-

Product	Features	Page No.
M1030-E	Advanced Peak Load monitor, with Over & Under Tonnage Limits, Trending; 2 - 4 sensor inputs	26-27
M1030	Signature analysis or Tonnage at angle, Protects Press, Dies and detects bad quality parts; 2 - 8 load sensor inputs	24-25
M1950 ACMS	Modular unit with 5 slots; Modules for Peak Load & signature analysis. 2- 4 load sensor inputs per Peak tonnage module; 2-4 input per signature tonnage module. Slots may be used for other Press controls, such as PLS	34-37
AutoPress ACMS	Integrated Press Automation Control & Monitoring Systems (ACMS) and touch screen operator interface for ACMS, PLC, Press feed & clutch brake control in one compact box. 5" Color, 6" Mono, 10" Color Display options. Available in many configurations providing Press Load Monitoring & other press functions.	38-43
BusModules (Plug-in Modules for PLC's and PC's)	Plug-in tonnage Module for Modicon 984 Compact PLC, GE 90-30 PLC, and PC (ISA Bus)	53

SHUT HEIGHT INDICATOR / CONTROL SYSTEMS-

Product	Features	Page No.
M1150-M10A	Absolute Shut Height Indicator; Dual Resolver as position sensor; 4.110" x 2.190" x 6.120" Package	28-29
M1150-M10	Semi-Absolute Shut Height Indicator; Single Turn Resolver as position sensor	28-29
M1450-P10	Linear Rod based shut height indicator & PLS	30-31
M2020/2022	Shut Height Control; Resolver & Linear rod based models; M2020 for single action presses, and M2022 for dual action presses; Counter Balance Option	32-33
M1950 ACMS	Modular unit with 5 slots; Modules for Shut Height Control (resolver & linear rod based). Slots may be used for other Press controls, such as PLS	34-37
AutoPress ACMS	Integrated Press Automation Control & Monitoring Systems (ACMS) and touch screen operator interface for ACMS, PLC, Press feed & clutch brake control in one compact box. 5" Color, 6" Mono, 10" Color Display options. Available in many configurations providing Shut Height Indicator/Control Systems & other press functions.	38-43
BusModules (Plug-in Modules for PLC's and PC's)	Plug-in Shut Height module for Major PLCs and PC (ISA Bus) 8-16 outputs depending upon PLC. Advanced features	52

M1025-P10 PLS

Cost Effective Replacement for Electro-mechanical CAMs

- ▶ **6 CAM or PLS, Relay Outputs**
- ▶ **Brake Monitoring and Press Stop Time display**
- ▶ **Fine-tuning in Motion - No press downtime for dwell changes**
- ▶ **Press Position / SPM display**
- ▶ **Programmable motion detect delay**
- ▶ **Removable front panel & Program enable inputs ensures Program Security**
- ▶ **Simple 5-Key Programming**



Autotech, your Programmable Limit Switch specialist, has now made it possible to simply obsolete electromechanical cam/limit switches!! In spite of numerous limitations such as cam bounce, limited life and high maintenance, the industry has continued to use the electromechanical switches due to their low cost. The M1025-P10 from Autotech has broken down the last barrier... the price. The M1025-P10 offers solid-state reliability and programmability at the cost of electromechanical switches.

Principle of Operation

The M1025-P10 consists of two parts, one being a position transducer(resolver) connected to the machine drive train and the other a programmable unit mounted in the machine control panel. The resolver produces an analog signal proportional to the shaft position that is converted to digital format by a ratio-metric converter inside the programmable unit. This position is then displayed on the front of the PLS panel and compared to the dwell setpoints programmed into it. When the process cycle reaches these set-points, outputs are enabled or disabled, resulting in starting or stopping desired functions during the cycle.

Programmable Zero Offset

The M1025 allows for quick initial set-up while matching "Machine TDC" to "Resolver Zero" After the resolver is mounted on the machine simply align the machine to a mechanical zero reference and enter the required offset number to read zero.

Brake Monitor

As an added feature, a Time-Based Brake Monitor is built into this unit. In addition the machine Stop Time will be displayed after each stop of the machine. A Brake Warning will occur if the machine's stop time exceeds a user defined preset stop time. If the stop time set point is exceeded then the Brake Fault output will activate.

Motion Detection

In order to prevent nuisance Motion Detection faults a user defined adjustable time delay should be set to allow the machine to mechanically engage prior to enabling the Motion Detection feature.

Fine Tuning In Motion

An additional advantage of the M1025 is that you can fine-tune your limit settings while the machine is running. The increase in machine productivity pays for the PLS within months.

Programmable Limit Settings

The ON/OFF set-points for each output can be programmed simply by the touch of a key from the front panel. The Autotech patented key sequence in the M1025 is incredibly simple and easy to use.

Tach Mode

In Tach mode M1025 displays the press speed in SPM.

Low Maintenance

Unlike an electromechanical limit switch that requires periodic maintenance and is often mounted at places that are hard to reach, the M1025 requires no maintenance and has no mechanical cam/contacts to wear out. In addition the plug in output relays are easily field replaceable.



Security

Once the set points are programmed using the front panel programming interface (POI), you can detach the interface from the main unit making the program inaccessible to any unauthorized personnel. The M1025 allows another level of security against unauthorized programming changes through the use of a programming enable electrical input.

Simple 5 Key Keypad

The M1025 is programmed using five keys as follows:

- MODE

 Key selects the function to be programmed while the display shows each function's current values.
- Key selects the parameter to be programmed while the location of the decimal points indicates which parameter is selected.
- INC ↑

DEC ↓

 Key adjust the parameter value while the display indicates all current parameter values.
- RECALL

 Key selects the next programmed setpoint for the display.

Detachable Faceplate



Once the set-points are programmed using the front panel programming interface, you can detach it from the main unit making the program inaccessible to any unauthorized personnel. While this feature makes the M1025 tamper proof, it also saves you money by using the same programmer to program various other PLS's in your plant.

Specifications:

Power Requirements:

120 VAC +/- 10%, 50/60Hz., 12VA

Operating Temperature:

-10°F to 130°F
(-23°C to 55°C)

System Resolution:

360 Degrees

Offset:

Programmable from, 0 to 359 Degrees

Scan Time:

1° accuracy @ 380SPM

Position Transducer:

Autotech's series RL100 or E7R resolver

Resolver Cable:

Twisted pairs, overall foil shielded, such as CBL 10T22-xxx. Max length: 2500ft.

Outputs:

6 PLS
1 Motion Fault
1 Brake Fault

Inputs:

Program Enable
Brake Signal
Brake Fault Reset

"Ready-to-install" system package part numbers

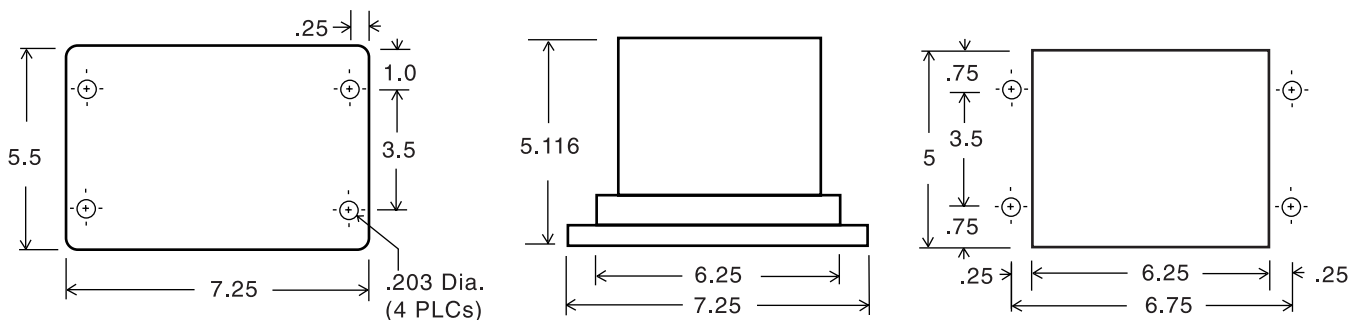
SYS-P1025-082:

- M1025 PLS with POI and Blank front cover, EM SPST relays for outputs (120VAC @10A resistive)
- E7R Resolver with MS Connector, Mounting bracket
- 30 Feet of cable with MS connector
- NEMA 12 enclosure with cut out, mounting holes and security clamp.

SYS-P1025-084:

- Above with RL100 Resolver.

Outline Dimensions:



M1056-P10 PLS

The most Powerful and Reliable PLS for Press Automation

- ▶ **Advanced PLS with 16 PLS outputs & built-in Brake Monitor & Motion detector**
- ▶ **Multiple (8) program setups for easy job changeover**
- ▶ **Press position & SPM, or Stop-time display**
- ▶ **Fine Tuning in Motion**
- ▶ **User friendly programming & operation**
- ▶ **Broken Resolver Wire Detection & Internal Fault Detection**
- ▶ **Short-circuit Proof Resolver Input**



Autotech, your Programmable Limit Switch specialist, has now made it possible to simply obsolete electromechanical cam/limit switches!! M1056-P10 with 16 PLS outputs & built-in brake monitor and motion detector offers you much more at comparable cost. You can store up to 8 job setups for easy job changeover.

Principle of Operation

The M1056-P10 works in conjunction with a resolver (a position sensor) mounted on press drive train. The M1056-P10 decodes resolver signals, and turns 16 PLS outputs on and off based on user programmed set points. The unit has 8 built-in, field-replaceable relays for 8 of the 16 outputs with choice of electromechanical or solid state relays.

Programmable Resolution & Zero Offset

Resolution on M1056-P10 can be programmed from 17 to 1000 counts per turn. Programmable offset allows you to electronically align resolver zero to machine zero for ease of mounting. (Typical press resolution - 360 degrees)

Multiple Setups

The M1056-P10 has capability to store 8 job setups, selectable from keypad or by external inputs. This makes job changeover easy.

Brake Monitor

M1056-P10 offers a Time-Based Brake Monitor which displays press Stop Time after each stop of the machine. Two programmable limits, Caution & Danger, with corresponding outputs, are activated if stop time exceeds limits.

Motion Detection

In order to prevent nuisance Motion Detection faults a user defined adjustable time delay that should be set to allow the machine to mechanically engage prior to enabling the Motion Detection feature.

Fine Tuning In Motion

An additional advantage of the M1056-P10 is that you can fine-tune your limit settings while the machine is running. The increase in machine productivity pays for the PLS within months.

Low Maintenance

Unlike an electromechanical limit switch that requires periodic maintenance and often at places that are hard to reach, the M1056-P10 requires no maintenance and has no mechanical cam/contacts to wear out. In addition the plug in output relays are easily field replaceable.

Security

The M1056-P10 has three levels of supervisory control:

1. View only (Operator Mode)
2. View plus set-point programming (Set-up Mode)
3. View plus set-point plus configuration programming (Supervisory Mode)

Advanced Features

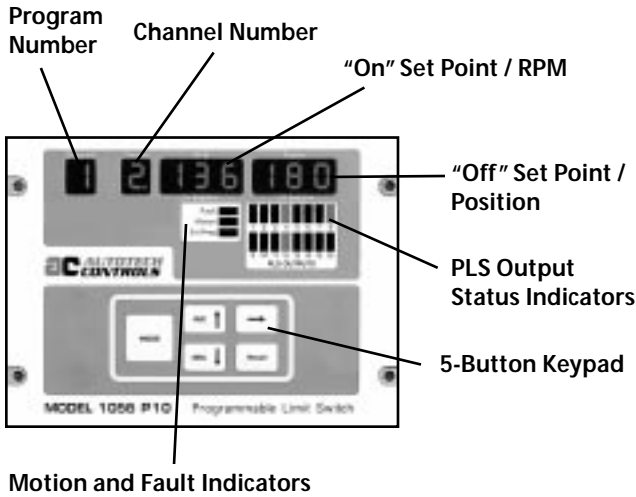
The M1056-P10 offers advanced features such as Speed Compensation, Angle-ON / Time-OFF and Reverse Motion Disable.

Speed compensation automatically adjusts PLS outputs to compensate for device response times.

Angle-ON / Time-OFF outputs turns on at a press angle and turns off after programmed time (instead of angle). This feature is useful for controlling air or lubrication.

Reverse Motion Disable feature turns off all PLS outputs during reverse motion of the press preventing damage to mechanical automation.

Simplest Human Interface



"Ready-to-install" system package part numbers

SYS-P1056-062:

- M1056-P10 PLS, Relay chassis with 4' interconnect cable, 18 EM SPST Relays for Outputs (120VAC @10A resistive), Brake input relay (M1056-P10 has 8 relay & 8 logic level outputs on board; relay chassis is used for converting logic level outputs to relay outputs)
- E7R Resolver with MS Connector, Mounting bracket, 30 Feet of cable with MS connector
- NEMA 12 enclosure with cut out, mounting holes and security clamp

SYS-P1056-142:

- Above with RL100 resolver

-STAND ALONE CONTROLS-
PROGRAMMABLE LIMIT SWITCHES

Specifications:

GENERAL:

Power Requirements:

120VAC +/- 10%, 50-60 Hz., 24VA
240VAC +/- 10%, 50-60 Hz., 24VA (Optional)

Operating Temperature:

-10°F to 130°F
(-23°C to 55°C)

Dimensions

7.25"H x 5.5"W x 5"D

PROGRAMMING:

System Resolution:

17 to 1000 counts per turn
(typical press- 360 counts)

Offset:

Programmable from,
0 to scale factor

Speed Compensation:

Individual for each PLS output

Number of PLS Programs:

8 selectable from keypad or externally via 3 program select inputs

PLS Set-points:

160 per PLS Program, 1,280 total

Brake Monitor:

Selectable 000 to 999
Milliseconds.

Motion Detection Delay:

Selectable 0 - 999 Milliseconds

OUTPUTS:

16 PLS (14 if Brake Monitor used)
(8 onboard EM or SS Relays,
8 Transistors)
1 Brake Danger, EM or SS Relay
1 Brake Caution, EM or SS Relay
1 Motion 120VAC, 10A EM Relay
1 Fault, 120VAC, 10A EM Relay

CONTROL INPUTS:

Supervisory

Program Enable

Brake input

Program Select

Input Electrical Specifications:

1500 V optical isolation
1800 Ohm Input impedance
True 8 - 28 VDC sourcing
False 0-0.8 VDC

Scan time:

100 -500 µsec. Max.

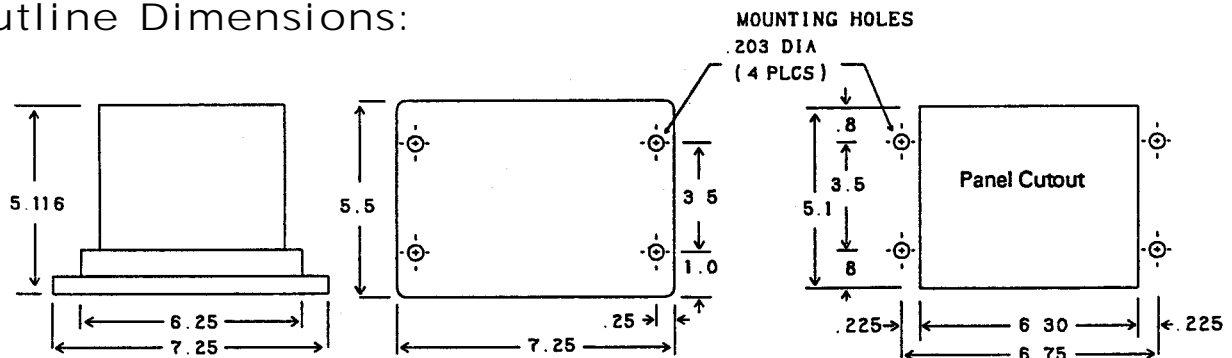
Position Signal:

Autotech's series RL100 or
E7R resolver

Resolver Cable

Autotech's CBL-10T22-Mxxx.
2500ft. max.

Outline Dimensions:



M1500, PC·PLS™

An advanced PLS with built-in LadderLogic, Timers, Counters and Operator Interface.

- ▶ **16 channel advanced PLS integrated with 16-In / 12-Out PLC**
- ▶ **High Speed Response of PLS**
- ▶ **Fine Tune capability of PLS**
- ▶ **Multiple Program Selection for quick job change over**
- ▶ **Standard Ladder programming for PLC Functions**
- ▶ **80 timers, 46 counters & 2 K Ladder Code**



Continuing the tradition of innovation and leadership, Autotech introduces the next generation of PLS's, the Pc-PLS, that eliminates the need of a separate PLC as well as operator interface. The Pc-PLS combines in one box the PLS, the PLC, an Operator Interface, and built-in power relay outputs. With 40 I/O's this unit is truly a study on power density and integration.

Principle of Operation

The Pc-PLS with its 3 processors allows distributed processing of logically independent tasks. A robust resolver mounted to the press drive train senses the press position. The PLS processor gets its' position information from a noise resistant, ratiometric resolver decoder. The PLS then controls PLS outputs based on the programmed position limits, with microsecond repeatability. In addition it provides motion and fault relay outputs. The PLS provides 16 PLS outputs, 10 of the 16 outputs are fed to the PLC processor internally for inputting machine timing/angle information. The other 6 are high speed direct PLS outputs.

The PLC microprocessor accepts 16 external inputs and 10 internal inputs from PLS, and performs programmed logic to control a total of 16 outputs. 12 are normal PLC relay outputs and 4 may be used too logically and the 4 direct PLS outputs. The PLC microprocessor supports most commonly used relay, timer and counter instructions.

Another microprocessor takes care of the operator interface. It controls display, keypad and exchanges information with PLS and PLC processors. Unlike most PLC's, the operator interface is integrated with the unit, and allows monitoring PLC variables such as bit status, timer/counter values and helps in debugging the program by forcing the I/O on or off. The machine can be fine-tuned while running using the operator interface.

Simple, Easy to Program and Fine-tune

Simple operator interface, using bright red LED display makes programming. Fine tuning, debugging and monitoring of the machine a breeze.

Simple 6-key Keypad

The operator interface has a key to switch between PLS and PLC and uses AVG-Autotech's very popular 5 keys to do the programming and monitoring.

English Language Prompts and Messages

The unit shows prompts for user to enter appropriate values and cursor position shows which value will change in response to INC/DEC keys.

Counters and Timers

Implement batch counters, parts counter or any desired counter or timer function in ladder logic using 80 timers and 46 counters supported by the PC.PLS and then use the interface to view counter/timer values.

Brake Monitor

This unit performs brake monitoring function and will display the press stop time.

Motion Detection

In order to prevent nuisance Motion Detection faults, a user adjustable time delay should be set to allow the machine to engage prior to enabling the Motion Detection feature.

Fine Tuning In Motion

An additional advantage of the M1500 is that you can fine-tune your limit settings while the machine is running. The increase in machine productivity pays for the PLS within months.

Programmable Limit Settings

The ON/OFF set-points for each output can be programmed simply by the touch of a key from the front panel. The Autotech patented key sequence in the M1500 is incredibly simple and easy to use.

Tach Mode

In the Tach mode the M1500 displays the press speed in SPM.

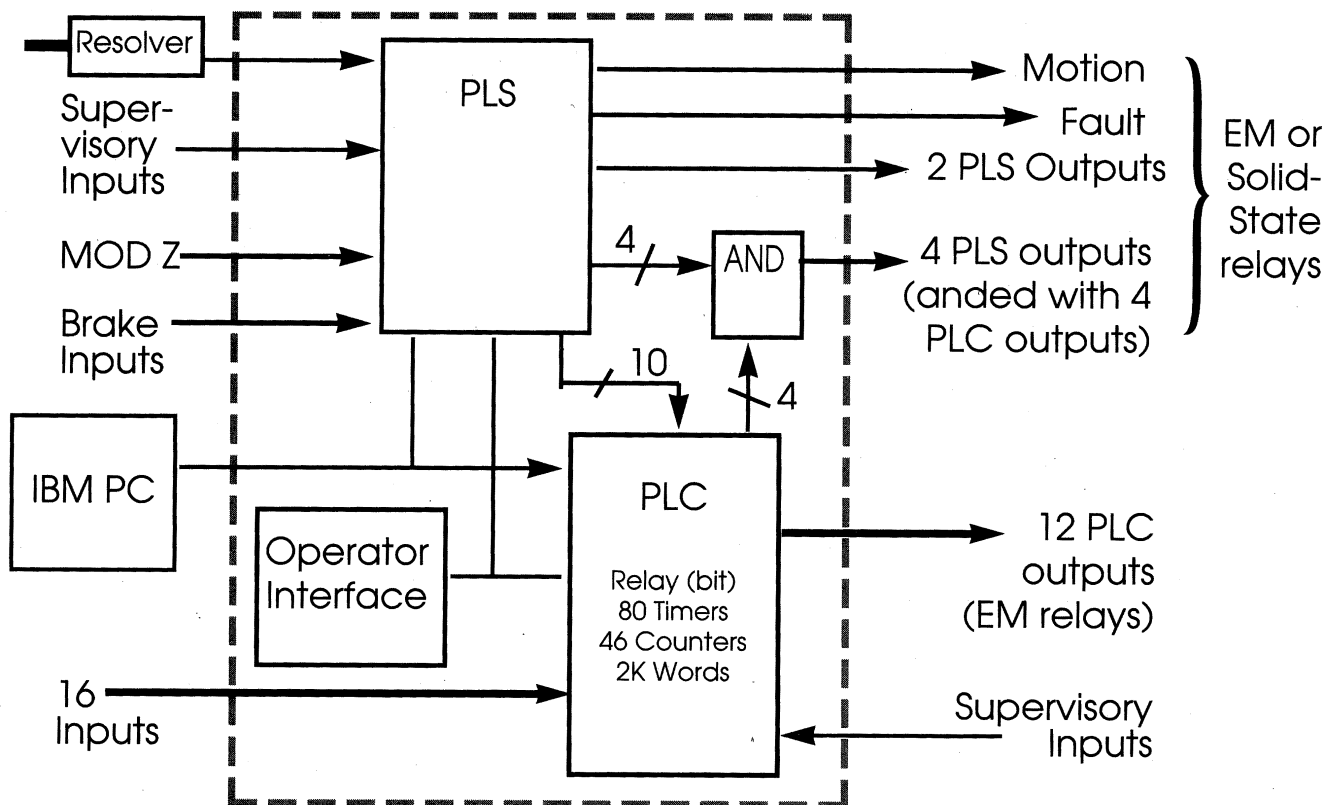
Low Maintenance

Unlike an electromechanical limit switch that requires periodic maintenance and is often mounted at places that are hard to reach, the M1500 requires no maintenance and has no mechanical cam/contacts to wear out. In addition the plug in output relays are easily field replaceable.

Security

The M1500 allows 2 levels of security, through the use of a programming enable electrical inputs, to prevent unauthorized programming changes.

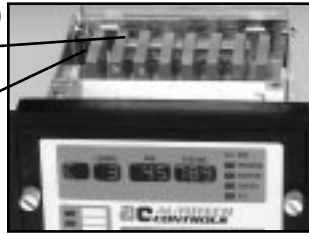
M1500 PC•PLS™ Block Diagram



Front and Rear Views

Quick Replaceable (SS or EM)
Motion and Fault relays

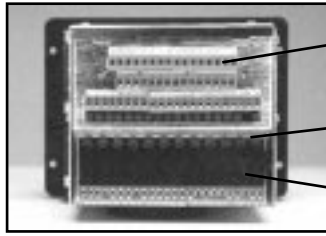
6 Field Replaceable PLS
Relays for High Speed
Precision Control



Quick Disconnect
Wiring Terminals

Bright LED Indicators

12 PLC Relay Outputs



Multi-drop RS-485 Port

8 Multi-Purpose LED Indicators

Built-in Operator Interface



80 Timers, 46 Counters,
2K Ladder Code

Resolver Position Input

16 Control Inputs

Programmable Limit Switch, Timers, Counters & Logic with built-in power relay outputs

All in one 7.25" x 5.5" x 6.7" package

"Ready-to-install" system package part numbers

SYS-P1500-012:

- M1500 Pc/PLS, 16 Solid State AC Relays for Outputs
- PC Based Ladder Logic Programming software & PLS Programming software, RS232 to RS485 Adapter, and Cables for connecting a PC & M1500 to the RS232 - RS485 Adapter
- E7R Resolver with MS Connector, Mounting bracket, 30 Feet of cable with MS connector

SYS-P1500-014:

- M1500 Pc/PLS, 16 Solid State AC Relays for Outputs
- PC Based Ladder Logic Programming software & PLS Programming software, RS232 to RS485 Adapter, and Cables for connecting a PC & M1500 to the RS232 - RS485 Adapter
- RL100 Resolver with MS Connector, Mounting bracket, 30 Feet of cable with MS connector,

Specifications:

Power Requirements:

120VAC +/- 10%, 50-60 Hz., 24VA
240VAC +/- 10%, 50-60 Hz., 24VA
(Optional)

Operating Temperature:

-10°F to 130°F
(-23°C to 55°C)

Computer Interface:

RS-485

PLC SPECIFICATIONS

Inputs:

16, All inputs are optically isolated
(1500 V isolation)
with TRUE level 11-28 VDC
sourcing 5-15 mA and
FALSE level < 0.8 VDC.

Outputs:

Total 16; 12 relay outputs, SPST
Solid state AC (120VAC@3A) or
DC (60VDC@3A) relays
4 outputs internal for
logically ANDing 4 direct PLS
outputs.

Programming Language:

Ladder Logic

Instruction Set:

Relay type (Bit type), timer,
counter

Program size:

2K Words

Internal Relays (bits):

256

Timers:

80, countdown (0 sec. - 18 hours)
with time base 10 msec.,
100 msec., 1 sec.

Counters:

46, count up or count down
(0 to 65000)

Supervisory Inputs:

RUN and PROGRAM: Controls
editing of the PLC program, data
table values and ladder execution.

Output enable:

When TRUE, PLC outputs are
enabled.

Scan Time:

6 µsec. Per instruction.
300 µsec. fixed overhead.

PLS SPECIFICATIONS

Scale Factor

To program desired number of
counts per turn.
Programmable from 16 to 999,
common to all PLS
programs (resolution 17 to 1000
counts/turn).

Offset:

Programmable from, 0 to
scale factor

Speed Compensation

For automatic advance of limits
based on the speed to the machine.
Programmable in scale factor
units per 100 rpm. Each channel
has its own speed compensation.
Channels 1 - 4 have 16 speed
compensation zones.

Motion Detector:

Low and High Motion Limits,
common to all PLS programs.
Programmable from 0 to 999 RPM.

Brake Monitor:

Activates brake danger output if
the brake stopping time exceeds
programmed danger limit.

Number of PLS Programs:

8 Selectable from the keyboard

PLS Set points:

160 per PLS program, 1280 total

Scan Time:

480 µsec. For 16 outputs

PLS SUPERVISORY INPUTS:

Program Enable(PE):

TRUE: set-point programming

Program Enable 2 (PE2):

Enables set-point and setup
programming

Output Enable (OE):

PLS Channel outputs enabled.

Brake Reset:

Input available

POSITION INPUT:

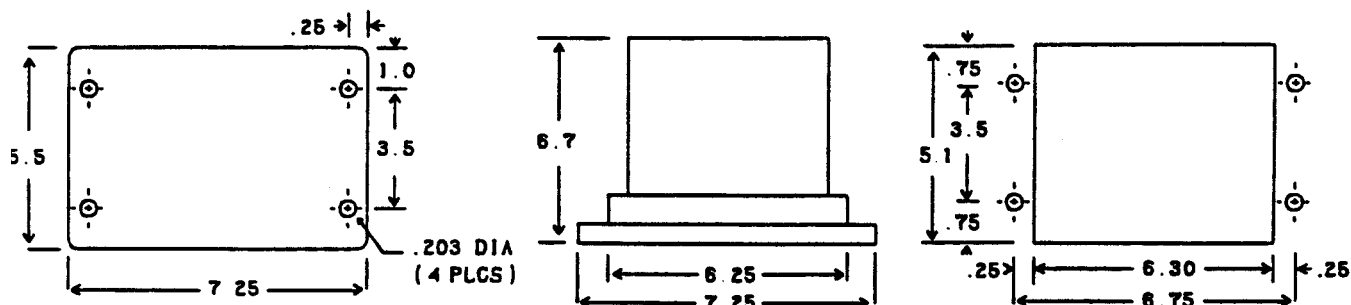
Position Transducer:

Autotech's series RL100 or
E7R resolver

Resolver Cable

Autotech's CBL-10T22-Mxxx.
2500ft., max.

Outline Dimensions:

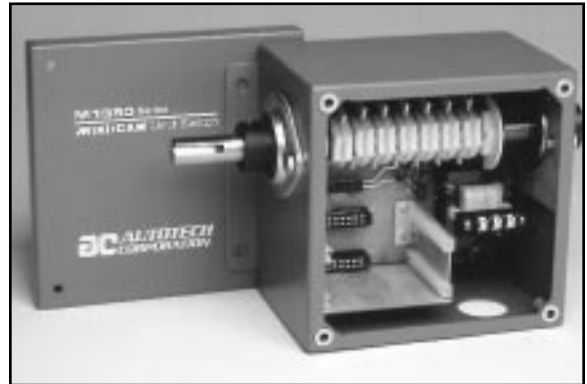


M1350 MINI • Cam™

Solidstate replacement of electromechanical cam switches

- ▶ **4, 8, 12 or 16 outputs**
- ▶ **Compact isolated AC or DC outputs provide noise immunity**
- ▶ **90 VDC outputs for clutch/brake control***
- ▶ **Built-in resolver for PLS interface or position/tach feedback***
- ▶ **Pulse generating discs for counters, rate meters, or multiple outputs per channel***
- ▶ **Easy to Install and Set-up**
- ▶ **Fully gasketed JIC Enclosure (NEMA 12)**

(*Optional)



The Mini Cam consists of the following components:

The Mini Cam model M1350 is an excellent substitute for electromechanical rotary cam limit switches. Like rotary cam switches, the Mini Cam is used to control outputs based on the position of the shaft to which it is coupled. The mini Cam utilizes slotted photoelectric switches and interrupting cam discs mounted on a rotating shaft. The cam discs consist of two halves that can be adjusted to create any required dwell. When the Mini Cam shaft rotates the cam disc passes or interrupts the light beam through the photoelectric switch at the appropriate shaft angle. The DIP switches are provided to select the outputs to turn on when the light is interrupted, or when light is passed. The solid state switching, ease of set up and improved accuracy help increase the productivity of your machine.

- Mini Cam Chassis (Available in 4, 8, 12 or 16 output models)
- Plug in Output Modules
- Optional accessories.

Compact Size:

The Mini-Cam is available in 4, 8, 12 or 16 output models to match a broad range of applications. The advanced design from Autotech has made it possible to double the output density of a 4 output unit; consequently the 8 outputs are housed in a 4 output enclosure.

Non-contact switching:

Photo couplers and solid state switches replace the micro switches of the rotary cam switches. This solid state non-contact switching allows operation at speeds up to 2000 rpm.

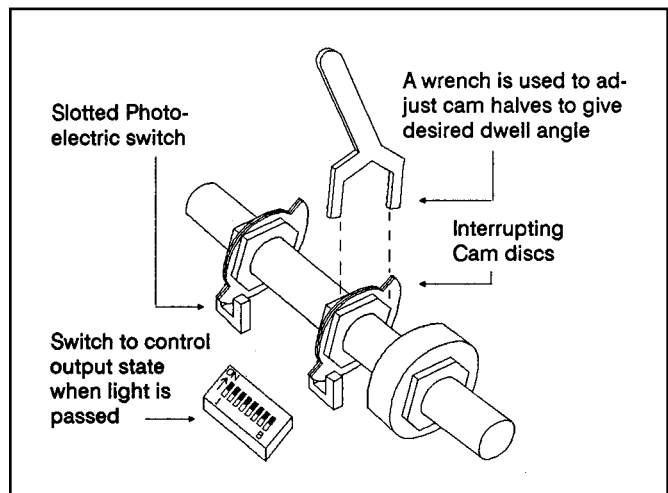
Isolation:

The basic unit comes with PNP sourcing transistor outputs rated at 100mA each with external power supply connection. Only 100mA total from all outputs is available when the internal power supply is used. The optical isolation is rated at 2500 V between the outputs and the control circuitry and provides an extremely reliable operation in electrically noisy press room environments.

Output Modules

1. PNP or NPN sourcing (P or N type) transistor
2. Optically isolated AC outputs
3. Optically isolated DC outputs

Each P or N type of output module provides 8 outputs while each AC or DC module provides 4 outputs. If the basic unit is for 4 outputs, you will be able to use only 4 outputs from the P or N type modules. The P or N type, AC and DC modules can be mixed to suit your application.



Specifications:

Power Requirements:

120VAC+/- 10%, 50-60 Hz.

240VAC+/- 10%, 50-60 Hz.

(Optional)

DC Power: 10-28 VDC (required only if sourcing more than 100 mA with PNP card)

Operating Temperature:

-10°F to 130°F (-23°C to 55°C)

Speed:

0 to 2000 RPM

Max Phase Shift:

1 degree @ 1000 rpm

Resolution:

1 degree @ 1800 rpm

Number of outputs:

4, 8, 12 or 16.

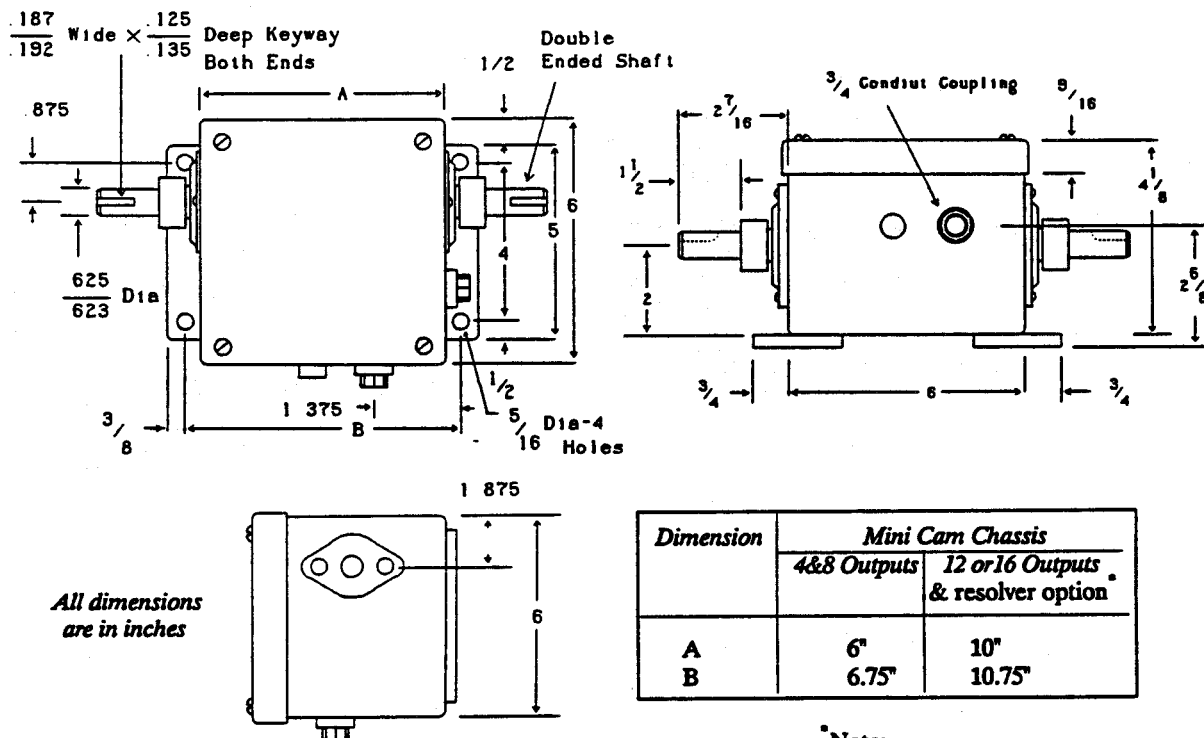
Type of outputs:

- Transistor (P or N)
- Optically isolated DC
- Optically isolated AC

Options:

- Built in Resolver
- Built in Pulse Disc, 60ppr (3 degree slots)
(Replaces cam at position #1.)

Outline Dimensions:



"Ready-to-install" system package part number

SYS-M1350-08DRO:

- M1350 with 8 AC outputs
- Integral Resolver
- Double ended shaft
- Setting Wrench

M1200 Die Protection System

Cost effective System with integrated PLS, Brake Monitor, & Motion Detector

- ▶ **Compact 8.7" x 7.6" x 5.25" package**
- ▶ **12 Sensor Inputs**
- ▶ **Review Mode for Quick setup**
- ▶ **4 counters: Batch, Quality, Total and Tool**
- ▶ **Pre-wired, enclosure mount system for quick installation**
- ▶ **Simple to use with Hot Keys & 2x20 character display**
- ▶ **Bright VFD display for easy visibility**
- ▶ **6 channel PLS, for automation**
- ▶ **Integrated Brake Monitor**
- ▶ **Built-in system integrity checks**



Autotech, the inventor of the microprocessor keyboard Programmable Limit Switch, would like to introduce you to the most advanced state-of-the-art Programmable Die Protection System, series M1200. The M1200 is a user friendly die protection system housed in a small 8.7" x 7.6" x 5.25" enclosure.

Principle of Operation

The M1200 DPS monitors input sensors to ensure that proper conditions are established (as far as material progression is concerned) before the die makes a hit. Up to 12 sensor inputs are monitored within user-programmed position dwells. The position information comes from an Autotech resolver, such as the RL100. Each input can be monitored for a variety of events, such as rising edge, falling edge, position high, position low, or pulse events on input, within the programmed dwell. Absence of an event triggers a fault.

Each sensor input is programmed to de-activate either an immediate fault relay (E-Stop), or a T-Stop fault relay to synchronize with a programmable top stop angle. The fault relays are NO type and are held closed (energized) under normal condition, and opened (de-energized) under fault conditions.

An immediate programmable engagement stop angle disables the E-Stop output from stopping the press at the bottom of the press stroke. This prevents sticking at the bottom.

Multiple setup storage

The M1200 can store setup information for up to 60 dies. A name of up to 8 character identifies each setup.

Counters

The M1200 has 4 counter standard:

1. Batch counter is programmable to top stop the press when the preset number of parts are counted.

2. Quality counter is programmable to output allowing a part quality check.
3. Total counter is an upward counter that counts the total number of press hits.
4. Tool counter is an upward counter counting the number of hits made by the tooling.

Easy to Use

The software provides user-friendly menu driven programming and simple English language messages. The two-row 20 character vacuum fluorescent display offers clear visibility in plant environments. The unit has a review mode making programming of dwells for the sensors very easy. Like for setups, the unit supports 8 character names for sensor inputs. For convenience, a library of commonly used sensor names is provided in the unit. Hot Keys allow quick access to desired functions.

6 Channel PLS

The M1200 has a PLS with power relay outputs built-in the unit. The PLS offers 6 outputs. Each output offers speed compensation. PLS outputs can be used for press automation.

Brake Monitor & Motion Detector

In addition the M1200 has built-in brake monitor and motion detector. M1200 has programmable limits for press stop-time & motion, for these features.

Choice of Panel-mount or Pre-wired enclosure-mounted system

Pre-wired Enclosure

Pre-wired, enclosure mount system for quick installation.
The M1200 also comes, optionally, in a Hoffman enclosure all pre-wired, ready for installation.



- ▲ The M1200 pre-wired "plug-n-play" enclosure offers quick field installation



- ▲ Pre-wired M1200 Enclosure with door open shows easy accessibility

Fully isolated inputs and Outputs

All M1200 inputs and outputs are fully optically isolated from user power sources to provide outstanding electrical noise immunity in the harsh press room environment.

All outputs, Die Protection as well as PLS, uses field replaceable relay outputs



- ▲ Field-replaceable relays: choice of electromechanical, solid-state AC or solid-state DC relays.

Specifications:

Power Requirements:

120VAC +/- 10%, 50-60 Hz., 36VA

Operating Temperature:

-10°F to 130°F (-23°C to 55°C)

Dimensions:

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

RESOLVER INTERFACE

Position Transducer:

Resolver, Autotech's Series RL 100 or E7R

Resolver Cable:

Autotech's CBL-10T22-Mxxx, or equivalent; 2500ft. max.

PROGRAMMING

Scale Factor: Fixed at 360

Offset:

Programmable from 0 to 359; common to all Die Protection and PLS programs

Die/Tool Identification:

One 8-character name per program. Search by name.

Number of Programs or Setups:

60 programs

DIE PROTECT SPECIFICATIONS

Number of Sensors: 12

Event Detection:

Programmable rising edge, falling edge, pulse, pos hi to pos low detection within programmed window.

Die Protection Fault Output:

(Programmable for each sensor)

E-STOP: Stops the press immediately (See Engagement Angle).

T-STOP: Stops the press at top.

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 delays between the detection of a slug fault and the deactivation of the E-Stop or T-Stop output.

E-Stop Engagement Angle:

Programmable angle from 90° to 190°.

E-Stop does not occur between Engagement Angle and 190°.

Top-Stop Angle:

Programmable angle at which the Top Stop output is activated, when required.

COUNTERS

Batch Counter:

Six digit presettable down counter. Counts down to zero. Top Stop output de-energizes at programmable T-Stop Angle, Resettable from keypad or input signal.

Quality Counter:

Six digit presettable down counter. Counter output de-energizes at programmable T-Stop Angle when Quality Counter=0

Total Counter:

Six digit resettable up counter. Resets at power up or from keypad or input signal.

Tool Counter:

Six digit tool specific up counter. Resets from keypad.

INPUTS

Electrical Specifications (all inputs)

Optical Isolation: 1500 V

Logic Levels: (except 120V

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 products

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:

Detects resolver broken wire and M1200 internal faults.

Without Fault: Relay remains energized.

With Fault: Relay de-energized.

Motion Output:

Relay energized with resolver RPM between programmed high and low motion limits.

E-STOP Output:

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

T-STOP Output:

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[AC1] μs; OFF time: 35 μs; Leak-

age: 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

Brake Danger Limit:

Programmable in hundreds of seconds from 0.00 and 9.99 seconds. The Brake

Output de-energizes when stopping

time exceeds this limit. The press stop

time is measured from the time the

Brake is engaged.

Brake Input:

Brake Engaged: 0-10 VAC or open

Clutch Engaged: 90-120 VAC input.

The press stop time is measured from

the time the brake is engaged until

SPM = 0.

PLS SPECIFICATIONS

PLS Setpoints:

17 per program

Speed Compensation

Programmable up to 359 degrees per

100 rpm. Each PLS channel has its

own speed compensation.

PLS Outputs:

Number of PLS Outputs: 6

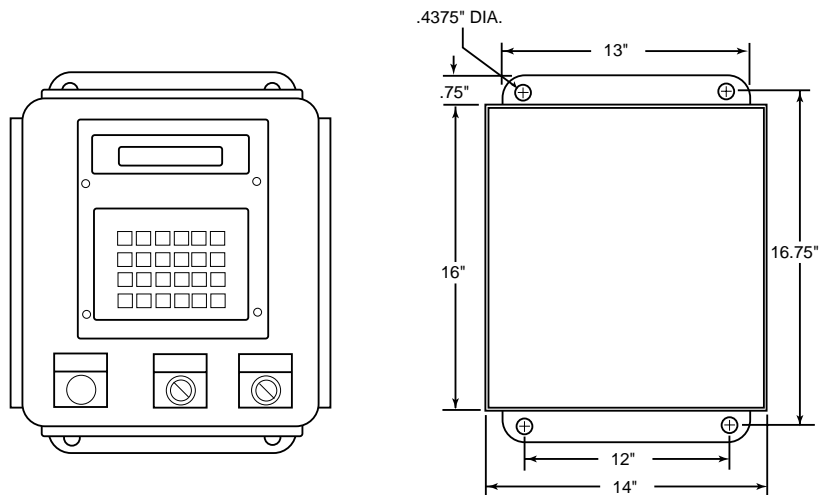
Type of Outputs:

Built in relays

Outline Dimensions (Enclosure Mounted System):

Mounting:

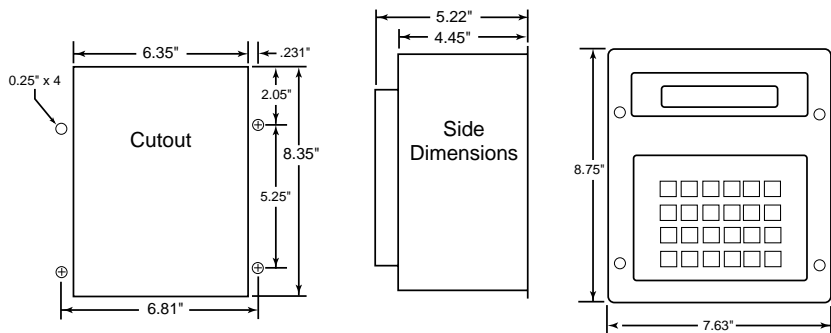
Height: 17.5"
Width: 14"
Depth: 10"



Outline Dimensions (Panel Mount):

Mounting:

Height: 7.6"
Width: 8.7"
Depth: 5.25"



"Ready-to-install" system package part number

SYS-M1200-P10:

- M1200 Die Set Protection system with PLS.
- RL100 Resolver with MS connector & 30ft. of Resolver Cable.
- Enclosure mounted and wired

M1030-P10 MINI • PLM™

The first affordable Load signature analysis and fault detection system

- ▶ **On-line tonnage at Angle/Signature analysis**
- ▶ **Up to 8 sensors in Small 7.25" x 5.5" x 5.9" Package**
- ▶ **Load sensors with 4-20mA outputs for easy wiring**
- ▶ **RS422/RS485 Multi-Drop Com Port Option**
- ▶ **3 limit outputs; throughout the stroke**
- ▶ **Easy to install/setup/calibrate**
- ▶ **8 Profiles for quick tool change-over**



A Press load monitor protects the press by alarming the operator if press load exceeds programmed limit. Load monitoring technology has much more to offer. By monitoring load or tonnage, over the working stroke of the press, not only can you protect the press, you can also protect dies, monitor part quality and detect the variation in press performance due to one of the several variables. This technology, though very promising, was out of reach for most stamping plants due to high cost. With the M1030, AVG-Autotech makes this promising technology affordable.

Principle of Operation

The M1030 works in conjunction with a resolver (coupled to the drive train, providing press position), and up to 8 tonnage sensors (mounted on press load bearing members, for example press columns). As the press ram (slide) moves from top dead center (TDC), all sensors are automatically zeroed to account for any drift. Then from 60 to 240 degrees of the press stroke, tonnage values are read. This data is referred in the M1030 PLM as the "current" profile. From 240 Degrees to 360 degrees this "current" profile is compared against a "Reference" profile to check if the "Current" profile is within preprogrammed limits and the appropriate outputs are activated by the time the press reaches top dead center as necessary.

Reference Profiles

Up to 8 reference profiles can be stored inside the PLM at one time. This allows for quick job changeover. The PLM learns reference profiles automatically by acquiring tonnage data during the stamping of a few good parts. Reference Profiles, once learned, can be saved on a PC and later down loaded when required.

Load Sensors - 4 to 20mA

AVG-Autotech uses industry standard strain-gauge sensors to read tonnage, but the similarities end right here. AVG-Autotech's sensors have a built in amplifier to give 4 - 20mA output, available on a terminal block. Unlike other sensors that have an internal cable coming out of the sensor that has to be pre-specified in length (as it can not be "spliced"). AVG-Autotech sensors can be connected to the PLM via standard shielded cables.

Press Protection

The M1030 allows you to program a peak ton limit on tonnage. The tonnage readings from the sensors are constantly compared against the programmed peak ton limit, and if ever the readings exceed the limit, an output called peak ton, is immediately de-energized.

Die Protection

The PLM allows you to program a band around reference profile, called Die-safe band. If current profile goes out of this band at any point in the press stroke, the Die-safe output is de-energized indicating a possible problem for the die (for example a change in shut height, or in material thickness).

Quality of Parts

In addition to Press & Die Protection, the PLM allows you to monitor quality of stamped parts. Each stamped part has a certain tonnage profile or signature (learned by PLM as reference profile). Variation in profile signals change in part quality. PLM allows you to define a Quality band around the reference profile. If the current profile lies outside of the quality band, the quality-alarm output is energized. Typically, the user will define a tighter quality band compared to the Die-Safe band.

Parts Counter

The PLM maintains a total hit counter, and a counter for quality parts as a percent of total parts. A part is considered as good if it's profile was within the quality band.

Specifications:

Power Requirements:

120VAC+/- 10%, 50-60 Hz., 30VA

Operating Temperature:

-10°F to 130°F
(-23°C to 55°C)

Tonnage Sensors:

Autotech's SAC-M1030-SEN sensors providing
4 - 20 mA current output for Tonnage.

Number of Sensors: 4

Strain Gage Element:

1 mV/V @ 400 micro-inch/inch

Sensor Mounting:

Weld pad

Tonnage Profiles:

Profile Window: 60 - 240 degrees
No. of stored Profiles: 8

RESOLVER INTERFACE

Position Transducer:

Autotech's resolver RL100 or E7R, with
CBL-10T22-xxxx cable, 2500 ft. max.

OUTPUTS

The PLM provides 3 relay outputs as follow:

Press Safe

Output de-energizes if measured peak tons exceeds
programmed peak tons.

Die Safe

Output de-energizes if measured tonnage profile
is outside programmed die safe band

Quality Alarm

The output energizes if the measured tonnage profile
is outside programmed quality band.

INPUTS

Program Enable

This input must be true to change any value in M1030

Supv. 1 & 2

Two supervisory inputs, allows two levels of security

Fault Reset

When TRUE, resets the fault output

Mounting:

Height: 5.50"
Width: 7.25"
Depth: 5.75"

"Ready-to-install" system package part numbers

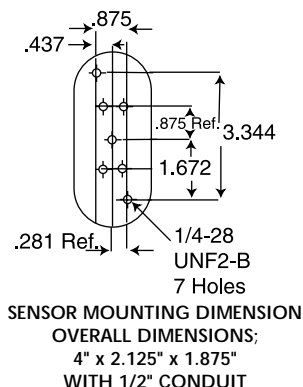
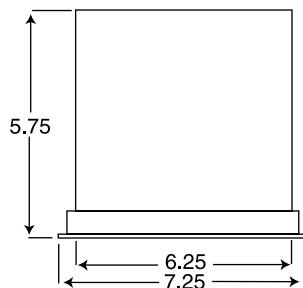
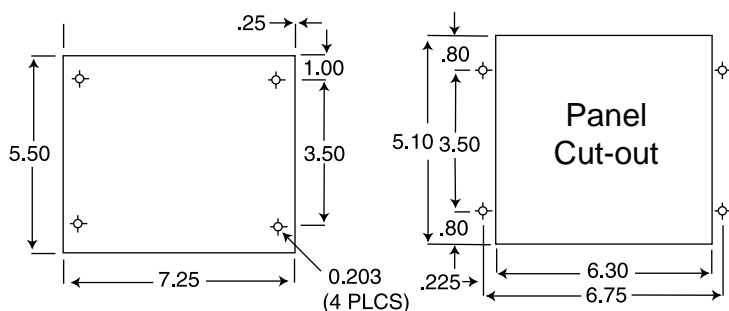
SYS-P1030-O2S:

- M1030 Signature Analysis unit with, 2-sensors
- 2 Tonnage sensors (Strain gauge with built-in amplifier) and mounting kits (torque pads and mounting screws), and 75 feet cable for sensor wiring
- E7R Resolver with MS Connector, Mounting bracket, 30 Feet of cable with MS connector, Coupling
- PC software, RS232 to RS485 Adapter, Cable for wiring M1030 & PC to the adapter

SYS-P1030-O4S:

- M1030 Signature Analysis unit with, 4-sensors
- 4 Tonnage sensors (Strain gauge with built-in amplifier) and mounting kits (torque pads and mounting screws), and 150 feet cable for sensor wiring
- E7R Resolver with MS Connector, Mounting bracket, 30 Feet of cable with MS connector, Coupling
- PC software, RS232 to RS485 Adapter, Cable for wiring M1030 & PC to the adapter

Outline Dimensions:



M1030E-P10 MINI•PLM™

The cost effective Load Monitor to Protect Press & Dies from Over & Under Tonnage, and to monitor process trend.

- ▶ **Up to 4 Sensors in one small panel mount 7.25" x 5.5" x 5.9" package**
- ▶ **Tonnage Sensors with 4-20 mA output to simplify wiring**
- ▶ **Built-in Sensor integrity check detects broken sensor wires as well as unusual sensor drift**
- ▶ **Programmable Over & Under Limits for Press Protection, Die Protection & Process Trend**
- ▶ **Learn Mode to automatically compute reference tonnage for Die Protect Band**
- ▶ **Field Replaceable Electro-mechanical relays for alarm outputs**
- ▶ **Multiple setup storage allows quick limit changeover**



Programmable Load Monitor, MINI-PLM M1030-E from AVG-Autotech, is one of the best investments in tools for a press. It offers an economical entry into the Press Load Monitoring.

Principle of Operation

The low cost MINI-PLM M1030-E measures load or tonnage on a press by using strain gages mounted on load bearing members, such as press columns. The M1030-E compares the measured load against user programmed limits for press protection, Die Protection and for Process Trend. If the measured load is outside the programmed limits the MINI-PLM de-energizes the appropriate control relay, which can be used to stop the press, warn the operator and/or signal a supervisory control.

Counters

The MINI-PLM M1030-E has two counters for counting total number of hits as well as the number of good parts made. A part is considered good if it did not cause any alarm or fault during stamping.

Load Sensors - 4 to 20mA

AVG-Autotech uses industry standard strain-gauge sensors to read tonnage, but the similarities end right here. AVG-Autotech's sensors have a built in amplifier to give 4 - 20mA output, available on a terminal block. Unlike other sensors that have an internal cable coming out of the sensor and has to be pre-specified in length as it cannot be "spliced," AVG-Autotech sensors can be connected to the PLM via standard shielded cables.

"Ready-to-install" system package part numbers

SYS-P1030-O2P:

- M1030E Programmable, 2 channel Peak Load Tonnage Monitor.
- Two Load Sensors including Strain gauges sensors, amplifier assemblies and mounting hardware (weld pads and installation kit), and 30 ft. of cable for the sensor wiring.

SYS-P1030-O4P:

- Above with 4 Load sensors and 150 ft. of cable.

Specifications:

Power Requirements:

120VAC +/- 10%, 50-60 Hz., 30VA

Operating Temperature:

-10°F to 130°F
(-23°C to 55°C)

Tonnage Sensor:

Autotech's SAC-M1030-SEN strain gage sensor providing 4-20 mA signal for tonnage. (Existing strain gages may be used with AVG-Autotech's SAC-M1030-SENA amplifier)

Number of Sensors: 4

Strain Gage Element:

1 mV/V @ 400 micro-inch/inch

Sensor Mounting:

Weld pad

Number of Counters: 2, Total # of Hits, % of Good parts

CONTROL INPUTS:

Electrical Characteristics:

TRUE: Contact closure to VO 11 - 28 VDC input
FALSE: Open or < 0.8 VDC input

Program Enable:

Input must be TRUE to change any value

Supervisory 1 and 2:

Must be TRUE for access control

Fault Reset:

Must be TRUE to reset faults.

Press Cycle Input:

Transition from FALSE to TRUE
(input should occur +/- 10 degrees of TDC.

PROGRAMMABLE LIMITS:

6 Limits for each installed sensor. The Limit comparisons can be selectively disabled, except for positive tonnage press limit.

Positive Tonnage Press Limit:

Programmed in tons for press overload protection, cannot be disabled.

Negative Tonnage Press Limit:

For "Snap Through" or "Reverse Tonnage" protection, can be disabled.

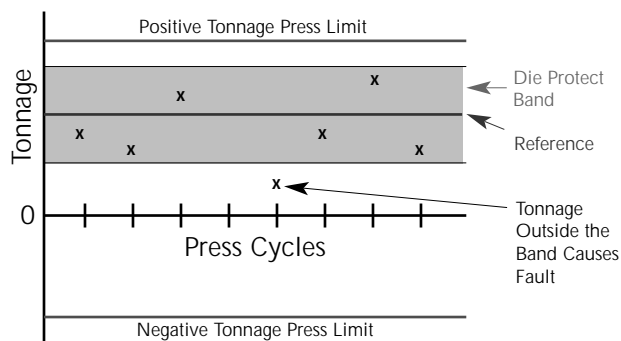
Die Protection Band:

Defined by die protect high and low limits. Both limits programmed as deviation from reference tons, either in tons or percent of reference ton value. Can be disabled.

Number of Reference Storage: 10

Process Trend Band:

Defined by process High and Low limits. Both limits programmed as deviation from process base tons, either in tons or in percent of the base tons. The comparison can be disabled. Process base tonnage is the running average of tonnage measured over the last several cycles. The number of cycles for averaging is programmable.

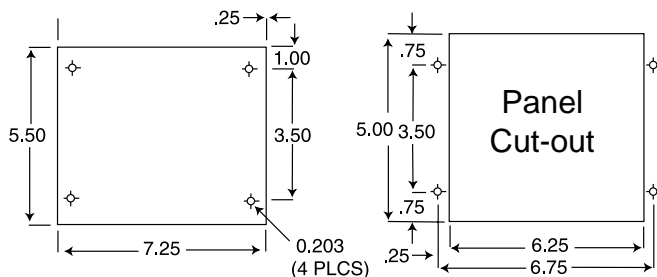


OUTPUTS:

4- 120VAC @ 10 Amp resistive SPST.

Output	Output Relay De-energizes if...
Positive Tonnage Press Limit	Measured Tonnage Exceeds Positive Tonnage Press Limit
Negative Tonnage Press Limit	Measured Tonnage Exceeds Negative Tonnage Press Limit
Over Die/Process Limit	Measured Tonnage is Greater than Die and/or Process High Limit
Under Die/Process Limit	Measured Tonnage is Less than Die and/or Process Low Limit

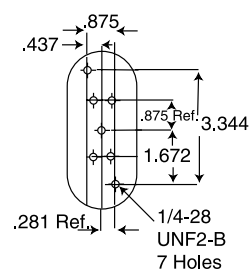
Outline Dimensions:



M1030-E FRONT VIEW

PANEL CUTOUT FOR M1030-E

M1030-E TOP VIEW



SENSOR MOUNTING DIMENSION OVERALL DIMENSIONS; 4" x 2.125" x 1.875" WITH 1/2" CONDUIT

M1151-M10A & M1150-M10

Programmable, Shut Height Indicators with limits

- ▶ **Precise Shut Height Indication with Bright LED read-out**
 - ▶ **Easy to calibrate - no calculations required**
 - ▶ **Digital Position output in BCD format**
- M1151-M10A:
- ▶ **Fully Absolute Position - No loss of position with power loss**
 - ▶ **Multi-turn dual resolver as position transducer**
 - ▶ **3 Programmable Limit Switch channels**
 - ▶ **Programmable Upper & Lower Travel limits**
 - ▶ **Broken resolver cable detection & Self Diagnostics**

M1150-M10:

- ▶ **Cost effective semi-absolute Shut Height Indicator**
- ▶ **Uses single turn resolver**
- ▶ **Two Limit output**



Digital Shut Height Monitor from AVG-Autotech is an invaluable tool on a press. The monitor's bright LED read-out continuously indicates the press shut height, giving you confidence that the shut height has not drifted. In addition, the monitor makes die changeover quick and easy by eliminating cumbersome and time consuming shut height measurement using blocks and calipers.

Principle of Operation

The **M1151-M10A** is a multi-turn programmable decoder. It takes position input signals from a multi-turn resolver like Autotech's RL210 which is mounted on the adjusting screw of the ram. The M1151-M10A decodes the resolver signals using a highly noise resistant ratiometric decoding technique, scales the digital data based on its calibration, and displays it on the front panel. The displayed data is also available to PLC/remote display through a digital position port.

M1150-M10

M1150-M10, on the other hand, is a semi-absolute position decoder. It uses a single turn resolver, such as the RL100. The single turn resolver makes several turns over the permissible Shut Height adjustment. The M1150-M10 maintains the resolver turns internally, decodes resolver position within a turn, and scales them to display accurate shut height. Since turns count is maintained on non-volatile memory, it is not lost during power loss. Also, if resolver movement is within half a turn, the M1150-M10 will maintain accurate shut height when power is restored.

Precise Shut Height Indication

The M1151-M10A will decode the shaft angle to the 1/4096th of a revolution.

Easy Calibration

The M1151-M10A scales decoded position into user friendly engineering units. The calibration of unit is extremely simple and does not require any computations. All users have to do is to move ram to two distinct

positions and enter the Shut Height corresponding to those positions. The unit computes scaling parameters automatically.

Absolute Position

The M1151-M10A with a dual resolver, provides an ideal solution for shut height indication. Because of the absolute nature of the resolver the position is retained even during power loss.

Upper and Lower Travel Limits

Fully isolated, programmable, upper and lower ram position travel limit outputs are standard on M1151-M10A.

Programmable Limit Switch Channels

The M1151-M10A offers 3 PLS channels. These channels may be used for drift monitoring, or as "Die-in-position" outputs.

Digital Position Output

The M1151-M10A provides digital position information in BCD format for possible use in a PLC. The unit supports data transfer input, allowing PLC to freeze position output to read stable data.

Self-Diagnostics & Broken Resolver Cable

The M1151-M10A constantly monitors internal circuitry and resolver. In case a fault occurs or resolver cable is broken, the unit goes into a Fault mode and Fault output changes state from on to off.

Specifications:

Power Requirements:

AC 120VAC+/- 10%, 50-60 Hz., 10VA
240VAC+/- 10%, 50-60 Hz., 10VA
(Optional)

DC 11-28 VDC, 100mA per channel exclusive of load
for customer driven outputs.

Operating Temperature

-10°F to 130°F (-23°C to 55°C)

Position Transducer

(M1151-M10A) Autotech Dual resolver RL210
(with 8, 16, 32, 64, or 128:1 gear ratio),
(M1150-M10) Single turn resolver such as RL100

Signal Resolution

4096 counts/turn

Scale Factor

Automatic

Resolver Cable Max Length

2,500 ft.

OUTPUTS:

Position Output Format

BCD

PLS Output

(M1151-M10A) 3 channels, 1 setpoint pair per channel
PNP or NPN only
(M1150-M10) 2 channels

Upper and Lower Travel Limits (M1151-M10A)

True within travel range
False when above or below travel range

INPUTS

Program Enable

This input must be true to change any value in M1150

Supv. 1 & 2

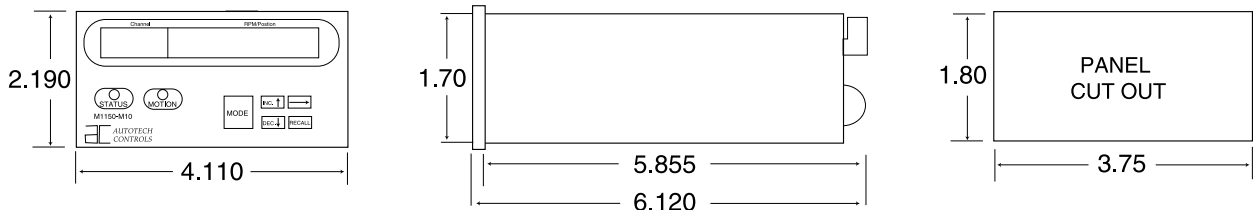
Two supervisory inputs, allows two levels of security

Fault Reset

When true, resets the fault output

Outline Dimensions:

This unit does not require mounting holes. It has two keyholes, one on each side, for sliding, (factory supplied) right angle mounting bracket.



"Ready-to-install" system package part numbers

SYS-P1150-M10:

- M1150-M10 Shut Height Indicator with two programmable limit outputs, semi-absolute
- 50 feet, 37-conductor cable for digital output wiring with overall foil shield and 37 pin D-Sub connector on one end
- RL100 single turn resolver with MS connector, 30 feet of resolver cable with connector
- Input power 120VAC

SYS-P1151-M10A:

- M1151-M10A Shut Height Indicator with two programmable limit outputs, fully absolute
- 50 feet, 37-conductor cable for digital output wiring with overall foil shield and 37 pin D-Sub connector on one end
- RL210 Dual resolver (128:1 gear ratio) with MS connector, 30 feet of resolver cable with connector
- Input power 120VAC
- Type "N" outputs

M1450-P10

Linear Rod Based Shut Height Indicator

- ▶ **Shut Height Indicator 12" to 108" span**
- ▶ **0.001" Resolution**
- ▶ **6 digit Bright Red LED display**
- ▶ **Modular unit with slots for 5 option modules**
- ▶ **Optional CAM & Position output modules**



Principle of Operation

The MINI-PLS consists of two parts, one being a linear transducer mounted on the machine and the other, a programmable unit mounted in the machine control panel. The position signal is scaled and displayed on the front panel.

Linear Ultrasonic Transducer

The MINI-PLS decodes the position of a linear shaft with .001" resolution and up to 108" of travel. This unit utilizes an ultrasonic transducer to monitor the linear position of a machine by the movement of a 1.3" diameter magnet ring over a 3/8" diameter stainless steel rod.

Easy Calibration

The M1450 requires calibration at the time of installation. The calibration process tells the M1450 the characteristics of the linear rod being used. Calibration is extremely easy. All that is required is entering a number printed on the label of linear rod.

Auto Zero Offset

The M1450 allows you to program an offset number to align machine zero to a point on linear rod. The offset can be entered through keypad, or can be completed automatically by M1450.

Programmable Limit Switch

The M1450 is a modular unit with 5 slots for option modules. A CAM option module provides 8 PLS outputs. User can program ON & OFF setpoints for 8 channels in the CAM module. Up to 5 modules can be used to give a total of 40 outputs.

"Ready-to-install" system package part numbers

SYS-LT140-012:

- M1450-LTO
- Linear Rod Based indicator
- Interface Box for decoder with cable for connecting interface box to M1450
- 12 inch length linear rod

SYS-LT140-024

- Above with 24 inch length

SYS-LT140-036

- Above with 36 inch length

SYS-LT140-048

- Above with 48 inch length

SYS-LT140-060

- Above with 60 inch length

SYS-LT140-072

- Above with 72 inch length

SYS-LT140-084

- Above with 84 inch length

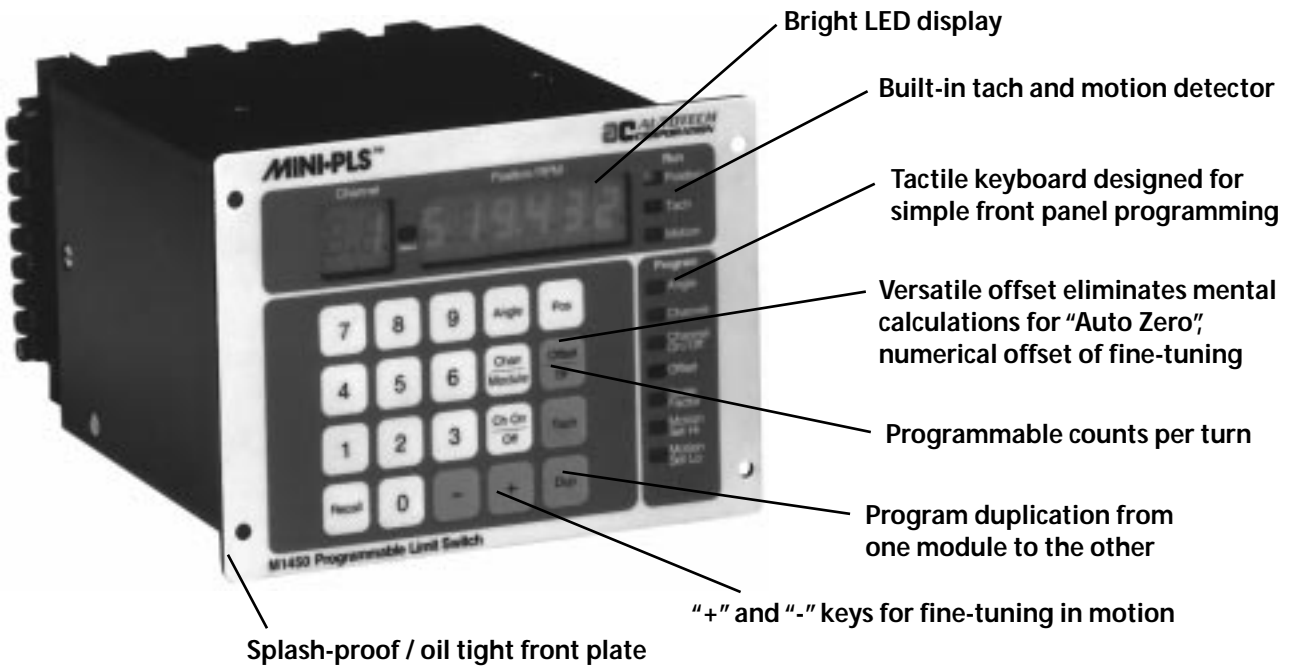
SYS-LT140-096

- Above with 96 inch length

SYS-LT140-108

- Above with 108 inch length

M1450-P10 Shut Height Indicator



Specifications:

Input Power:

105 - 135 VAC 50/60/ Hz 35W
exclusive of load(Optional 220 VAC)

Operating Temperature:

-10°F to 130°F (-23°C to 55°C)

System Resolution:

0.001"

Position Transducer:

Autotech's series LT140

Scale Factor:

Programmable, 10 to 1000
12" to 108" Range

Offset:

Programmable from, 0 to full scale

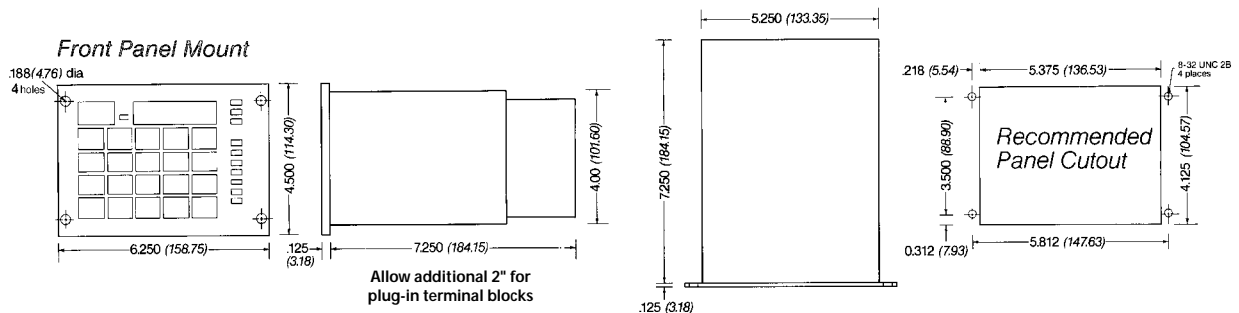
Maximum Cable Length:

3000 Feet, Shielded

Option modules:

- CAM Module:
 - 8 CAM outputs per module
- BCD Module:
 - For position output in BCD format

Outline Dimensions:



M2020 / M2022, Die•Set™

Automatic Shut Height adjustment for Quick Machine Setup

- ▶ **Accurately sets Shut Height with a push of a button**
- ▶ **Storage for up to 255 jobs**
- ▶ **Resolver and Linear rod based systems available**
- ▶ **Extremely easy to calibrate (no calculations required)**
- ▶ **Output alarms for upper/lower limits, ram drift and ram interference**
- ▶ **System, Broken Chain (No motion) and Broken Wire diagnosis**
- ▶ **Programmable Upper & Lower Travel limits to keep ram movement within OEM travel limits**



Principle of Operation

Autotech is proud to introduce the DieSet, series M2020. The DieSet is a fully automatic state-of-the-art Shut Height controller that makes the task of die change-over quicker and easier. Set-up parameters for up to 255 dies can be programmed in the M2020. At die changeover, simply select the die number, press the start button and the DieSet will automatically position the die to the preprogrammed shut height. Typically, the 2020 pays for itself within the first few months of operation. M2020 supports single action press, while M2022 model is used for dual action presses.

The M2020 reads die position from a position transducer (a Resolver or Linear Rod) and automatically activates the proper outputs to adjust the shut height to the proper preprogrammed position. Additional outputs are activated if travel limits or other certain faults occur.

Digital Shut Height Indication and Control

The DieSet features a 6-digit readout and displays the Shut-Height to 0.001" accuracy. The bright digital readout is extremely helpful in trouble shooting and fine tuning the press operation to produce high quality metal stampings. You know with complete certainty that the shut height has been adjusted to the highest accuracy.

Automatic Drift Monitoring

Sometimes the Shut Height drifts once the production has begun. M2020 DieSet constantly monitors the actual Shut Height to the programmed Shut Height on every stroke of the press. In case the Shut Height has drifted beyond a programmed tolerance in either direction, a fault signal is produced to generate an alarm.

Die I. D. Box for Automatic Die Selection

Die I.D. box helps eliminate possible human error of selecting a wrong die during die change. The consequences of adjusting a die to wrong Shut Height can be catastrophic. With the Die I.D. box, the die identifies itself to the M2020, and M2020 automatically selects the right setup information. A die I.D. box, an 8 bit wired (code) plug, is required for each die.

Travel Limits

Electronic Back-up to OEM Travel Limits.

Single or Dual Action

The M2020 is used for single action Shut Height adjustment, but most lead presses require a dual die set. For double action presses, the M2022 with two resolver inputs incorporates all the features of the M2020 in addition to controlling the Shut Height adjustment for both the inner and outer dies. In addition, the M2022 has a programmable interference limit to maintain a minimum distance between the inner and the outer die Shut Heights.

Security

M2020 DieSet has two levels of security, that is two separate connections have to be made to allow changing the shut heights that have already been programmed, thus preventing unauthorized tampering that could cause serious damage to the dies and/or cause poor quality parts being produced by the press.

Specifications:

Power Requirements:

120VAC +/- 10%, 50-60 Hz., 40VA Exclusive of load

Operating Temperature:

-10°F to 130°F
(-23°C to 55°C)

Position Sensor:

Dual Resolver RL210 (128:1 gear) or
Linear Rod based models

INPUT/OUTPUT

Program Enable

Contact closure to customer power supply common (Vs-), or a solid state sinking output with less than 0.8 V drop at 10mA.

Supervisor Enable

contact closure to customer power supply (Vs+), or 10 to 28VDC logic input, sourcing output

Outputs

All outputs NPN sinking, 30VDC max @ 100mA.
Autotech offers a compatible relay output chassis that can be used for power outputs.

UP: Energized to move the die upward
DOWN: Energized to move the die downward

USL: Energized when upper travel limit is exceeded

LSL: Energized when lower travel limit is exceeded

DRIFT: Energized when die position is too far from programmed position.

BW: Energized when resolver is not functioning nor has a broken wire

UP: Energized to move the die upward

FAULT: The fault relay coil is energized when the M1200 is operating properly.

Power OK

Resolver OK

Processor OK

It is DE-ENERGIZED when a FAULT condition exists.

Remote Inputs:

Die Number:

8 bit BCD (die number 001 to 255)

Contact closure to customer power supply Vs+; or

10 to 28 V logic input, (sourcing output)

Logic False: 4 VDC @ 1mA and

Logic True: 10VDC @ 10mA to 28VDC @30mA

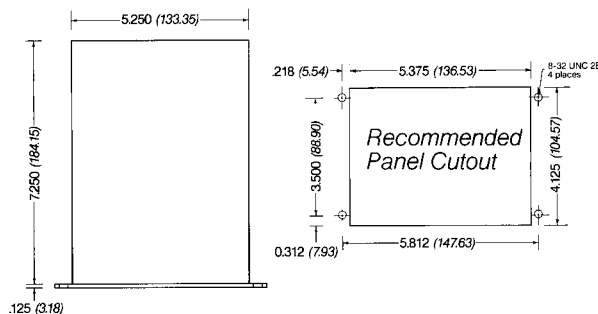
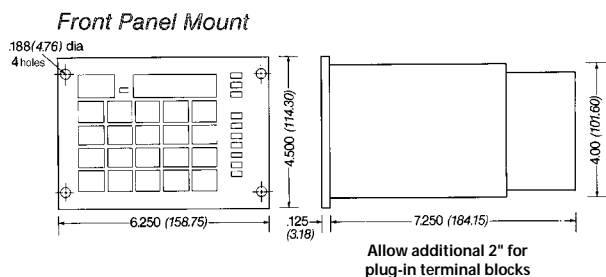
Remote and start inputs:

Contact closure to customer power supply common (VS-); or solid state sinking output less than 0.8V drop at 10mA

Outline Dimensions:

Mounting:

Height: 4.5"
Width: 6.875"
Depth: 8.0"



"Ready-to-install" system package part numbers

SYS-P2020-S128:

- M2020 Complete Die Set for automatic shut height positioning of single action presses
- Dual, 128:1, RL210 resolver with 30 Feet of resolver cable

SYS-P2020-SCA:

- Above with Counter Balance Control

SYS-P2022-S128:

- Die Set for Double Action press (will include Two RL210 resolvers)

SYS-P2022-SCA:

- Above with Counter Balance Control

M1950-P10

A New Level of Integration, Compactness and Modularity

- ▶ **Modular, 6" x 4" x 10" compact control with 5 Slots for plug-in modules**
- ▶ **Modules for most press control functions:**
- ▶ **Includes Brake Monitor & Motion Detector**
- ▶ **PLS, Up to 80 channels (16 per module)**
- ▶ **Die Protection, Up to 40 sensor inputs (8 per module)**
- ▶ **Load Monitoring, (Signature or Peak)**
- ▶ **Shut Height Controller and Indicator**
- ▶ **2x20 char LCD for simple English prompts**
- ▶ **4 digit bright LED position, SPM, etc.**
- ▶ **Hot Keys for quick access**
- ▶ **Storage for up to 100 setups**
- ▶ **Self Diagnostics and broken resolver cable detection**



Many presses use separate controls for automation, die protection, load monitoring, and shut height control requiring a large control panel. With M1950, AVG introduces a modular compact control to replace a multitude of controls by a single control box, saving valuable panel space, and offering consistent user interface.

Principle of Operation

The M1950 is designed for modularity and flexibility. The unit has 5 slots for plug-in modules, allowing any module to go in any slot. The modules can be used in any combination, up to a total of 5 modules.

The microprocessor in the base unit takes care of the functions common to all modules. The intelligent modules have their own processors to perform their control functions, which allows multiprocessor architecture achieve fast response time from the control modules.

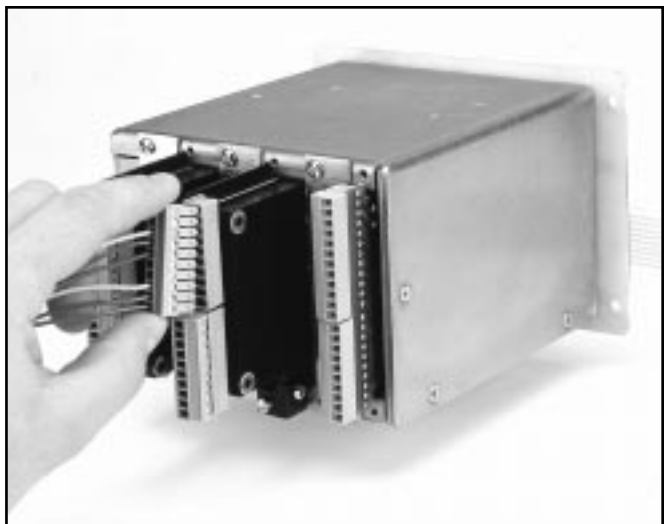
The base unit has a short circuit proof resolver input circuit which decodes resolver (coupled on drive train) signals and broadcasts press angle to all the slots. This allows the PLS, Die Protection, and Tonnage modules to share the same resolver.

User-friendly Interface

The front mount unit has a 2 line x 20 char LCD display for menu driven programming and for providing maximum information on one screen. A 4 digit of LEDs display is provided for displaying press slide position, SPM, and other commonly used parameters. The keypad provides hot keys to quickly access different modules. The keypad provides a full numeric keypad for direct entry of numerical information as well as 5 Simple Programming Keys common to several other autotech products.

5 Slots for Modularity & Flexibility

The M1950 has 5 slots for plug-in modules. AVG-Autotech offers several modules for press control & monitoring functions. Since all slots on M1950 are identical, any of the modules can be used in any slot and the modules can be used in any combination.



▲ The M1950 rear view

M1950-P10 Plug-in Modules...

Variety of Modules

AVG-Autotech currently offers several modules for press control functions:

- **PLS Module for press automation - 16 channels**
- **DIE PROTECTION Module - 8 inputs**
- **SHUT HEIGHT CONTROL Module - Resolver based**
- **SHUT HEIGHT CONTROL Module - Linear Rod based**
- **LOAD MONITOR Module - Signature or Tonnage at angle Module- 4 sensor inputs**
- **LOAD MONITOR Module - Peak Tonnage-4 sensor inputs**
- **COMMUNICATION Module - Tonnage Display**

Each of these modules offers advanced features. These features are described below:

PLS Module

Programmable Limit Switch (PLS) provides timing signals for press automation functions such as Lube, Part Eject, Feed Advance, etc. The M1950 PLS module offers 16 channels with advanced features, which are plenty for most press applications. For applications requiring more outputs, more than one module may be used. The module has the following features:

- **16 logic level optically isolated outputs**
- **Storage for up to 100 setups for quick job changeover**
- **Multiple dwells for each channel**
- **Each channel can be used as Angle ON - Angle OFF, or as Angle ON - Time OFF. An Angle On - Time Off channel turns ON outputs at an angle for preset time.**
- **Fine tune in motion allows you to modify dwells without shutting down press**
- **Outputs "N" type Sinking or "P" type Sourcing**
- **Scale Factor: Programmable from 16 to 999 (Resolution 17 to 1000 counts; typ. press application - 360 counts)**

Die Protection Module

The die protection module helps protect expensive dies by ensuring proper material progression throughout the press stroke. Appropriately located sensors (proximity, photo eye, etc.) monitor material progression. The module checks sensors constantly for programmed events during programmed dwells. The M1950 die protection module can monitor up to 8 sensor inputs. The module has the following features:

- **8 optically isolated sensor inputs**
- **Programmable sensor events, such as Sensor Low, High, Rising edge, falling edge, pulse**
- **Programmable multiple dwells for monitoring sensors**
- **Programmable sensor names allow you to refer sensor by their functions, such as Feed, Eject, etc.**
- **Each sensor fault can be independently associated with either E-Stop output or with T-Stop output**
- **2 Counters for Batch and Part Quality**

...M1950-P10 Plug-in Modules

Shut Height Indication/ Control Modules

The Shut Height indication/Control modules use either a dual-resolver or a linear rod as a Shut Height position sensor. The indication module decodes position, scales it and displays in engineering units. The control module, in addition to indication functions, also adjusts the Shut Height automatically. Shut Height modules from AVG-Autotech are very easy to calibrate and use. The calibration is as simple as moving the ram (or slide) to two different positions, and entering the corresponding Shut Heights in the unit.

The Shut Height modules from AVG-Autotech have the following features:

- **Dual resolver or Linear rod based (factory ordered option)**
- **Extremely easy to calibrate**
- **Precise Shut Height indication**
- **Automatic Shut Height adjustment ability (control modules)**
- **Drift monitoring feature ensures that shut height is within user programmable drift setting**
- **Programmable Upper & Lower Travel limits to keep ram movement within travel limits**

Load Monitor Modules - Peak & Signature

The press industry is recognizing the benefits of load monitoring. The peak monitor module protects the press from over & under tonnage, while the signature module acquires the tonnage & compares it to be within programmed limits from a reference signature curve. The reference signatures are learned by the module while few good parts are stamped. Signature module, in addition to protecting press from over tonnage, protects dies and ensures quality of stamped parts.

The M1950 tonnage modules, unlike other load monitors, use tonnage sensors with built-in current amplifiers to give a 4-20 mA output instead of the usual micro volt level output. With current loop output, the wiring of the sensors to the monitor are more robust, and resistant to press floor electrical noise.

The modules have the following features:

- **Up to 4 load sensor inputs**
- **Sensors with 4-20 mA output**
- **Peak module protects press from over/under tonnage**
- **Signature module protects press, dies & detects bad quality parts**
- **Total & Good parts counter**

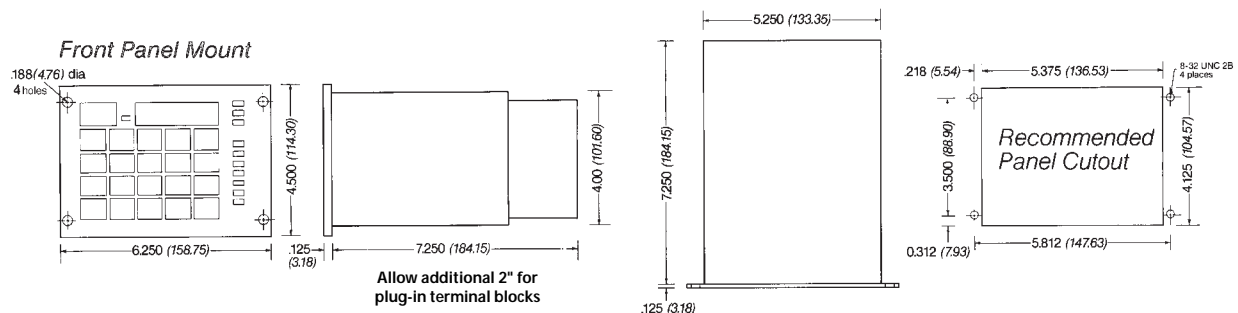
Signature module uses a communication module to display signature on a PC.

Outline Dimensions:

Mounting:

Height: 5 1/2"
Width: 6 1/4"
Depth: 5 1/4"*

* Depth may vary depending on plug-in module; consult factory for specifications



Specifications:

GENERAL:

Power Requirements:

120VAC+/- 10%, 50-60 Hz., 24VA
240VAC+/- 10%, 50-60 Hz., 24VA
(Optional)

Operating Temperature:

-10°F to 130°F (-23°C to 55°C)

Position Transducer

Single turn resolver such as RL100; with CBL-10T22-Mxxx cable, 2,500 ft. max.

Supervisory, Brake Input and Brake Reset Inputs:

Optically isolated

TRUE: Contact closure to VS- (common)

FALSE: Open circuit

Motion Detector & Brake Monitor

Motion Detector Limits:

2, Low & High. programmable; Motion detector output energizes when the resolver RPM is between low and high limits.

Brake Monitor:

Normally energized, de-energizes when press stopping time (0-9.99 sec) exceeds programmed danger limit - 2nd caution output energized when stopping time exceeds caution limit.

Brake Input:

Brake timing starts when the input becomes TRUE.

of PLS Programs/Set-ups:

up to 100, keypad selectable

Scale factor: Programmable 16-999

Offset:

Programmable from 0-Scale Factor, common to all programs

PLS Module

Scan Time:

100-280 microseconds

No of PLS outputs:

16 per module, optically isolated, "P" or "N" factory ordered

Die Protection Module

Number of inputs:

8, optically isolated; all inputs "P" type or "N" type, factory ordered

Event Detection:

Programmable rising edge, falling edge or pulse detection within programmed window.

Fault Outputs:

All outputs either "P" or "N" type (see GENERAL section), factory ordered Faults because of the non-occurrence of event can be assigned to activate one of the two outputs:

Top Stop: Stops press at top

E-Stop:

To stop press immediately

2 Pre-set Counters:

Outputs energize at 0 count

Shut Height Module

Position Transducer:

RL210, 128:1 geared Dual Resolver

Outputs:

Outputs to motorized slide adjust to move in Up and Down directions.

Peak Load Monitor Module

Load Sensor:

AVG-Autotech's Load Sensor with built-in electronics to provide 4-20mA current signal

Number of Sensors:

4 per module

Outputs:

4 to detect Positive & Negative tonnage press limits, Over & Under Die Limits

Tonnage at Angle

Load Sensor:

AVG-Autotech's Load Sensor with built-in electronics to provide 4-20mA current signal

Number of Sensors: 4 per module

Outputs: All outputs "P" or "N" type, factory ordered

Press Safe:

Normally energized; de-energized when peak tons exceed programmed max. limit

Die Safe:

Normally energized, de-energized when acquired tonnage profile lies outside the programmed band around stored reference profile

QC Alarm:

Energized when number of bad parts exceed programmed limit (a part is considered bad if acquired tonnage profile is outside programmed QC band)

Communication Module

Serial Communication: (Required for tonnage signature on PC)

RS485 multi-drop

Remote Power Relay Outputs

All modules with NPN sinking output can use remote power relay chassis to provide higher power outputs. The relay supported are electromechanical (10A@120VAC), AC solid-state (3A@24-280VAC) and DC solid-state (3A@9-60VDC or 1A@0-200VDC).

"Ready-to-install" system package part numbers

SYS-P1950-P10:

- M1950 with RL100 resolver with 30 ft. of resolver cable
- 16 output PLS module
- 8 input Die Protect module
- 4 input Peak Load Monitor unit with 4 Load sensors & sensor mounting kits
- Shut Height control with RL210 resolver & 30 ft. of resolver cable

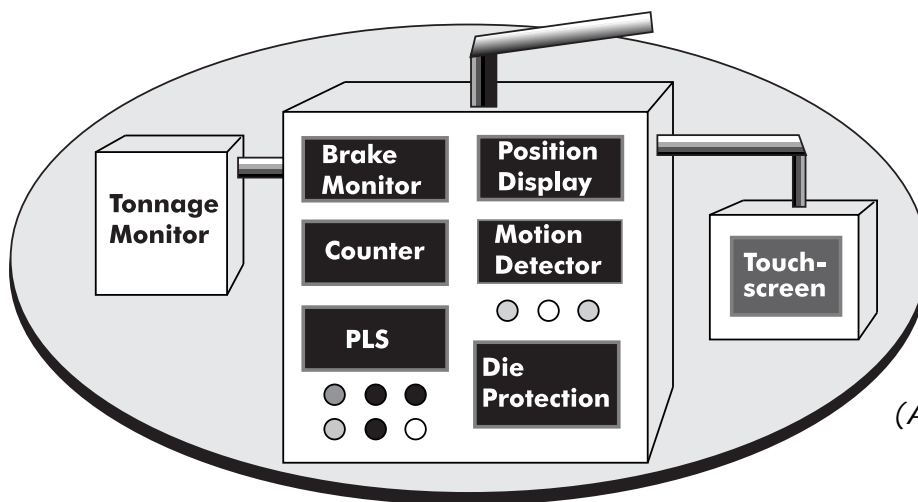
AutoPress ACMS™ Family of Products

The Ultimate in Press Automation Controls and Monitoring Systems

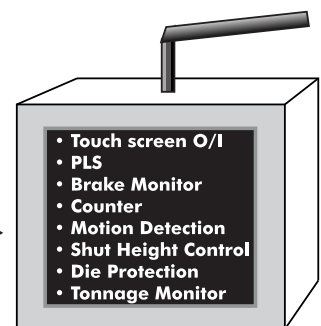
- ▶ **Easy to operate, setup & monitor the press due to Touch-screen Graphical user interface**
- ▶ **Help screens make press calibration & maintenance easy**
- ▶ **Advanced Press Automation Control & Monitoring Functions in one compact package:**
 - Programmable Limit Switch (PLS)
 - Die Protection
 - Shut Height Control
 - Press-Load monitoring
 - Brake Monitor
 - Motion Detector
 - Production Counters
- ▶ **Customizable operator interface in many languages (eg. English & Spanish)**
- ▶ **Variety of display sizes - 5" Color, 6" Mono, & 10" Color**
- ▶ **Self diagnostics with Broken-Resolver cable detection**
- ▶ **PC Based software, PressNet, for setup & monitoring the Power ACMS on network**
- ▶ **Networkable to A-B DH+, Modbus+, Profibus etc.**
- ▶ **Operator interface for clutch Brake Controls (stand alone, such as ISB, or PLC Based), and for Transfer Automation PLCs (such as SLC 500, Modicon 984, Mitsubishi, Omron, GE 9030 & many more)**

AutoPress ACMS™ replaces multiple controls (including Touch screen O/I) on a press with one compact control

Typical Press Panel



Panel with AutoPress ACMS



(All in one compact box)

...AutoPress ACMS™ Family of Products

Description

Single Control Box

AutoPress ACMS family of products represent a quantum leap in Press Automation control & monitoring equipment. The AutoPress ACMS, in fact, is a full-featured touch screen operator interface (that can talk to most clutch Brake Controls & PLC's) with integrated press automation & monitoring functions, such as Programmable Limit Switch (PLS), Die Protection, Shut Height Control, and press load monitor. This allows you to replace multiple controls & operator panels with a single control panel. Operator can view and adjust (if permitted) parameters within AutoPress ACMS (and connected PLC) by simply touching appropriate cells on the AutoPress ACMS screen.

Customizable Screens

AutoPress ACMS comes with pre-designed screens to get you started. However, the programmable OI allows you to customize the display that best meets your needs. You can combine information from several different functional units on one screen. For example, you may put information from Load monitor shut height, and PLC's (if any) on the same screen. User designs these screens using a user-friendly, Windows based software called uWin.

PressNet Software

Press function modules can be programmed from the AutoPress ACMS screens, or from PC based software. The PC based software, PressNet, allows you to remotely setup and monitor press-related functions in the AutoPress ACMS. With PressNet, you can create and save virtually unlimited setups on the PC hard disk, and download a setup to AutoPress ACMS with few mouse clicks, allowing you to change jobs very quickly. One PC can be used with several AutoPress ACMSs.

Display Options

AutoPress ACMS offers a variety of display options, with varying capabilities, to serve different application needs. The AutoPress ACMS is available in following display sizes:

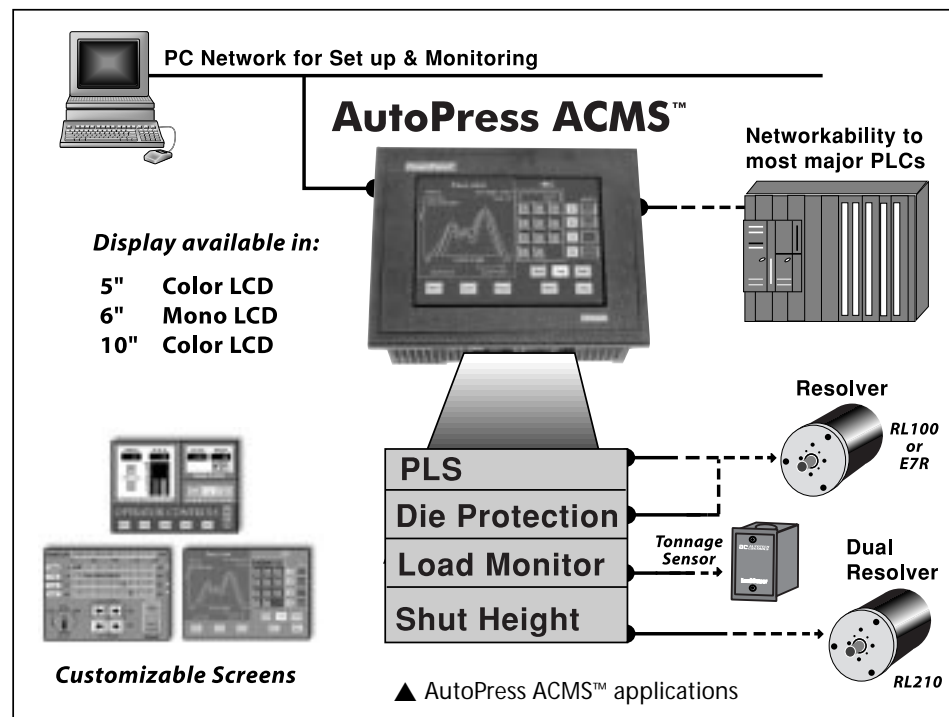
- 5" color LCD
- 6" Monochrome LCD
- 10" Color LCD

Press Automation, Control & Monitoring System (ACMS)

AutoPress ACMSs have modular construction. The following types of modules are available for AutoPress ACMSs:

- Die Protection & Programmable Limit Switch (DPPLS), includes Brake Monitor & Motion detector
- Load Monitor for 2 or 4 tonnage sensors (Peak & Signature)
- Shut Height Control

Availability of a number of display options as well as number of function modules create too many possible configurations. To simplify the ordering process, some of the more commonly used functions are factory packaged and can be ordered by using a single part number. However, modular construction allows AVG to customize products for your needs very quickly.



AutoPress O/I features:

AutoPress ACMS contains a full-featured touchscreen operator interface (O/I) that can talk to most major PLCs. This allows AutoPowerACMS to replace multitudes of pushbutton/pilot-light operators on the press with a single operator interface.

The touchscreen offers realistic 3D operator controls giving real life look and feel of traditional pushbuttons and pilot lights. The touchscreen supports Numeric as well as ASCII keypad allowing you to enter numeric or alphanumeric information into the PLC. At 999 (subject to memory limits), every AutoPress ACMS offers you virtually unlimited screens. AutoPress ACMSs provide 1024, 16 bit registers for interfacing with PLCs.

...AutoPress ACMS™ Functions

Programmable Limit Switch Function

Programmable Limit Switch (PLS) provides timing signals for press automation functions such as Lube, Part Eject, Feed Advance, etc. The AutoPress ACMS PLS has the following features:

- **Logic level optically isolated outputs**
- **Storage for up to 100 recipes for quick job changeover**
- **Individual Speed compensation for each channel for compensating device response time**
- **Multiple dwells for each channel**
- **Each channel can be used either as Angle ON - Angle OFF, or as Angle ON - Time OFF. An Angle On - Time Off channel turns ON outputs at an angle for preset time.**
- **Fine tune in motion allows you to modify dwells without shutting down press**
- **Built-in Brake Monitor & Motion Detector**

Load Monitor Modules - Peak & Signature

The press industry has long recognizing the benefits of load monitoring. The peak monitor module protects press from over & under tonnage, while the signature module acquires the tonnage & compares it to be within programmed limits from a reference signature curve. The reference signatures are learned by the module while few good parts are stamped. The Signature module can, in addition to protecting press from over tonnage, protect dies and ensure quality of stamped parts.

The AutoPress ACMS tonnage modules, unlike other load monitors, use tonnage sensors with built-in current amplifiers to give a 4-20 mA output instead of the usual micro volt level output. With current loop output, the wiring of the sensors to the monitor are more robust, and resistant to press floor electrical noise.

The load monitor in AutoPress ACMS has the following features:

- **2 to 4 Load sensor inputs with 4-20 mA output**
- **Peak module protects press from over/under tonnage**
- **Signature module protects press, dies & detects bad quality parts**
- **Total & Good parts counter**

Die Protection Functions

The die protection module helps protect expensive dies by ensuring proper material progression throughout the press stroke. Appropriately located sensors (proximity, photo eye, etc.) can monitor material progression. The module checks sensors constantly for programmed events during programmed dwells. The AutoPress ACMS die protection module can monitor up to 13 sensor inputs. Following are the Die Protection features of AutoPress ACMS:

- **Optically isolated sensor inputs**
- **Programmable sensor events, such as Sensor Low, High, Rising edge, falling edge, pulse**
- **Programmable multiple dwells for monitoring sensors**
- **Programmable sensor names allow you to refer sensor by their functions, such as Feed, Eject, etc.**
- **Built-in sensor integrity check ensures that the sensors are functional**
- **Each sensor fault can be independently associated with either E-Stop output or with T-Stop output**
- **4 Counters for Batch, quality, tool, and total**

*Shut Height Indication - Control Modules**

The shut height indication/Control modules use either a dual-resolver or a linear rod as shut height position sensor. The indication module decodes position, scales it and displays in engineering units. The control module, in addition to indication functions, also adjusts the shut height automatically. Shut height modules from AVG-Autotech are very easy to calibrate & use. The calibration is as simple as moving ram to two different positions, and entering corresponding shut heights in the unit.

The AutoPress ACMS shut height modules have the following features:

- **Dual resolver based**
- **Extremely easy to calibrate**
- **Precise shut height indication**
- **Automatic shut height adjustment (control modules)**
- **Drift monitoring feature ensures that shut height is within user programmable drift**
- **Programmable Upper & Lower Travel limits to keep ram movement within OEM travel limits**

* consult factory for availability

...AutoPress ACMS™ Configurations

As mentioned before, the display options coupled with several press function options create several configurations. To simplify ordering process, several configurations are factory packaged. If your requirements are not met by these configurations, please call factory with your requirements.

5" Color

The 5" color LCD model offers 16 bright colors, high contrast with 320x240-pixel resolution, and 8 x 6 touch-cell grid.

Following factory-ordered configurations are available in 5" color model:

Model Number	Functions*
100GP5S1R0A	Die Protect (5 Inputs) & PLS (7 outputs)
100GP5S1R01	Peak Load Monitor with 2 Tonnage Sensor Inputs
100GP5S1R02	Peak Load Monitor with 4 Tonnage Sensor Inputs
100GP5S1R01A	Die Protect (8 Inputs), PLS (8 outputs), and Peak Tonnage (2 Sensors)
100GP5S1R02A	Die Protect (8 Inputs), PLS (8 outputs), and Peak Tonnage (4 Sensors)
100GP5S1R01B	Die Protect (13 Inputs), PLS (16 outputs), and Peak Tonnage (2 Sensors)
100GP5S1R02B	Die Protect (13 Inputs), PLS (16 outputs), and Peak Tonnage (4 Sensors)



All configurations with PLS include brake monitor and motion detector.

6" Monochrome Units:

The 6" model provides 320x240 resolution with 3 shades of gray and 8 x 6 touch cells.

Following factory-ordered configurations are available in 6" mono model:

Model Number	Functions*
100GP5L1R0A	Die Protect (5 Inputs) & PLS (7 outputs)
100GP5L1R01	Peak Load Monitor with 2 Tonnage Sensor Inputs
100GP5L1R02	Peak Load Monitor with 4 Tonnage Sensor Inputs
100GP5L1R01A	Die Protect (8 Inputs), PLS (8 outputs), and Peak Tonnage (2 Sensors)
100GP5L1R02A	Die Protect (8 Inputs), PLS (8 outputs), and Peak Tonnage (4 Sensors)
100GP5L1R01B	Die Protect (13 Inputs), PLS (16 outputs), and Peak Tonnage (2 Sensors)
100GP5L1R02B	Die Protect (13 Inputs), PLS (16 outputs), and Peak Tonnage (4 Sensors)



All configurations with PLS include brake monitor and motion detector.

*New Configurations

AutoPress ACMS is a new evolving product with new functionality under development. Modules for Shut Height control, Signature tonnage analysis are under development. Please consult factory for availability of these and any new modules.

...AutoPress ACMS™ Models

10" Color Units:

The 10" model comes with a bright 640 x 480 resolution, 16-color display and 16x12 touch cell grid.

Following factory-ordered configurations are available in 5" color model:

Model Number	Functions*
100GP1S1R01B	Die Protect (13 Inputs), PLS (16 outputs), and Peak Tonnage (2 Sensors)
100GP1S1R02B	Die Protect (13 Inputs), PLS (16 outputs), and Peak Tonnage (4 Sensors)

All configurations with PLS include Brake Monitor and Motion Detector.

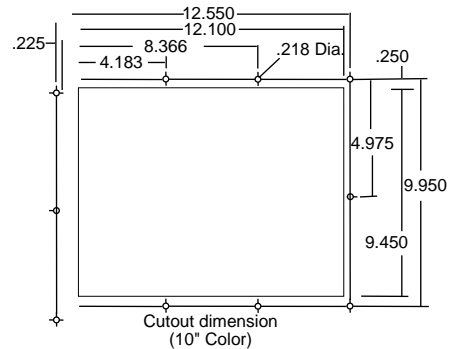
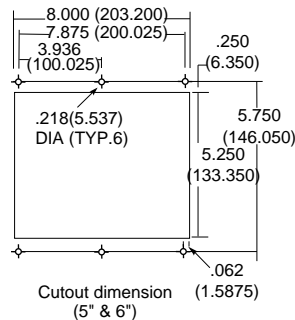


*New Configurations

AutoPress ACMS is a new evolving product with new functionality under development. Modules for Shut Height control, Signature tonnage analysis are under development. Please consult factory for availability of these and any new modules.

Mounting Dimensions:

Model	Depth
5"	6.13"
6"	6.00"
10"	6.75"



Specifications:

Power Input:

5" Color Model: 24VDC
 6" Monochrome LCD Model: 24VDC
 10.4" Color: 120VAC+/- 10%, 50-60 Hz. VAC or 24VDC

Position Transducer

Single turn resolver such as RL100; with CBL-10T22-Mxxx cable, 2,500 ft. max., common to PLS, Die Protection and Tonnage functions

Display Sizes and Resolution:

Display	Size	Resolution	Touch Cells	Shades /Colors	Enclosure
Monochrome LCD	6"	320 x 240	8 x 6	3	NEMA 4, 4X
Color	5"	320 x 240	8 x 6	16	
Color	10"	640 x 480	16 x 12	16	NEMA 4X

Specifications (cont' d):

Die Protection & PLS functions

Number of Die sensor inputs:
Configuration dependent

Input type:
"N" type

Event detection:
Programmable for each sensor, Rising edge, falling edge, or pulse detection within programmed window

Die Protection fault outputs:
Two, T-stop or E-stop;

T Stop Output:
Fail-safe N type, de-energizes to stop press at TDC if any associated sensor event does not occur

E-Stop Output:
Fail-safe N type, de-energizes to stop press immediately (see engagement angle) if any associated sensor event does not occur

Engagement Angle:
Programmable angle (used to avoid press sticking at bottom due to E-stop occurring close to BDC)

No. Of PLS outputs:
Configuration dependent

Offset:
0 to 360 degrees

Speed compensation:
Independent leading & trailing edge compensation for each channel

Output Type:
"N" type

Counters
No. Of counters:
2

Shut Height function*

Position Transducer:
RL210, 128:1 Dual geared resolver

Slide Adjust Outputs:
2 to move slide Up & Down

Die Drift Limit:
Programmable Limit controls drift output

Drift Output:
Fail-safe, de-energizes if die position is outside the programmed drift Limit

Safe Travel Limits:
2, Upper & Lower

Tonnage, Peak & Signature*

Load Sensor:
AVG-Autotech's Load Sensor with built-in electronics to provide 4-20mA current signal

Number of Sensors: 4 per module

Outputs: All outputs "P" or "N" type, factory ordered

Press Safe:
Normally energized;
de-energized when peak tons exceed programmed max. limit

Die Safe:
Normally energized,
de-energized when acquired tonnage profile lies outside the programmed band around stored reference profile

QC Alarm:
Energized when number of bad parts exceed programmed limit (a part is considered bad if acquired tonnage profile is outside programmed QC band)

Communication

No. of Serial Ports:
4; for computer, PLC, Uticor slave network and Bar Reader/Printer

Available PLC Interfaces:
See Table below

Motion Detector

Programmable Low and High Limits:
Programmable motion detect delay

Motion Fault:
Fail safe, "N" type output

Brake Monitor

Programmable Danger and Caution Limits:
0 to .999 sec.

Brake Fault Outputs:
"N" type

Brake Input:
"N" type

Brake Reset Input:
"N" type

* Consult factory for availability of signature tonnage and shut height functions.

PLC Drivers Available:

Interfaces to more than 30 PLCs including:

- | | | |
|------------------|--------------------|------------------------|
| ✓ A-B Remote I/O | ✓ Keyence | ✓ Reliance Automate |
| ✓ A-B DH+ | ✓ Klockner-Moeller | 15/20/30/40 |
| ✓ A-B SLC500 AIC | PS 306/316 | ✓ ProfiBus |
| ✓ A-B SLC500 DF1 | ✓ Koyo | ✓ Square D Symax |
| ✓ A-B PLC5 DF1 | ✓ Mitsubishi | ✓ TI Series 5x5 |
| ✓ CTC | ✓ Modbus | ✓ TI Series 100 |
| ✓ GE Series 90 | ✓ Modbus Plus | ✓ Uticor Director 6001 |
| ✓ GE Genius I/O | ✓ Omron Host Link | ✓ and many more |

M8251 Series PLS BusModules™

PLC Plug-in Modules

- ▶ **16 Optically isolated Programmable Limit Switch (PLS) Outputs in one slot**
- ▶ **Highly repeatable, High-speed position based outputs, independent of PLC scan time**
- ▶ **PLS setup from PLC Back-plane, keypad, or from a PC**
- ▶ **PLS information, such as Output Status, Position, etc. always available to PLC through Back-plane**
- ▶ **Leading/Trailing speed compensation**
- ▶ **Brake Monitor & Motion detection**
- ▶ **Angle ON - Time Off Outputs**
- ▶ **Broken resolver cable detection**
- ▶ **Built-in 5 Key keypad and Display**



*AB is a trademark of Allen Bradley Company, Inc. AB does not warrant or support this product nor has this product been technically approved by Allen Bradley for use in their 1771 system. Use of this module, however, does not violate AB warranty.

PLS vs. PLC

A programmable limit switch provides outputs that remain ON for a programmed position dwell. A PLC can perform the same function by reading position from a position-input module, and then comparing the position with user-set limits and turning ON output if the position is within limits. However, the timings of the outputs will vary by the scan time of the PLC, which is not acceptable in many applications. The PLS module from AVG-Autotech offers many advantages over the PLC as far as PLS function is concerned:

1. The PLS module provides highly repeatable outputs independent of PLC scan time.
2. With PLS module, you do not have to write any software in PLC for performing PLS functions.
3. The PLS module makes it extremely easy to fine tune dwells while machine is in motion.
4. Advanced features of PLS module, such as speed compensation, require complex coding when implemented in PLC, particularly in ladder logic.

In addition, a PLC plug-in module provides position, SPM, and other status information to the PLC, eliminating the need for an additional position-input module.

Principle of Operation

The PLS module uses a resolver coupled to the press drive train for getting press position information. The module constantly reads & decodes resolver signals, and then turns up to 16 PLS outputs on and off based on user programmed set points. The whole operation is much faster and is independent of the PLC.

Module setup

The M8251 gives you many choices to setup the module. You may setup the module from the keypad, PLC, or a PC. When programming from the PLC, you write ladder logic program to setup parameters in the module. The M8251 PLS module interfaces with the PLC using Input & Output registers.

Programmable Resolution & Zero Offset

PLS module has programmable resolution from 17 to 1000 counts per turn. Programmable offset allows you to electronically align the resolver to machine zero for ease of synchronizing.

Brake Monitor

The M8251 offers a Time-Based Brake Monitor. The unit displays press Stop Time after each stop of the machine. The unit provides two programmable limits, Caution & Danger, with two corresponding outputs. These outputs are activated if stop time exceeds the corresponding limits.

Motion Detection

In order to prevent nuisance Motion Detection faults, a user defined adjustable time delay can be set to allow the machine to mechanically engage prior to enabling the Motion Detection feature.

Advanced Features

The PLS offers advanced features such as Speed Compensation and Angle-ON / Time-OFF.

Speed compensation automatically adjusts PLS outputs to compensate for device response times as system speed increases.

Angle-ON / Time-OFF outputs turns on at a press angle and turns off after a programmed time (instead of angle). This feature is useful for controlling air or lubrication.

Specifications:

PLC COMMUNICATION

Through input and output registers

The following table shows required slots & I/O:

PLC	Slots	I/O Addresses
AB1771*	2	1 In / 1 Out
Modicon 800 Series I/O	1	6 In / 6 Out
TI 5x5	1	32 In / 32 Out

POWER REQUIREMENTS:

Backplane:

5 VDC @ 650 mA
Customer (Power Input):
24 VDC +/- 15% @ 100 mA

RESOLVER INTERFACE

Position transducer:

Resolver, Autotech Series
RL100 or E7R

Resolver cable:

Overall foil shielded,
twisted pair, such as
Autotech's cable:
CBL-10T22-XXX,
2,500 ft. max

PROGRAMMING

All features programmable
from keypad, IBM®
compatible PC, or through
the backplane.

Number of PLS setups: 8

PLS setpoints:

160 per PLS setup

Scale factor:

Programmable from 16 to 999

Offset:

Programmable from 0 to
Scale Factor value

Speed Compensation:

Programmable for each
PLS channel.

Motion Detector:

Low and high motion limits:
Programmable from 0 to
1999 SPM

RESPONSE TIMES

PLS outputs:

1.6 mSec (0.8 mSec
version available)

Tach. Update Time:

15 ms

Position, Tach., and Output Status available to backplane:

Every 1.6 mSec typical
(0.8 mSec version available)

CONTROL INPUTS

Program Enable (PE) &
Supervisor Enable (SE)
Output Enable (OE):

OUTPUTS

Fault Output:

Broken resolver wire or
internal fault is detected.

Motion Output:

Output energized whenever
resolver RPM is between
programmed limits.

Number of PLS Outputs: 16

OUTPUT SPECIFICATIONS

Customer power:

24VDC Nominal +/- 15%

All Outputs (16 PLS, Fault, and Motion):

N type or p type,
factory ordered
Up to 2 Amp per output;
10 Amp total per module
Optical Isolation: 5,000 Vrms

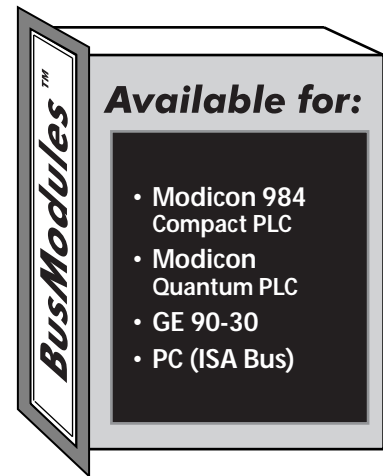


Please consult instruction manual of a module for complete information on that module.

M7251 PLS and DPPLS BusModules™

PLC Plug-in Modules for PLS and for Die Protection/PLS functions

- ▶ **16 PLS Channels in one slot (8 Optically isolated PLS Outputs, 8 through Backplane)**
- ▶ **13 Die Protection Inputs (DPPLS only)**
- ▶ **Highly repeatable, High-speed position based outputs, independent of PLC scan time**
- ▶ **Module information, such as Output Status, Position, etc. always available to PLC through Back-plane**
- ▶ **Leading/Trailing speed compensation**
- ▶ **Brake Monitor & Motion detection**
- ▶ **Angle ON - Time Off Outputs**
- ▶ **Broken resolver cable detection**



PLS vs. PLC

A programmable limit switch provides outputs that remain ON for a programmed position dwell. A PLC can perform the same function by reading position from a position-input module, and then comparing the position with user-set limits and turning ON output if the position is within limits. However, the timings of the outputs will vary by the scan time of the PLC, which is not acceptable in many applications. The PLS module from AVG-Autotech offers many advantages over the PLC as far as PLS function is concerned:

1. The PLS module provides highly repeatable outputs independent of PLC scan time.
2. With PLS module, you do not have to write any software in PLC for performing PLS functions.
3. The PLS module makes it extremely easy to fine tune dwells while machine is in motion.
4. Advanced features of PLS module, such as speed compensation, require complex coding when implemented in PLC, particularly in ladder logic.

In addition, a PLC plug-in module provides position, SPM, and other status information to the PLC, eliminating the need for an additional position-input module.

M7251 PLS

Principle of Operation

The PLS module uses a resolver coupled to the press drive train for getting press position information. The module constantly reads & decodes resolver signals, and then turns up to 16 PLS outputs on and off based on user programmed set points. The whole operation is much faster and is independent of the PLC.

Module setup

The M7251 gives you many choices to setup the module. You may setup the module from the PLC, or a PC. When programming from the PLC, you write ladder logic program to setup parameters in the module. The M7251 PLS module interfaces with the PLC using Input & Output registers.

Programmable Resolution & Zero Offset

PLS module has programmable resolution from 17 to 1000 counts per turn. Programmable offset allows you to electronically align the resolver to machine zero for ease of synchronizing.

Brake Monitor

The M7251 offers a Time-Based Brake Monitor. The unit displays press Stop Time after each stop of the machine. The unit provides two programmable limits, Caution & Danger, with two corresponding outputs. These outputs are activated if stop time exceeds the corresponding limits.

Motion Detection

In order to prevent nuisance Motion Detection faults a user defined adjustable time delay can be set to allow the machine to mechanically engage prior to enabling the Motion Detection feature.

Advanced Features

The PLS offers advanced features such as Speed Compensation and Angle-ON / Time-OFF.

Speed compensation automatically adjusts PLS outputs to compensate for device response times as system speed increases.

Angle-ON / Time-OFF outputs turns on at a press angle and turns off after a programmed time (instead of angle). This feature is useful for controlling air or lubrication.

DPPLS Module

The M7251 DPPLS module offers a highly integrated PLC plug-in module with 16 outputs PLS, 13 input Die Protection, Brake Monitor, and Motion Detector, all in one module. The PLS function has the same advanced features as those available in M7251 PLS module.

Die Protection

The M7251 DPPLS module has 13 inputs for Die Protection sensors. These inputs can independently be programmed to monitor a variety of sensor events within

programmable dwells, and to active either E-stop or T-stop if the event does not occur. The E-stop output is wired in the press circuit to stop the press immediately. The engagement angle feature ensures that the press does not stick at the bottom by disabling E-stop output between the engagement angle and BDC.

Tool Name:

Each tool (set-up) can be given 0-8 character name for easy reference, The tool set-up can be searched by this name.

Specifications:

CARD LOCATION:

Uses one slot PLC rack and in PC

PLC COMMUNICATION

Through input and output registers; allocate 12 Input and 12 Output registers for Modicon 984 Compact, 32 IN, 32 OUT for Quantum and 4 KB for PC

POWER REQUIREMENTS:

Customer (Power Input):

24 VDC +/- 15% @ 100 mA

Position transducer:

Resolver, Autotech Series RL100 or E7R

Motion Detector:

Programmable Low and High limits, 0-999 RPM

Brake Monitor:

Programmable Caution and Danger Limits 0-9.99 sec. max.

Fault Output:

Normally energized. De-energizes if broken resolver wire or internal fault is detected.

Motion Output:

Output energized whenever resolver RPM is between programmed limits.

M7251 PLS

PLS Outputs:

16

PLS setpoints:

112 per PLS setup (maximum of 56 per group of 8 outputs)

No. of Setups:

8

Speed Compensation:

Each PLS output has its own compensation

M7251 DPPLS

No. of Setups:

40

PLS Outputs:

16

PLS setpoints:

112 per PLS setup (maximum of 56 per group of 8 outputs)

Speed Compensation:

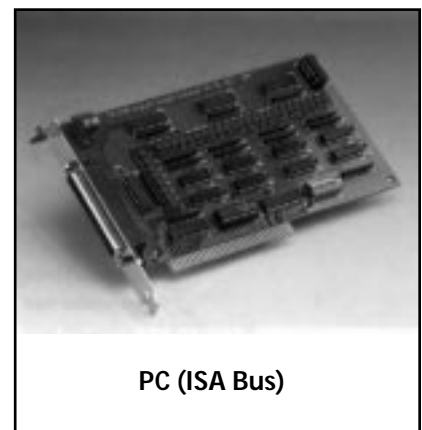
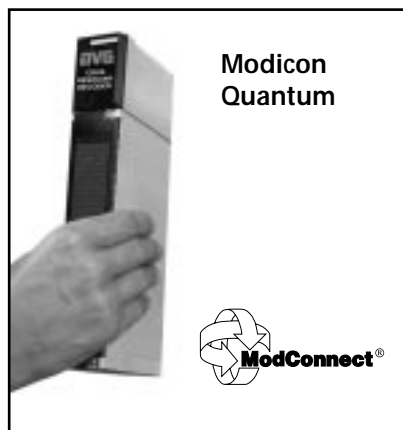
Leading and Trailing, independently programmable for each channel

Engagement Angle:

Programmable 0 - 189°

Die Protection Outputs:

2, E-stop and T-stop



Please consult instruction manual of a module for complete information on that module.

M8350 Series Position Feedback BusModules™

PLC Plug-in Resolver Decoder Modules

- ▶ **Resolver Based Position feedback system**
- ▶ **Absolute position - No loss of position during power loss**
- ▶ **Resolver offers reliability under extreme conditions**
- ▶ **Noise immune ratio-metric decoding**
- ▶ **Programmable resolution from 20 to 4096 counts per turn**
- ▶ **Programmable Offset for electronic alignment**
- ▶ **Programmable position format - Binary, BCD, or Gray code**
- ▶ **Broken resolver cable detection**
- ▶ **Built-in Keypad and Display**



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Position Feedback

A PLC controlling a press needs press position feedback all the time. The two most common ways to provide position-feedback are an optical encoder with a counter card, and a resolver with a decoder. AVG-Autotech offers a versatile resolver based position feedback system.

Resolver vs. Optical Encoders

A resolver has several advantages over an optical encoder:

- **Completely passive - electromagnetic device**
- **Rugged & robust - tolerates higher mechanical shock & vibrations compared to fragile glass disk encoders**
- **Wide temperature range - No condensation problems at low temperature**
- **Immune to plant environment - Oils, mists, dusts, etc.**
- **Absolute position compared to incremental encoders**

Because of these advantages and resolver's track record in automotive pressrooms, more stamping plants prefer a resolver-based system over optical encoder based systems.

PLC Interface

The position feedback module uses noise-immune ratio-metric method to decode resolver signals. The decoded position is passed to PLC through the backplane.

The module may be programmed from PLC or the keypad in front of the module. The module communicates with the PLC using Input & Output registers.

Programmable Resolution

Unlike optical encoders, the M8350 offers you a programmable resolution from 20 to 4096 counts per turn.

Programmable Offset

Offset allows you to electronically align resolver zero with your machine's zero. This makes mounting of resolver easier.

Motion Detector

The M8350 has over/under speed switch with programmable motion limits.

Broken Resolver Cable Detection

The M8350 ensures system integrity by detecting broken resolver cable. This information is passed to PLC through back plane.

Specifications:

PLC Communication

The following table shows required slots and I/O:

PLC	Slots	I/O Addresses
AB1771*	2	1 In / 1 Out
Modicon 800 Series I/O	1	6 In / 6 Out
TI 5x5	1	32 In / 32 Out

POWER REQUIREMENTS:

Backplane:

5 VDC @ 650 mA

Customer (Input Power):

24 VDC +/- 15% @ 100 mA

ENVIRONMENTAL CONDITIONS

Operating temperature:

-10°F to 130°F

(-23°C to 55°C)

Relative humidity:

5 to 95% non-condensing

RESOLVER INTERFACE

Position transducer:

Resolver; Autotech Series RL100 or E7R.

Cable length between resolver and M8350:

2500 feet max, shielded

Resolver cable:

Overall foil shielded, twisted pair, such as Autotech's cable (CBL-10T22-xxxx)

PROGRAMMING

All features programmable from keypad, or through backplane

Scale factor:

Programmable from 19 to 4095 (resolution 20 to 4096 counts/turn)

Offset:

Programmable from 0 to scale factor value

Fault detector:

TRUE (active) on power up. FALSE if broken resolver wire or internal fault is detected.

Motion detector:

Low and high motion limits are programmable from 0 to 1999 RPM. Motion detector is TRUE when the machine's RPM is within the programmed limits. Motion detector's status is available on the backplane.

RESPONSE TIMES

Tach update time:

15 ms

Position, tach, and output status available to backplane:

Every 700 μ s typical

CONTROL INPUTS

Program Enable (PE):

PE must be TRUE for setup programming

Output Enable (OE):

OE must be TRUE for outputs to be enabled (applies only when optional ASY-M8250-NOUT module is used)

Electrical specifications

(All Inputs):

Optical isolation:

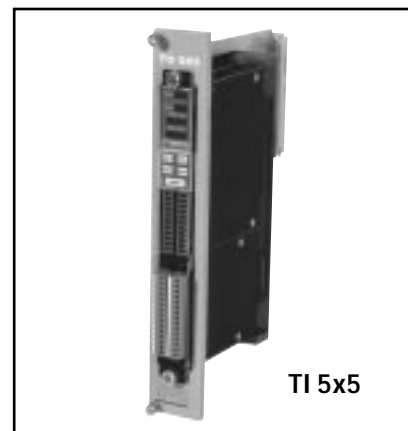
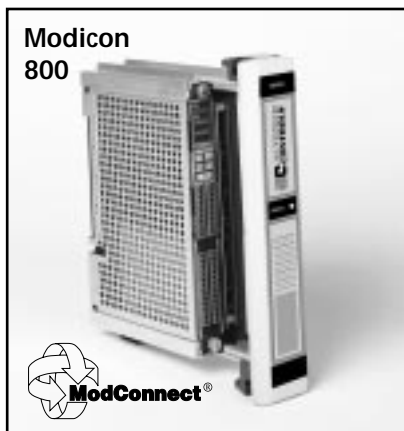
2500 VAC RMS

Input current :

3mA typical @ 24VDC

Logic levels:

TRUE: 21 to 27 VDC (V+ relative to V-) (not to exceed)
FALSE: < 1VDC

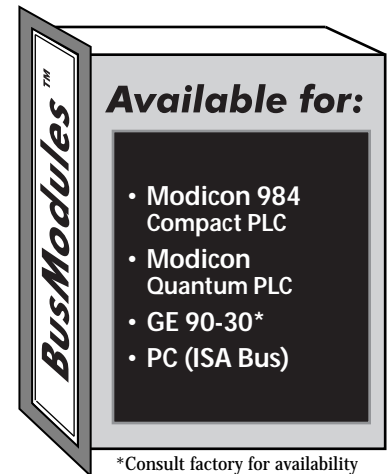


Please consult instruction manual of a module for complete information on that module.

M7350 Series Position Feedback BusModules™

PLC Plug-in Resolver Decoder Modules

- ▶ **Resolver Based Position feed back system**
- ▶ **Absolute position - No loss of position during power loss**
- ▶ **Resolver offers reliability under extreme conditions**
- ▶ **Noise-immune ratio-metric decoding**
- ▶ **Programmable resolution from 20 to 4096 counts per turn**
- ▶ **Programmable Offset for electronic alignment**
- ▶ **Programmable position format - Binary, BCD, or Grey code**
- ▶ **Broken resolver cable detection**



A PLC controlling a press needs slide position feedback all the time. Two of the most common ways to provide position-feedback are an optical encoder with a counter card, or a resolver with a decoder. AVG-Autotech offers a versatile resolver based position feedback system.

A resolver has several advantages over an optical encoder:

- **Completely passive - electromagnetic device**
- **Rugged & robust - tolerates higher mechanical shock & vibrations compared to fragile glass disk encoders**
- **Wide temperature range - No condensation problems at low temperature**
- **Immune to plant environment - Oils, mists, dusts, etc.**
- **Absolute position compared to incremental encoders**

Because of these advantages and resolvers track record in automotive pressrooms, more stamping plants prefer a resolver-based system over optical encoder based systems.

PLC Interface

The position feedback module uses noise-immune ratio-metric method to decode resolver signals. The decoded position is passed to PLC through the backplane.

The module may be programmed from PLC. The module communicates with the PLC using Input & Output registers, while with PC, the module occupies memory address.

Programmable Resolution

Unlike optical encoders, the M7350 offers you a programmable resolution from 20 to 4096 counts per turn.

Programmable Offset

Offset allows you to electronically align resolver zero with your machine's zero. This makes mounting of resolver easier.

Motion Detector

The M7350 has over/under speed switch with programmable motion limits.

Broken Resolver Cable Detection

The M7350 ensures system integrity by detecting broken resolver cable. This information is passed to PLC through back plane, as well as an output is activated.

Specifications:

CARD LOCATION:

Uses one slot (any location) PLCs and in PC

PLC COMMUNICATION

Through input and output registers; allocate 12 input and 12 output registers for Modicon 984 Compact, 32 IN, 32 OUT for Quantum and 4 KB for PC

POWER REQUIREMENTS:

Customer (Input Power):
24 VDC +/- 15% @ 100 mA

ENVIRONMENTAL CONDITIONS

Operating temperature:
-10°F to 130°F (-23°C to 55°C)
Relative humidity:
5 to 95% non-condensing

RESOLVER INTERFACE

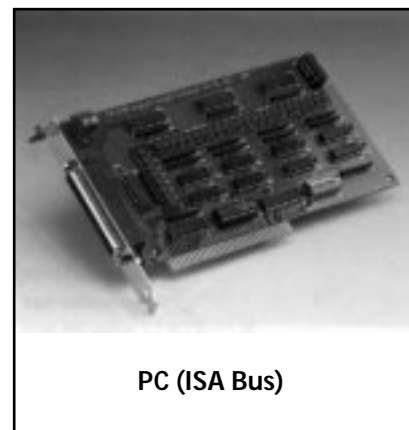
Position transducer:
Resolver; Autotech Series RL100 or E7R
Cable length between resolver and the module:
2500 feet max, shielded
Resolver cable:
Overall foil shielded, twisted pair, such as Autotech's cable (CBL-10T22-Mxxx)

PROGRAMMING

All features programmable through backplane
Scale factor:
Programmable from 19 to 999
(resolution 20 to 1000 counts/turn)
Offset:
Programmable from 0 to scale factor value
Position formats:
Binary
Fault detector:
TRUE (active) on power up.
FALSE if broken resolver wire or internal fault is detected.
Motion detector:
Low and high motion limits are programmable from 0 to 1999 RPM.
Motion detector is TRUE when the machine's RPM is within the programmed limits.
Motion detector's status is available on the backplane.

RESPONSE TIMES

Tach update time:
15 ms
Position, tach, and output status available to backplane:
Every 0.6 mSec typical

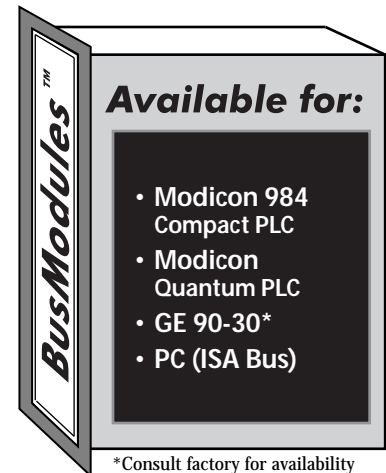


Please consult instruction manual of a module for complete information on that module.

Shut Height Feedback BusModule™

M7350 Dual Resolver Decoder Module

- ▶ **Resolver Based Shut Height feed back system**
- ▶ **Uses AVG-Autotech's RL210 128:1 gear ratio resolver**
- ▶ **Absolute position - No loss of position during power loss**
- ▶ **Broken resolver cable detection**
- ▶ **Occupies only one slot in rack**



Shut Height Feedback

A PLC controlling press functions requires the press shut height information. AVG-Autotech's Dual Resolver module is a convenient way to input press shut height to PLCs. The module takes up only one slot in the PLCs supported. The module talks to the PLCs through several I/O registers.

The position read from the module can be scaled and displayed on an operator interface for indication.

Resolver RL210

The module works with Autotech's dual resolver, RL210 with 128:1 gear ratio. The resolver is mounted to the shut height adjustment drive train (through some gears, if required).

Automatic Shut Height Control

With little ladder logic, the module can be used for Automatic Shut Height adjustment inexpensively. The PLC constantly reads the Shut Height and controls slide adjustment motor to bring slide at the desired position.

Specifications:

CARD LOCATION:

Uses one slot (any location) PLCs and in PC

PLC COMMUNICATION

Through input and output registers; allocate 12 input and 12 output registers for Modicon 984 Compact, 32 IN, 32 OUT for Quantum and 4 KB for PC

POWER REQUIREMENTS:

Customer (Input Power):

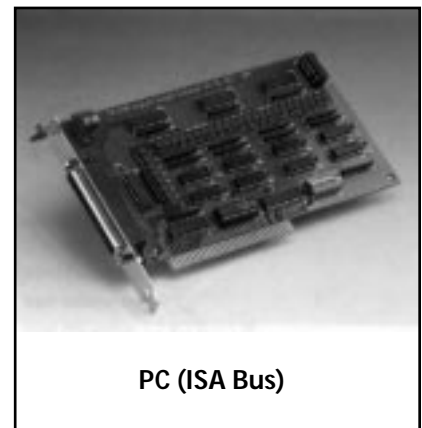
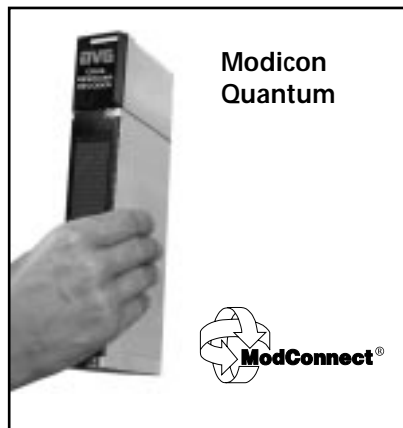
24 VDC +/- 15% @ 100 mA

Position transducer:

Dual Resolver; Autotech Series RL210 (128:1 gear) or equivalent

POSITION OUTPUT:

17 Bits Binary

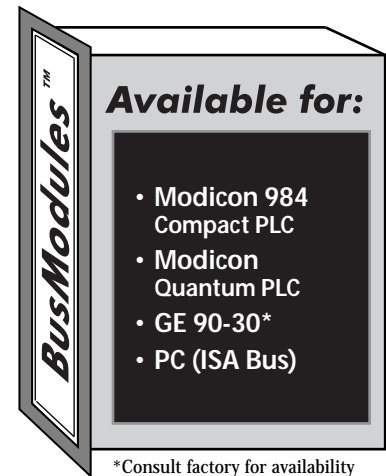


Please consult instruction manual of a module for complete information on that module.

M7450 Load Monitor BusModule™

Cost effective PLC plug-in load monitor allows complete integration of load information with PLC.

- ▶ **Monitors Up to 4 sensors**
- ▶ **Sensors with built-in 4-20 mA output simplify wiring**
- ▶ **Built-in sensor integrity checks**
- ▶ **Programmable Over & Under Limits for Press Protection, Die Protection and Process Trend**



Load Monitoring

The Load Monitor BusModule is a PLC plug-in module to monitor load on a mechanical press. The module measures load through the load sensors mounted on the load bearing members of the press. The module compares the measured load against user programmed limits for press protection, Die protection and for process trend.

Integration & Flexibility

When used in a press control system that uses a PLC, the BusModule offers advantages over the stand-alone solutions. Since the BusModule is plugged-in a PLC rack, the PLC has complete access to load monitoring information including limits, alarms, actual tonnage, etc. The Module is setup through PLC, and the setup can be easily backed up along with the rest of PLC program. Once the load information is in PLC, user has more flexibility in using it. For example it can be displayed on an operator interface, can be sent to a computer over the network, etc.

Load Sensors - 4 to 20mA

AVG-Autotech uses industry standard strain-gauge sensors to read tonnage, but the similarities end right here. AVG-Autotech's sensors have a built in amplifier to

give 4 - 20mA output, available on a terminal block. Unlike other sensors that have an internal cable coming out of the sensor and has to be pre-specified in length as it cannot be "spliced," AVG-Autotech sensors can be connected to the PLM via standard shielded cables.

Specifications:

CARD LOCATION:

Uses one slot (any location) PLCs and in PC

PLC COMMUNICATION

Through input and output registers; allocate 12 input and 12 output registers for Modicon 984 Compact, 32 IN, 32 OUT for Quantum and 4 KB for PC

Number of Sensors:

2 or 4

Sensor Outputs:

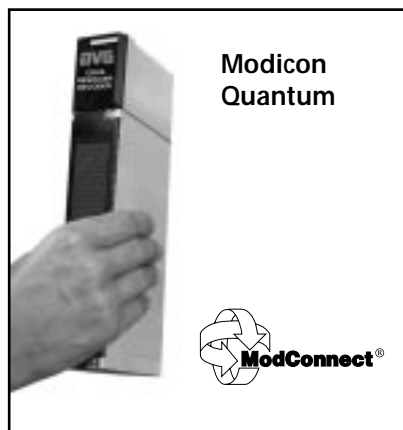
4-20mA

Alarm Outputs:

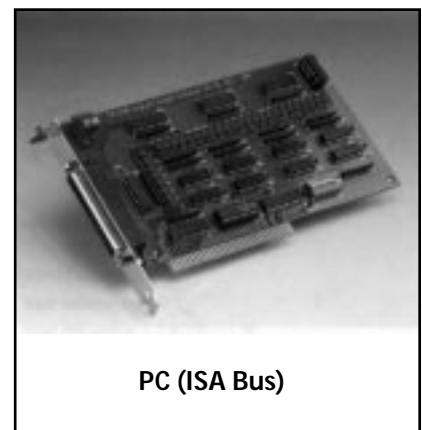
4



Modicon
984 Compact



Modicon
Quantum



PC (ISA Bus)

Please consult instruction manual of a module for complete information on that module.

Resolvers

Robust & noise-resistant rotary position transducers for press applications

- ▶ **Absolute Shaft Position**
- ▶ **No Internal Electronics**
- ▶ **Brushless Resolver**
- ▶ **High resistance to shock and vibration**
- ▶ **NEMA 13 housing providing protection against water mist, oil and dust**
- ▶ **Broad temperature range, -67°F to 248°F**



Autotech uses resolver as position transducer for most of its position based controls, such as PLS, Die Protect System, Tonnage monitors, etc. Resolver, with its proven robustness & noise-immunity is an ideal choice for plant floors.

The resolver is a highly accurate and highly dependable device for absolute position shaft encoding. Resolvers have a reliable track record of applications in aerospace, military and industry, where they have been used for decades for position sensing. Some of the common applications are radar antenna position sensing, missile guidance systems, NC machine position feedback, automotive stamping presses, 2 piece can manufacturing presses and packaging machines. The resolver is designed to operate reliably under extremely hostile environments such as continuous mechanical shock, vibration, extreme temperature and humidity changes, oil mist, coolants, and solvents.

The resolver is a passive transducer. It is a brushless rotary transformer with one rotor and two stator windings. The stator windings are electrically 90 degrees out of phase with each other. As the shaft rotates, the relative position of the rotor and the stator windings change. Either the rotor or the two stator windings together can be used as the primary of the rotary transformer and the secondary will then produce an analog voltage corresponding to the shaft position.

Single Turn Resolver

Autotech has over 50,000 resolvers operating with extreme reliability in highly demanding applications in automotive, can manufacturing and packing industries. Rugged industrial housing, heavy duty double row ball bearings and an internal flexible coupling lend to an extremely reliable design.

Built in Gear Train for Multi-turn Application

Various resolver models from Autotech are available with a built in precision gear train. The resolver makes 1 turn for many turns of the input shaft.

Dual Resolvers for Multiturn Application

A multi turn resolver consists of two resolvers coupled to each other through a gear train. One of the resolvers called the fine resolver, is coupled to the machine shaft in such a way that it turns at the same rpm as the machine, while the other resolver, called the coarse resolver, is geared down by the gear ratio used. As the shaft of the multi turn resolver keeps track of the shaft position in each revolution. Thus the combination of the two resolver signals gives the absolute machine position. The gear train uses an anti backlash gear to eliminate backlash errors.

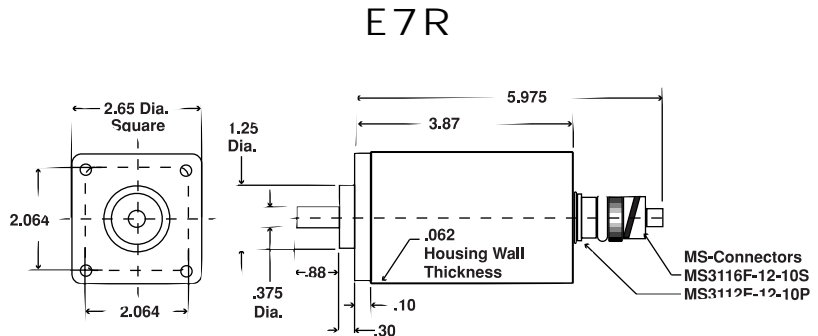
A Variety of Models

AVG-Autotech offers several models of resolvers to suit different applications. Some of the more common resolver models and their accessories are described below:

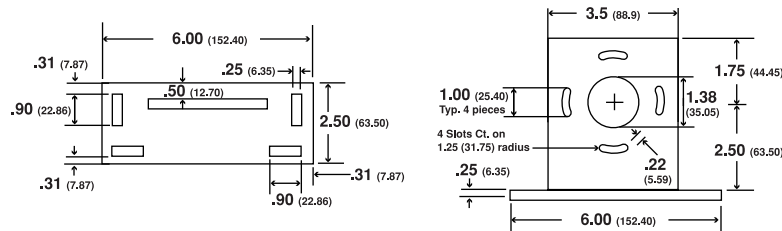
Single Turn Brushless Resolvers

E7R Resolver

Autotech's E7R resolver, 2.5" Diameter, flange mounted, 3/8" diameter shaft, 50 lb. axial loading, NEMA 13 housing, rear mounted MS connector, 36 lb. Radial loading, 200g for 11mSec. shock rating, 20g to 2000Hz Vibration, approximate weight 6 lbs.



Mounting Bracket:



Single and Dual Multi-Turn Geared Resolvers

RL100 (Workhorse of the Industry):

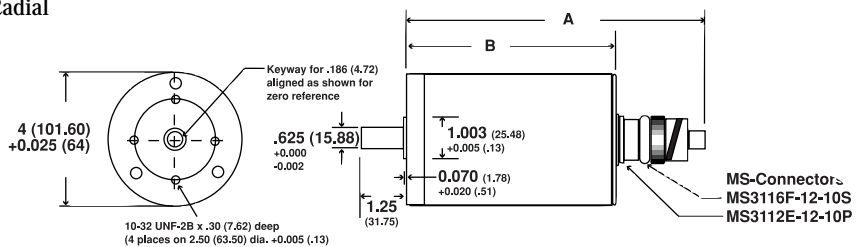
Autotech's RL100 resolver is the most rugged resolver in industry today. Single, Brushless resolver, 4" Diameter, with MS connector, 5/8" diameter shaft, 50 lb. Axial loading, NEMA 13 housing, 100 lb. Radial loading, 200g for 11mSec. Shock rating, 20g to 2000Hz Vibration, approximately Weight 6 lbs.

RL210:

Dual, Brushless resolver, Built in 128:1 Gear Ration, 4" Diameter, with MS connector, 5/8" diameter shaft, 50 lb. Axial loading, NEMA 13 housing, 100 lb. Radial loading, 200g for 11mSec. Shock rating, 20g to 2000Hz Vibration, approximately Weight 6 lbs.

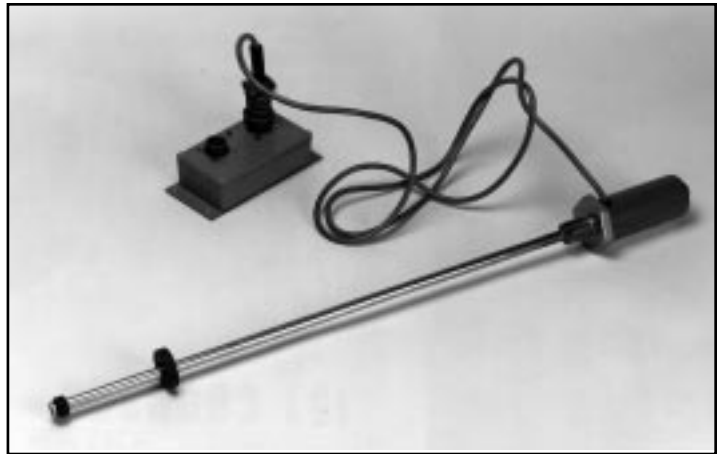
RL100 & RL210

Dimension	RL100	RL210
A	5.50"	6.50"
B	7.60"	8.6"



LT-140 Absolute Linear Position Transducer

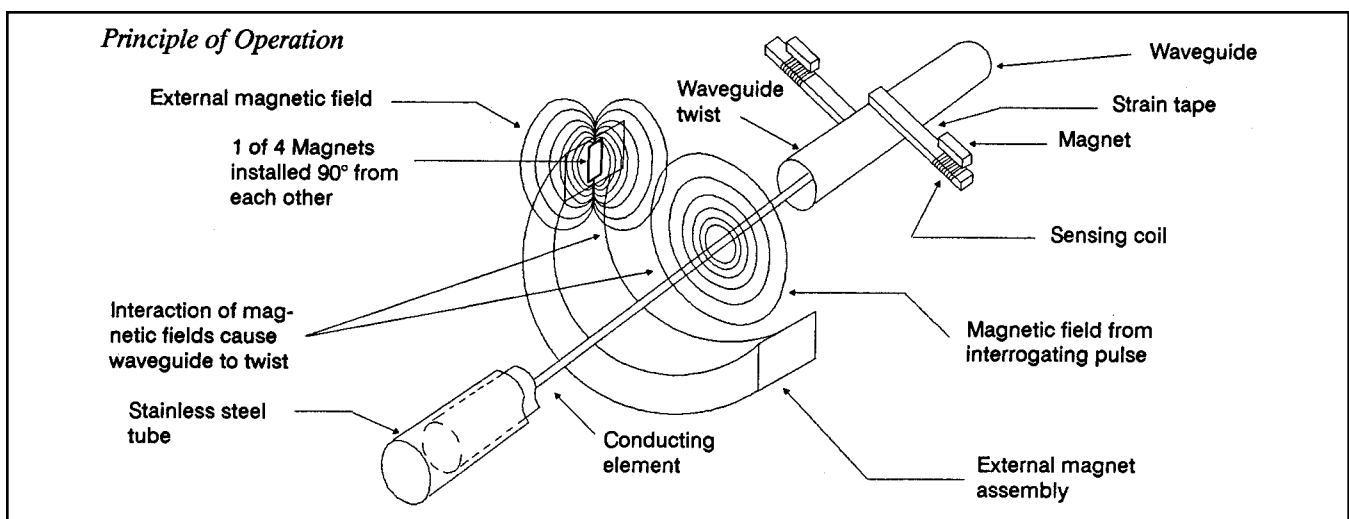
- ▶ **Absolute Linear Position**
- ▶ **Ultrasonic Position sensing**
- ▶ **No Moving Parts**
- ▶ **Accurate to 0.001"**



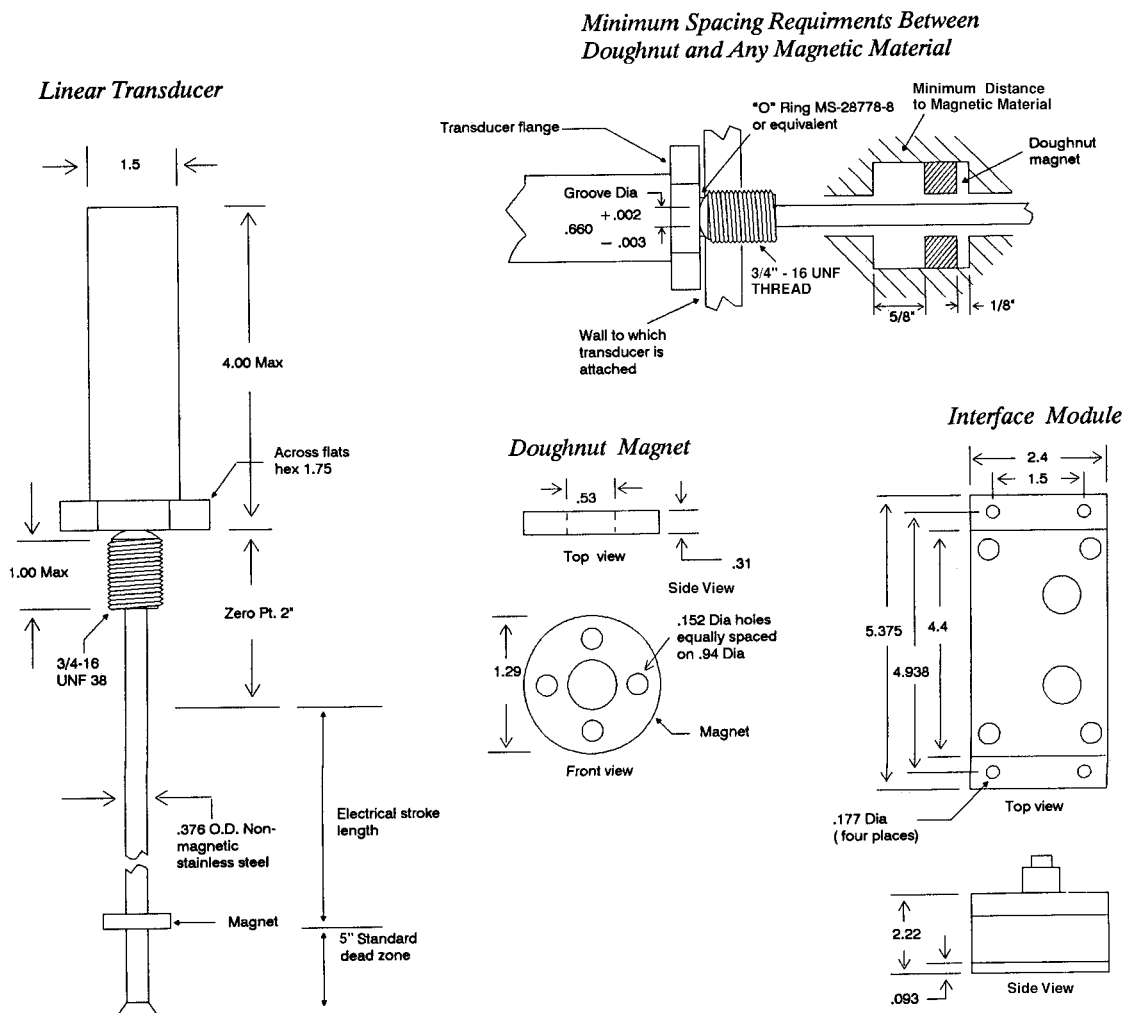
An ultrasonic linear transducer consists of an interface control module, a non-magnetic stainless steel rod with sensing head and a "doughnut" magnet. An electrical interrogating pulse, generated in the interface control module, creates a magnetic field around the conducting element housed inside a waveguide which in turn is enclosed in the non-magnetic stainless steel transducer rod. The "doughnut shaped" permanent magnet, mechanically representative of machine position, reacts with this generated field producing a mechanical force at right angles to the conducting element. This force causes

a twist (torsional strain) which travels back the length of the rod. These strain pulses arrive at a fixed reference a certain time interval later and this time delay from the interrogating pulse indicates the linear position of the "doughnut" magnet. These precise time based pulses are then converted to digital output inside a linear decoder or a linear PLS.

Magnetic fields normally generated by 60 Hz or 400Hz equipment will not affect the operation because these frequencies will be rejected by the narrow band-width detector utilized.



Outline Dimensions:



Specifications:

Working stroke length:

12-108 inches (1 foot increment)

Scan rate:

3.5 ms up to 100 inches length; 7 ms above 100 inches length.

Linearity:

0.05% of full stroke

Temperature coefficient:

0.0005% per °F of reading

Resolution:

0.001 inches over 100 inches length

Operating temperature:

0° to 185° F (-17°C to 85°C)

Mechanical zero Reference:

Approximately 2 inches from mounting surface.

Over all rod length:

Stroke length +7 inches

Rod material:

Non-abrasive stainless steel

P-40 SoftStart™

Auto Motor Controller

- ▶ **Energy Savings**
- ▶ **Reduce Starting Inrush Current**
- ▶ **Kick Start**
- ▶ **Adjustable Starting Torque & Acceleration**
- ▶ **Reset Circuit**
- ▶ **Dynamic Braking**
- ▶ **Motion Sensing / Anti Plugging**
- ▶ **Solid State Motor Starter**



When you start AC induction motors with an on-line starter, you draw up to 8 times the normal running current. This produces up to three times the normal full load torque. In many applications, the high impact of this starting torque or sudden speed change can cause damage to the motor, load and / or the power transmission mechanism. The solution AMC™, Auto Motor Controller. The AMC gradually increases the voltage applied to the motor. The result is a smooth stepless operation increasing motor life and avoiding problems such as chain breakage and coupling failure.

Energy Savings

Induction Motors waste a large amount of energy at no load or partial loads by drawing heavy magnetizing currents. The unique design of the AMC reduces the magnetizing current and supplies the motor with optimum energy by a solid state feedback mechanism. The AMC constantly senses the motor load by measuring the power factor angle and provides the motor only the amount of voltage necessary to match that load. The motor runs cooler and at a much higher efficiency. KW and KVAR are both significantly reduced.

Reduce Starting Inrush Current

In addition to the smooth stepless operation of the AMC, the reduction in peak starting current also helps the overall power supply in the plant. The AMC allows motor starting with minimum disruption to the other loads on the same line. Furthermore, you reduce the possibility of the circuit breaker trip on the line.

Kick Start

In this mode of operation, full line voltage is applied to the motor at the beginning of the cycle for an adjustable period of 0 - 1.5 seconds. This is especially useful as a breakaway pulse to ensure a good start of high friction loads. Kick start is easily disengaged by fully turning the control potentiometer counterclockwise.

Adjustable Starting Torque and Acceleration

With the AMC in the motor circuit, the starting torque and acceleration depend on the initial voltage applied to the motor and it's rate of increase. Both of these parameters are field adjustable by industrial grade potentiometers mounted underneath the cover-plate to avoid any tampering. "Starting-Torque" pot adjusts the initial voltage applied to the motor every time the motor is started, reversed or it's speed is changed. "Ramp Time" pot adjusts the time to reach full voltage. The time required for the motor to accelerate to full speed is dependent upon the speed torque characteristics of the motor and load

Reset Circuit for Reversing or Multi-Speed Motors

Normally, the AMC requires a power loss of more than 100ms to reset to starting mode (to ignore momentary power loss). However, some applications require the instantaneous reset such as motor reversing or multi-speed motors. This is simply accomplished by connecting normally open auxiliary contacts from the starter to the AMC option terminals.

Dynamic Braking with Auto Release

Another optional feature of the AMC enables electronic braking of the motor. In this mode a DC voltage is applied to the motor windings resulting in a stationary magnetic field which brings the motor to a fast, smooth stop. The stopping time of the motor can be adjusted by changing the "Brake Torque" setting. The brake is automatically released when the motor comes to a stop

Motion Sensing / Anti Plugging

When used with Dynamic Braking option, the AMC can be purchased with a built in motion sensor which monitors the back EMF generated by a coasting and / or braking motor. When the motor comes to a stop, a LED indicator marked "Motor Stopped" turns on, along with a motion relay. The relay contacts are brought out for other control functions such as prevention of accidental plug reversing the motor which can cause sever damage in some applications.

The AMC as a Solid State Motor Starter

Normally the AMC is used in conjunction with a traditional electromechanical motor starter. However, with the addition of an overload relay, phase loss sensor and a logic voltage start / stop feature, the AMC can completely replace the electromechanical starter. Fast acting electronic fuses and shorted SCR detectors can also be added for further safety.

Low Maintenance

Unlike an electromechanical limit switch that requires periodic maintenance and often at places that are hard to reach, the M1025 requires no maintenance and has no mechanical cam/contacts to wear out. In addition the plug in output relays are easily field replaceable.

Security

Once the set points are programmed using the front panel programming interface, you can detach it from the main unit making the program inaccessible to any unauthorized personnel. The M1025 allows another level of security against unauthorized programming changes through the use of a programming enable electrical input.

Specifications:

Input Power:

230, 460 or 575 VAC, +12.5%
3 phase, 50 or 60 HZ

Power Devices:

6 SCR's, full wave inline
1400V rating

Transient Protection:

RC snubber network plus MOV's
on each phase

Operating Temperature:

-20°F to 122°F
(-28°C to 50°C)

Overload Capacity:

250% of current rating for 30 sec.

P-60 DigiBrake™

Frictionless Digital Brake with Motion Sensor & Automatic Release for AC induction motors

- ▶ **Precision Braking Current**
- ▶ **Thumbwheel Adjustment**
- ▶ **Motion Sensing**
- ▶ **Anti Plugging**
- ▶ **Automatic Release**
- ▶ **High Duty Cycles**
- ▶ **Overload Protection**
- ▶ **Status Indication**
- ▶ **Unmatched Power Density and Size**



Autotech's DIGIBRAKE provides a means to stop any AC induction motor quickly and safely without motor winding damage, excessive heat generation, or mechanical wear. When a motor needs to be stopped frequently because of different machine operations or set up changes, the machine productivity can increase dramatically by the elimination of normal coast down time.

Precision Braking Current

The DIGIBRAKE's ultramodern circuit eliminates the need to constantly adjust the brake torque and time settings due to line voltage and/or motor temperature variations. A motor starting cold in the morning can change 30 to 40% in current requirements during use. On other brake manufacturers units this change can result in a 2:1 change in stopping time. With DIGIBRAKE'S unique design features this is not the case as stopping time will remain constant no matter what voltage or temperature changes take place.

Thumbwheel Settings

Two digit thumbwheels are used for setting braking current in % of FLA resulting in accurate and repeatable stopping times.

Motion Sensing

The DIGIBRAKE not only electronically brakes the motor but monitors the back EMF generated by the coasting motor and displays a stopped signal a contact closure once motion has stopped.

Anti-Plugging

The motion sensing contact can be used as an anti-plugging feature to prevent changing motor direction until motion has stopped.

Automatic Release

The DIGIBRAKE also does away with the brake time settings on competitive models. The circuitry continually senses motor motion. Once the stop signal is sent, the motion sensor automatically de-energizes the braking cycle as soon as motion ceases.

High Duty Cycles

As a standard feature the unit can tolerate as high as a 50% duty cycle for up to a 150 Amp brake.

Overload Protection

The unit is protected against excessive DC currents caused by a defective or oversized motor. There are no fuses to be replaced.

Status Indication

There are three status LEDs used. Motor running, Motor Braking and Motor Stopped

Unmatched Power Density and Size

With the unit's modern heat-sink design valuable panel space is saved over electromechanical and other brake designs.

Specifications:

Input Power:

230, 380, 460 or 575 VAC, +12.5%
3 phase, 50 or 60 HZ

Current Setting:

20 to 100% of full scale

Accuracy:

+5% of current setting

Operating Temperature:

-20°F to 122°F
(-28°C to 50°C)

Current Setting:

20% to 100% of full scale by 2 digit thumbwheels.

Duty Cycle:

50% up to 150AMPS
10% over 150 AMPS

Enclosure:

12" x 10" x 6 1/2" open frame
12" x 10" x 7" NEMA 12 for brakes
up to 300 AMPS
Consult factory for higher ratings.

Interlock Relays:

Plug in relay contacts
10 AMP @ 120 VAC

Motion Sensor:

C-form Plug in
10 AMP @ 120 VAC

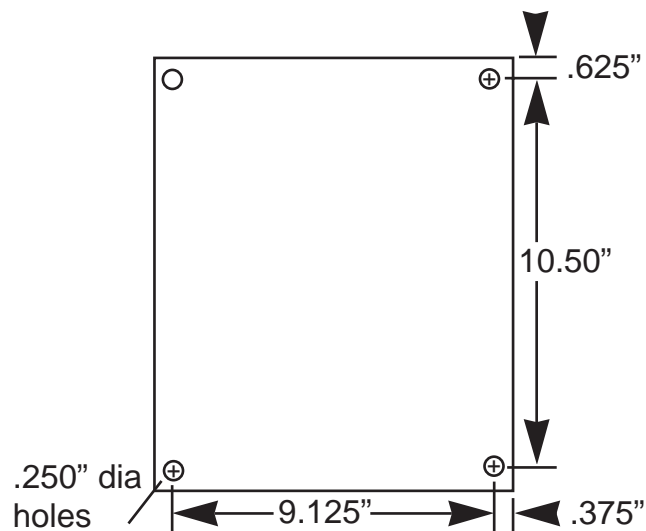
E & D Options:

Isolated set of contacts

R Option:

10 AMP @ 120 VAC, resistive.

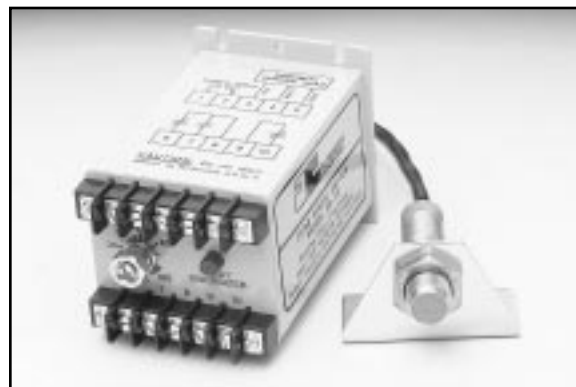
Outline Dimensions:



PS-111 & PS-112

Speed Switches

- ▶ **Solid State Constructions**
- ▶ **Adjustable sensing time**
- ▶ **Senses speed as low as 1/3 RPM**
- ▶ **High Noise Immunity and transient protection**
- ▶ **Explosion Proof option**
- ▶ **Low Cost**



PS-111 Zero Speed Switch

On application of power to the input, the internal relay is energized and a time interval starts. If there is motion being sensed, pulses will be present at the sensing input, and the timer will be reset on each pulse. Should motion stop, the unit will time out and de-energize the internal relay. If the pulses restart, the relay re-energizes and the timer resets.

Non-contact Proximity Sensors

PS Series Speed Switches, when used with QS series sensors, can monitor motion of any metallic target such as gear teeth, chain links, sprockets, bolt heads etc. as far as 0.4" away from the surface of the sensor.

Encoders, Programmable Controllers etc.

The pulse input to the PS Series Speed Switches can also come from any 12VDC device such as PLCs, encoders, photoelectric devices etc.

Electromechanical Sensing

The PS-111 may be used with a repetitive contact closure such as a limit or reed switches. The switch contacts will carry low voltage at low current, and the leads should be isolated from any other wiring, which might induce noise into the sensing output.

PS-112 Adjustable Speed Sensor

On application of power to the input terminals, the PS-112 begins sensing the repetition rate of the pulses being generated by the proximity switch. If the pulse rate is lower than the set-point adjustment, the internal relay remains deactivated. If the pulse rate is higher than the set point, the internal relay activates.

Sensing Range

150 to 1500 SPM standard. Other ranges on special order.

Response Time

Equal to time between any two pulses at a given set point.

Adjustment

Easily adjustable linear scale, locking bushing potentiometer.

Scan Loss Detector

The PS Series speed switches when used with Programmable Controllers to monitor if the PC is going through regular scans. If the PC quits scanning its I/O ports the pulses to the speed switch would stop and turn on an alarm.

Specifications:

Input Power:

120VAC +/- 10% VAC 50-60 Hz.

Output Contacts:

10 Amp resistive @ 115 VAC

Sensing Input:

120, 240 or 480 VAC, single or Three Phase

Operating Temperature:

-10°F to 135°F (-23°C to 57°C)

Output: One SPDT and One SPST (N.C) contacts

Sensor Input:

PS112: Input impedance 4.7k pull-up to 12VDC

Logic 1: 9 to 13VDC, **Logic 0:** 0 to 3VDC

PS111: Input impedance 4.7k ground

Logic 1: 5 to 13VDC, **Logic 0:** 0 to 0.8VDC

Pick-up Speed Variation: +/- 10% of setting over input voltage and temperature range

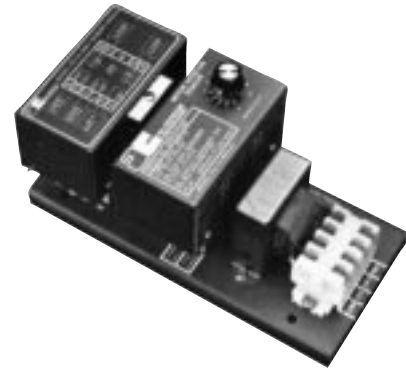
Maximum number of pulses per minute (PPM):

PS111 - 10,000, PS112 - 100,000

Pick-up Repeatability: +/- 2% at constant temperature and input voltage.

PS-119 ANTI-PLUGGING Zero Speed Switch

- ▶ **Fast and Simple Installation**
- ▶ **Lower Installation Cost**
- ▶ **Solid State Construction**
- ▶ **One size fits all**
- ▶ **Greater Reliability**
- ▶ **Greater System Protection**



The PS-119 Anti-Plugging Zero Speed Switch requires 115 VAC 50 or 60 HZ as a power source and works off the back EMF or generated voltage of a coasting motor as a sensing input. As soon as the motor comes to a complete stop, the Zero Speed Switch senses the absence of back EMF and allows the motor to be started in either reverse or forward direction. Whenever the motor is rotating (regardless of applied power or momentum) the output of the MRS-1R module is de-energized and the motor ceases turning the output turns on. The speed at which the output will turn on can be adjusted by a knob on this module. The MM11 memory module, allows you to restart instantly in the same direction of rotation if the motor is coasting, but prevents a restart in the opposite direction.

Fast and Simple Installation

The PS-119 Anti-Plugging Zero Speed Switch is designed to replace motor mounted devices.

Lower Installation Cost

With the PS-119 Zero Speed Switch installation is simple and economical as there are no gears or sensors to be mounted to the motor shaft. The device installs quickly in the control panel with no changes in control wiring. All operating checks are made in the control panel and there is no need to check zero speed at the motor.

Solid State Construction

The PS-119 is an all Solid State device without gears or sensors to mount on the motor or motor shaft.

One Device for Different Size Motors

The PS-119 can work on any size motor, from fractional to hundreds of horse power. The motor can be 115, 230 or 480 VAC.

Greater Reliability

Due to the solid state construction there are no gears, sensors and etc. to monitor, calibrate, maintain or wear out.

Specifications:

Input Power:

120VAC +/- 10%, VAC 50-60 Hz.

Output Contacts:

10 Amp resistive @ 115 VAC

Sensing Input:

120, 240 or 480 VAC, single or Three-Phase motor

Operating Temperature:

-10°F to 135°F (-23°C to 57°C)

PS-127A Voltage Sensor (Zero Speed Switch)

- ▶ **20 to 400 MV AC or DC adjustable sensing range**
- ▶ **600 Volts capacity**
- ▶ **Small Footprint**
- ▶ **10 Amp Relay Contacts**
- ▶ **Visual Indication**
- ▶ **Low Cost**



The PS-127A is a unique voltage-sensing device since even though the sensitivity is in millivolt range, the sensing terminals will accept up to 600 Volts over voltage. This feature lends the PS-127A to be used as a Zero Speed Switch monitoring the Back EMF generated by a coasting motor.

Operating Logic

The PS-127A voltage sensor requires 115 VAC, 50 / 60 Hz for its' operation. The output relay is energized when the voltage at the sensing input falls below the set point adjusted by a locking bushing potentiometer. A led indicator lights up when the relay is energized. The indicator and the relay turn off when the input exceeds the set point. The PS-127A has approximately 5% differential between turn on and off set points to avoid continuous output tripping when the input voltage is close to the switching point.

Easy Installation

As Zero Speed Switch the PS-127A is designed to replace motor mounted mechanical speed switches. The installation of this completely solid state device is fast and simple, right into the control panel with no changes in control circuit wiring. There are no gears or sensors to mount onto the motor shaft. The size of the motor is immaterial.

Solid State Construction

The PS-127A is an all Solid State device without gears or sensors to mount on the motor or motor shaft.

Specifications:

Input Power:

120VAC+/- 10%, VAC 50-60 Hz.

Output Contacts:

10 Amp resistive @ 115 VAC

Sensing Input:

120, 240 or 480 VAC, single or Three Phase

Operating Temperature:

-10°F to 135°F (-23°C to 57°C)

Network Products

InterBus, ModBus+, DeviceNet, Profbus

The industrial networks are playing an increasingly important role in manufacturing plants. Over the years, the networks have become fast, robust, reliable, and are being accepted in press rooms. AVG Automation offers several industrial bus product, and continues to develop new products to satisfy our customers' requirements. Below, we list some of the network products. Please contact the factory for your industrial network based press products.

Interbus Products:

InterBus Resolver Decoder

AVG's DM7 resolver decoder offers InterBus interface option. The DM7 uses a single turn resolver such as RL100, as position transducer and decodes resolver signal up to 4096 counts per turns. The DM7 makes this information available on the interbus.

- Single turn resolver decoder
- Bright LED for position & RPM display
- Interbus interface
- Programmable resolution & offset



InterBus Display

AVG's 1855D offers 3 & 5 digit displays for use on the Interbus. The displays provide bright red 0.56" 7-segment LED display.

- BCD to seven segment panel display
- 5 digits, .56" high, bright LED display
- Rugged metal enclosure
- Interbus interface
- 100% solid-state construction



InterBus RL210 Resolver

AVG offers the RL210 resolver with Interbus interface. The RL210 has two geared resolvers (128:1). The decoded position from the two resolvers is put on the Interbus.

- Robust dual resolver
- 17 Bits of decoded information
- Ideal for shut height applications
- InterBus interface



ModBus+ Product:

ModBus+ RL220 Resolver

AVG's RL220 resolver combines two single turn resolvers in one package. The two 1:1 geared resolvers effectively provide the same information (i.e. shaft position). The signals from one of the resolvers are brought out as such, while the signals from the other resolvers are decoded and placed on the Modbus+.

- Two single turn resolvers in a package
- Straight resolver & ModBus+ outputs
- Used for redundancy in press applications



Additional Products from AVG

“ Innovation & Quality by Design ”

In addition to press automation and monitoring products, AVG offers several other products, for use in pressrooms. AVG manufactures a wide range of touch-screen operator interfaces, Marquees, Message Displays, Andons, and Industrial Computers. Below, we list some of the features of these products. Please contact your sales representative or factory for more information on these products.

Marquees and Andon Displays

AVG Automation's Uticor Marquees represent the best in plant-wide communication. Uticor marquees are constructed with specially selected LEDs to provide uniform brightness over long life of the units. Marquees come in variety of sizes and can be stacked to meet different application needs.

AVG Uticors high quality marquees and other display components allow you to get Andon displays made for customized communication.

- Variety of sizes: 1-8 lines, 2-8" character height
- Uniform LED brightness over the life of marquees
- Readable from 100 to 400 feet
- Parallel and/or serial control
- Networkable
- Stackable units
- Wall-mount or suspended



Message Displays/ Operator interfaces

AVG-Uticor offers a wide variety of character based message display & operator interfaces with highly visible VFD displays. The high quality construction makes these units natural choices in plant environment.

- 1-4 line, 20 or 40 char per line
- On- or Off-line programming
- Interface to most PLC's
- Front panel keys on several units for operator interaction



Industrial Computers

AVG Uticor offers rugged industrial computers suitable for plant floor operation. A unique feature of AVG's industrial computers is the "Hot Swappable" feature which allows your to change the display without turning off the computer. Thus, if the displays requires changing, or back light bulb require replacement, the PC can continue to control or operate while you change the display.

Glossary of Terms

A comprehensive glossary of technical terms (an excellent reference) for your use. The glossary contains not only the terms used in this catalog, but also the terms that are useful in press rooms.

ACMS

AVG's acronym for Automation Control and Monitoring Systems.

Address

Unique designation for the location of data or the identity of an intelligent device; each device on a communications line can respond to its own message.

Air Pressure Switch

A switch that is used to determine if pressure is in an air line and send a discrete signal when a selected pressure condition has been met.

ANSI

(American National Standards Institute) Non-profit, non governmental body. U.S. member to the ISO (International Standards Organization).

Anti-Repeat

Part of the press control system designed to limit the press to a single stroke if the tripping or actuating means is held operational.

ASCII

(American Standard Code for Information Interchange) A binary code consisting of 7 data bits plus 1 bit for parity or special symbols; established by ANSI for compatibility between data services.

Automatic Feeding

Feeding wherein the material or part being processed is placed within or removed from the point of operation by a method or means not requiring action by an operator on each stroke of the press.

Automatic Single Stroke

A press stroking control mode whereby the press clutch control or trip-control system is given a stroke initiating signal by an automatic feeding system or other auxiliary equipment without the action by an operator after the initial start.

Back EMF

(Electro - Motive Force) The voltage that a motor generates while rotating without power being applied (while coasting).

Baud Rate (baud)

Unit of signaling speed. The data transfer rate between two or more devices or modems. The speed in baud is the number of line changes (in frequency, amplitude, etc.) or events per second.

Bed Area

Front to Back, and Right to Left, dimensions of the top working surface of the bed.

Bit

(Binary Digit) Smallest unit of information that can be stored or transmitted by digital means.

Bitmap

A graphic consisting of bunches of little dots on-screen

Blow Off

An air system used to remove a part from a die after the press has formed it.

Bolster Plate

The plate attached to the top of the bed of the press having drilled holes or T-Slots for attaching the lower die or die shoe.

Brake

The mechanism used on a mechanical power press to stop and/or hold the crankshaft, either directly or through a gear train, when the clutch is disengaged.

Brake Monitor

A sensor designed, constructed and arranged to monitor the effectiveness of the press braking system.

Brake Stopping time

Total response time of all components (electrical, pneumatic, and mechanical) of the press drive brake system to bring slide motion to a halt (zero).

Buffer

A temporary storage device used to compensate for a difference in data rate and data flow between two devices (typically a computer and a slower device). With a printer it is usually called a "Spooler."

Byte

A two digit hexadecimal value placed in or read from an address or register.

Chain Break

The cam or resolver on a press is usually connected to the crankshaft by a sprocket and chain assembly. Chain break detection is performed by either a physical switch or by motion detection.

Checksum

A method of memory/program checking. At start-up (power on), the microprocessor based device will check the validity of the stored program routine with additional stored information.

Chopper

A device used to cut up waste material after a punching operation has been completed. Usually mechanically coupled to the crankshaft of the press.

Closed Loop

Any system where the output is measured compared to the input (such as motor speed due to the input voltage compared to a tachometer voltage being returned from the motor, to control or maintain motor speed.

Clutch

The coupling mechanism used on a mechanical power press to couple the flywheel to the crankshaft, either directly or through a gear train.

Glossary of Terms

Coil Feed

One method of feeding raw material into the press. Can be either a horizontal or vertical feeding system.

Commutation

The switching of voltage into a motor's phase windings necessary to create rotation.

Concurrent

Acting in conjunction; used to describe a situation where two or more controls exist in an operated condition at the same time.

Continuous Stroking (Continuous)

Uninterrupted multiple strokes of the slide without intervening stops at the end of individual strokes. The Continuous mode is maintained by the control system once stroking is manually initiated by the operator(s).

Counter-balance

The mechanism that is used to balance or support the weight of the connecting rods, slide, and slide attachments.

CPU

(Central Processing Unit) Microprocessor that does the computation work and runs the programs or applications.

Crankshaft

The member of a punches that moves the slide down and up when coupled to the flywheel by the clutch.

Daisy-Chain

Linking of multiple devices in sequence to a data line such that information flows through one device to the next. Daisy-Chained devices are usually distinguished by unique device addresses.

Data Bits

Number of data bits in each data packet sent between two computers or devices. Most characters are transmitted in 7 or 8 data bits.

DC Drive

A motor control system that varies the speed of the motor by controlling the electrical voltage supplied to the motor. Speed of the motor is regulated by adjustable voltage to the armature operating below base speed, and by weakening the field excitation when operating above base speed (constant torque below base speed, constant horsepower above base speed).

DCE

(Data Communication Equipment) Devices that provide the functions required to establish, maintain, and terminate a data-transmission connection.

Die

The tooling used in a press for shearing, punching, forming, drawing, or assembling metal or other material. An upper and a lower die make a complete set.

Die Cushion

A pneumatic and/or hydraulic device that applies a counter -pressure to slide. Usually used in draw forming applications.

Die Protection

A system that, through the use of sensors, will stop the press if an unusual event were allowed to happen would cause damage to the dies or the press itself. Also used to detect when stock needs to be replaced.

Die Set

A tool holder held in alignment by guide posts and bushings and consisting of a lower shoe, an upper shoe or punch holder and guide posts and bushings.

Die Setting

The process of placing or removing dies in or from a mechanical power press, and the process of adjusting the dies, other tooling and safeguarding means to cause them to function properly and safely.

Die Shoe

A plate or block upon which a die holder is mounted. A die shoe functions primarily as a base for the complete die assembly, and, when used, is bolted or clamped to the bolster plate or face of the slide.

Direct Drive

A type of drive arrangement wherein no clutch is used; coupling and decoupling of the driving torque is accomplished by energizing and deenergizing a motor.

DOS

Disk Operating System. Developed by IBM and Microsoft, created the self instruction set (Executive Code) to allow personal computers to work with, store, and display data.

DTE

(Data Terminal Equipment) Devices acting as a data source.

Dual Valve

Controls the air pressure to the Clutch/Brake system of a power press.

Eddy Current Drive

A type of variable speed coupling between a single speed main motor and the Flywheel.

EEPROM (E2PROM)

(Electrically Erasable Programmable Read-Only Memory) A non-volatile semiconductor PROM that can be erased by applying an electrical signal for reuse (re-write). Does not require any power to maintain memory.

Eject Detect

A system that detects when a finished part completely leaves the die area.

Ejector

A mechanism for removing work or material from between the dies.

Glossary of Terms

Electrical Noise

Electrical noise can come from a variety of sources including, but not limited to: power line disturbances, externally conducted noise (as from coil driven devices - relays/solenoids/clutches/brakes, SCR fired induction/resistance heaters or motor speed controls, Arc Welders, etc.), transmitted noise (such as radio transmitters for remote control operations or wireless communications), ground loops (voltage/current present on the equipment or shield ground conductor usually due to multiple earth ground connections at a distance from each other). The effects of induced "noise" can be reduced (or eliminated) by twisting the wires to limit straight line antenna effects, and by crossing voltage/current carrying conductors at 90 degree angles.

EMI/RFI

(Electro-Magnetic Interference/Radio Frequency Interference) Line or "background" noise that can alter or destroy data transmissions.

E/M Relay

Electro-Mechanical Relay

Emulation's

The imitation of all or part of a computer system, performed by a combination of hardware and software, that allows incompatible systems to work together.

End Of Stock

A sensor that detects when there is no more coil or strip fed material left to feed. This sensor system usually top-stops the press.

Engagement Angle

(Die Protect) A user specified angle before Bottom Dead Center (180 degrees). An E-Stop will not be recognized between the engagement angle and BDC to prevent die lock-up, or "sticking- the-press," on BDC.

EPROM

(Erasable Programmable Read-Only Memory) A non-volatile semiconductor PROM that can be erased by exposing it to intense ultraviolet light for reuse. Does not require any power to maintain memory.

Even Parity

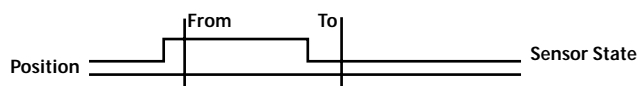
Works similarly to Odd Parity. The eighth bit is either a 1 or a zero so the word received will always be even.

Face of Slide

The surface of the slide to which the punch or upper die is generally attached.

Falling Edge

A die protection sensor mode where the sensor detects an object (or is "tripped") before entering a "window" and resets before the "window" closes.



Fault

An abnormal condition of a control system.

Firmware

A computer program or software stored permanently in PROM or ROM, or semi-permanently in EPROM.

Flywheel

Major source of energy for the mechanical power press when performing "work."

Full Revolution Clutch

A type of clutch system that cannot be disengaged until the press has completed a complete cycle, stroke, or revolution.

Full Revolution Clutch

A type of clutch that, when tripped, cannot be disengaged until the crankshaft has completed a full revolution and the press slide a full stroke.

Green Constant Sensor

Must turn on before the ready signal begins and turn off after the ready signal ends; that is, it must stay actuated during the ready signal.

Green Quick Check

Must turn on after the ready on signal and off before the ready off signal.

Green Sensors

Must actuate at least momentarily during the ready signal.

Green Special Sensor

Used to detect slug ejection.

Guide Post

The pin attached to the upper or lower die shoe, operating within the bushing on the opposing die shoe, to maintain the alignment of the upper and lower dies.

Hydraulic Overload Protection

A method of limiting the amount of stamping tonnage to a pre-set level to protect the press from "overload" conditions during the full load portion of the stroke cycle (typically 1/4" to 1/2" before BDC depending upon press design)

Icon

A picture to represent an object such as a program, file, or command.

Inch

Mode of Stroke Control. Used in setting up the machine; not a production mode.

ISO

International Standards Organization

Isolated Input (output)

A means of isolating the external signals from the internal control electronics.

Jog

An intermittent motion imparted to the slide by momentary operation of the drive motor, after the clutch is engaged with the flywheel at rest.

Glossary of Terms

Knockout

A mechanism for releasing material from either die.

LED

(Light Emitting Diode) A semiconductor light source that converts electrical signals to visible light or invisible infrared radiation.

Liftoff

Also known as knockout.

Line Driver

A DCE device that amplifies a data signal for transmission over cable for distances beyond the RS-232 limit of 50 feet.

Manual Feeding

The material or part being processed is handled by the operator on each stroke of the press.

Mnemonics

Converting commands to/from code (bytes) for memory storage and retrieval.

Motion Detect

Used to detect movement of the resolver shaft to sense decoupling. The motion detection circuit is activated after an adjustable time delay to allow for the clutch and crank to mechanically start turning.

Network

The connecting of several separate computers together to allow sharing of information and equipment (such as printers, scanners, modems, etc.).

No Parity

When No Parity is chosen or used to transmit characters in the standard ASCII code set, the eighth bit is still transmitted, but is ignored by both the terminal and the remote system.

Node

A point of interconnection to a network

NPN (N type outputs)

It's normal condition is Hi and when actuated sinks to near ground.

Null Modem

A device that connects two DTE's directly by emulating the physical connections of a DCE device.

OBI

(Open Back Inclined) A gap frame press arranged so that the press frame may be inclined for part or scrap removal by gravity.

Odd Parity

The terminal adds up the individual data bits used to transmit a character and then adds an eighth bit. If the sum of the bits in the character is even, the system will add a 1 bit to make it odd. If the sum is odd to begin with, the terminal will add a 0 bit to leave it unchanged.

Offset (Factor)

A value added to resolver position to get displayed position.

Optical Encoders

Operate by rotating or moving a "grating" that is positioned between a light source and a detector. When light passes through the transparent areas of the grating, an output is seen from the detector. The light source may be a light emitting diode or an incandescent lamp, and the detector is either a photo-transistor or (more commonly) a photo diode. Two channel encoders provide position information and directional information as the outputs are usually offset by 90 degrees from each other (one leads/one lags). Output signals are typically square waves.

Opto-Isolated

A method of sending a signal from one piece of equipment to another without using an interconnecting electrically conductive path. The signal is transmitted optically with a light source and a light sensor.

Output Enable

A method of externally enabling and disabling the outputs of a monitor.

Parallelism

Flatness of the slide face to the top of the bed (or bolster). Typical manufacturing standards are .001" per foot of die space, front to back and left to right - no diagonals at BDC (if provided with pneumatic counter-balance - over balance pressure to be used to remove any lost motion within drive train).

Part Revolution Clutch

A type of clutch system that can be disengaged at any point before the press has completed a complete cycle, stroke, or revolution.

Phase Modulation

One of three ways of modifying a sine wave signal to make it "carry" information. The sine wave or "carrier" has its phase changed in accordance with the information to be transmitted.

PLC

(Programmable Logic Controller) A machine controller that activates relays and other devices from a stored program and connected to input devices.

PLM

AVG's acronym for Programmable Load Monitor.

PLS

See Programmable Limit Switch.

PWM

(Pulse Width Modulation) A method of controlling the average current in a motor's phase winding by varying the on-time (duty cycle).

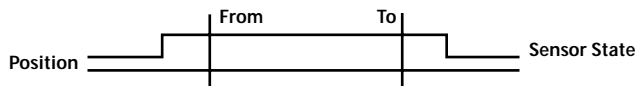
PNP (P type outputs)

It's normal condition is Low and when actuated rises to the +DC power supply voltage.

Glossary of Terms

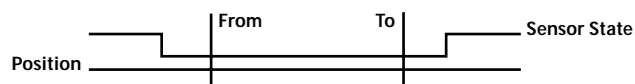
Position High

(See Green Constant Sensor). A die protection sensor mode where the sensor detects an object (or is “tripped”) during the entire “window.” If the sensor’s state is not high at the beginning of the “window” and/or goes “low” before the “window” closes, a fault will be registered.



Position Low

A die protection sensor mode where the sensor does not detect (or is ‘tripped”) at any time during the “window.”



Presence-Sensing Device

A device designed, constructed, and arranged to create a sensing field, area, or plane that will detect the presence of the operator’s or other’s hand or other body part.

Program Enable

A method of security that allows operational programming to be done and restricts access to unauthorized personnel.

Programmable Limit Switch

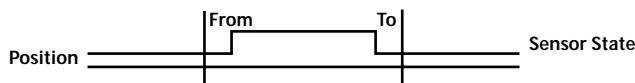
An electronic device that can change the state of an output based on the relative rotational position of a mechanical device.

Protocol

A formal set of conventions governing the formatting and relative timing of message exchange between two communications systems.

Pulse

(See Green Sensor) A die protection sensor mode where the sensor detects an object (or is “tripped”) after the start of a “window” and resets prior to the “window closing.”



RAM (electronic)

(Random Access Memory) Semiconductor read/write volatile memory. Data stored is lost if power is turned off.

Ram (mechanical)

See “Slide.”

Red Sensors

A normally closed static sensor that when opened is a fault signal.

Repeat

An uninitiated or unexpected successive powered stroke of the press resulting from a malfunction.

Resolver

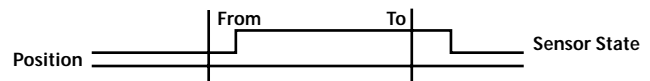
A device that converts relative rotational position to an electronic signal; a rotating transformer with three

windings. One winding (Rotor - R1,R2) induces a sine wave type signal into the rotor which then induces the signal into two windings (Stator - S1, S3 and S2, S4) 90 degrees out of phase with each other to provide position, rotation, and speed information.

Output signals are sine waves.

Rising Edge

A die protection sensor mode where the sensor detects an object (or is “tripped”) after the start of a “window” and stays “tripped” until after the window closes.



Rotating Cam Switch

An electro-mechanical device used to send a signal when the crankshaft reaches a specific degree of rotation. Accuracy of these devices is approximately +/- 5 degrees. Must be manually set.

RS-232

EIA interface standard between DTE and DCE equipment, employing serial binary data interchange.

RS-422/423

EIA interface standard that extends transmission speeds and distances beyond RS-232. RS-422 is a balanced-voltage system with a high level of noise immunity; RS-423 is the unbalanced version.

RS-485

Balanced interface similar to RS-422 and is used in multi-point applications where one computer controls many different devices.

Run

Mode of Stroke Control. Single stroking or Continuous stroking of a press. Production modes of operation.

Run-Out

The amount of deviation of the vertical path of the slide (ram) face from vertical during the stroke of the press.

Scale Factor

A programmable resolution that divides a complete cycle into individual sections (desired counts per turn, minus one).

Serial Transmission

The most common transmission mode. Information bits are sent sequentially on a single data channel.

Set Point Pair

Two points that define a “start” or “beginning”, and a “finish” or “end.”

Shielding

Protective cable covering that eliminates electro-magnetic and radio frequency interference.

Short Feed

When material does not completely move into the die area.

Shut Height

Glossary of Terms

Distance from the top of the Bed (or bolster plate) to the Slide Face with the stroke at BDC (typ. 180 degrees), and slide adjustment at the upper most travel limit.

Signature

(As used in Tonnage and Die Protect) A monitor mode in which the unit records input activity data.

Single Stroke

Mode of Stroke Control. One complete stroke of the slide, usually initiated from a full open (or up) position, followed by closing (or down) and then a return to the full open position.

Sinking

See NPN

Slide

The main reciprocating press member. Smaller presses also call the "Ram." Also called a plunger or platen.

Sourcing

See PNP

Speed Compensation

A programmable method where the "window" of programmed operation can be "advanced" when machine speed is increased beyond base speed. This is used to compensate for device response time.

SS Relay

(Solid State)

A solid state type of control relay. Uses semiconductors to control output voltage/current

Stock Buckle

A condition that is sensed and indicates that material has miss-fed.

Stop Bits

Specify the time between transmitted characters. Stop bits are not actually bits; they are timing units between character (7 or 8 bit words). Above 110 baud, stop bit value is typically 1.

Stop Time

The amount of time it takes for the press to stop once the run signal has been stopped.

Straight Side

A power press that has four columns, one at each corner of the machine. Usually starting at a 150 ton rating.

Straightener

A series of rollers that straighten coiled stock prior to entering the punch press die area.

Stripper

A mechanism or die part for removing the parts or material from the punch.

Surge

An oversupply of voltage from the power company/or voltage supply grid, lasting as long as several seconds. A strong surge can damage equipment.

Time Based

Describes one form of braked monitoring. Measures

the amount of time that it takes for a press to stop once the run signal has been stopped. Usually measured in micro-seconds.

Tonnage Monitor

A system used to measure the amount of pressure developed by the stroke of a power press. Can be used to maximize the performance of a machine, increase the accuracy of the press and prevent possible damage to the dies or the machine.

Tonnage Overload

The amount of work being required of the press that is beyond its design capacity to provide.

Top Stop

A stop signal that will cause the press to stop at the top of its stroke rather than an immediate stop.

Transient

An abrupt change in voltage, of short duration; a brief pulse caused by the operation of a switch. Also called a "Spike."

Unitized Tooling

A type of die in which the upper and lower members are incorporated into self-contained units and arranged as to hold the die members in alignment.

Virtual

A computer simulation that looks real, but not really there.

Virtual Memory

The ability of the computer to use a part of the hard disk for RAM in performing program operations.

Volatile Memory

A storage medium that loses all data when power is removed.

Window

(As used in Programmable Limit Switch and Die Protection) A period of operation defined either by specifying position "On" points with either a position "Off" or timed "Off" point. Most Autotech devices can have multiple "windows" of operation for each output/input channel.

Yellow

A static sensor normally open to ground; a stop command is sent to the press as soon as the sensor actuates (closes with respect to ground).