

Helm Instrument Co. • 361 West Dussel Drive • Maumee, Ohio USA • 419-893-4356

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SECTION 1:

INTRODUCTION

You have just purchased the most advanced press control system available. HELM INSTRUMENT COMPANY, INC. manufactures a complete line of press control solutions for use on metal stamping, forging, compaction and assembly presses.

At HELM, quality is inherent not only in the design of our products but in the attitudes of our employees as well. We're working together to give you the best. After all, that's what our business is all about - providing innovative instrumentation to help make your manufacturing processes more productive and your operations more efficient.

THE HELM-PAK SYSTEM

Helm-Pak consists of an operator interface type enclosure containing the, run buttons, press control processors, magnetics and Human Machine Interface (HMI). These components are laid out for the maximum operator efficiency.

The control enclosure(s) contain Allen-Bradley SLC PLC's, operating pushbuttons, selector switches and the operator Interface.

The dual rack configurations provide the redundant control of the clutch and brake system. Both controllers monitor all clutch/brake I/O and exchange information about machine status. They are linked by hardwired I/O so if one controller detects a condition different from that detected by the other, the control logic is designed to declare a fault and turn off all outputs to press valves. The other controller is designed to follow suit.

Compliance:

The package uses two redundant processors with application software for self testing and verification to meet the safety requirements of ANSI B11.1, OSHA 1910.217 and CAN/CSA Z142-M90 press safety regulations for mechanical stamping presses.

REPLACING MODULES

Do not remove modules under power.

The module location in a specific rack is critical to proper operation of the Helm-Pak press control. If a module is replaced, ensure that the proper module is inserted into the proper slot in the rack. If it is not the ladder programming will not recognize the module and the Helm-Pak control will become unstable and unsafe to operate.



SAFETY FIRST Check all light curtains, barriers, safety shields and personnel safety devices to ensure that they are present and functioning properly. If they are not, do not proceed with starting the press. Authorized personnel should make any repairs that are required before starting the press. *Always wear eye and ear protection when operating a stamping press.*

SECTION 2:

CLUTCH / BRAKE SOFTWARE

The HelmPak Clutch/Brake Control System is a bundle of hardware, software, and engineering documents designed to control the clutch and/or brake mechanism on a mechanical stamping press that has a part-revolution friction clutch and/or brake. This system uses two processors for clutch/brake control.

The clutch/brake control system is designed to signal brake wear by monitoring the brake monitor cam (BCAM). Should it see the BCAM closed after a normal cycle stop has been initiated and before the press comes to a top stop, it is designed to protect against press restart.

I/O modules in both Clutch/Brake chassis are identical for clutch/brake control. If the processor in one chassis detects a condition different from that detected by the other, its control logic is designed to declare a fault and turn off all outputs to press valves. The other processor is designed to follow suit. Dual processors control outputs to clutch/brake valve.

Clutch/Brake Modes:

The operator can select the mode of control system operation with the selector switch located on a control panel.

Mode Operation

five seconds.

Inch	Jog the press through successive parts of the cycle by pressing and releasing the pair of INCH buttons. If INCH buttons are held, the press will stop at the top of its stroke, if inch stop on top is enabled in the setup menu.
Single-stroke	Run the press through one complete cycle by holding both RUN buttons until completion of the down stroke.
Continuous	Run the press in a single on demand manner until stopped by a stop-on- top command or until a fault is detected. The method to start the press is a factory configured option where operator presses the CONTINUOUS SETUP button and press both RUN buttons in all active stations within

POSITION MONITORING

• The Helm-Pak Press control is configured with dual resolvers to monitor the position of the press electronically. The control system monitors the rotational position of the press.

PROGRAMMABLE LIMIT SWITCH OPERATION

PLS software is a group of engineered press-control products for PLC processors. This software controls the operation-of:

• Programmable Limit Switch (PLS) for crankshaft synchronization

WHAT IS A PROGRAMMABLE LIMIT SWITCH?

The Programmable Limit Switch is ladder logic for a PLC -based control system that times or sequences outputs according to precise and repeatable positions of a crankshaft. Crankshaft positions are monitored by a resolver. You can use PLS to integrate auxiliary press machinery such as lifters, grippers, blow-off valves, and interpress automation into your stamping press control system.

HOW A PLS CHANNEL WORKS

You preset the rotational position (preset angle) at which you want the PLS output to turn ON. You select how you want the PLS output to turn off: based on a preset angle or a preset time. If the PLS is to only occur intermittently, based on a number of strokes, then Intermittent angle or intermittent timer mode is necessary. You will then select the number of strokes, time duration, or OFF angle based on the desired mode of operation



APPLY DM SENSORS TO A STAMPING PROCESS IN A VARIETY OF WAYS.

Typical PLS / DM / Load Monitoring Application



FOR EXAMPLE:

SENSORS TO DETECT MOVEMENT OF A PART part in position part ejected feed coil misfeed

SENSORS TO DETECT STATIC CONDITIONS lube end of feed die clamps air pressure

DESCRIPTION OF MODES

The purpose of DM channels is to verify that predictable conditions in your press operation take place. When the software detects a fault condition, it sets a selected output response. You select the type of mode for each channel from the following:

- Static
- Cyclic
- Intermittent Cycle
- In Position
- Intermittent In Position

Use the following table to help you select the types of channel modes required for your application.

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Mode:	Signal must be seen as follows, or function sets an output action:
static	continuously
cyclic	Thru a preset angular window once every cycle.
Intermittent cyclic	Thru a preset angular window after a preset number of press cycles
in position	thru a preset angular window (with part in place)
intermittent in position	Thru a preset angular window with part in place after a preset number of press cycles.

DEFINITION OF DIE MONITORING WINDOW

Window Input signals for Cyclic (CYC) and In-position (POS) modes are synchronized with the rotation of the crankshaft, and must be detected within a zone of crankshaft rotation. We call this zone a window. For example, a part-detect signal could be expected within a window of 80-110° to indicate that a part was inside a die before it was hit by a stroke.

When the software detects input signals that are different from those described here, the software generates a fault signal. We graphically define these (window) inputs as follows:

DEFINITION OF DIE MONITORING WINDOW



Cyclic (CYC) N.O. Use this mode to verify that a pulse from the sensor (OFF-ON-OFF) occurred within the window once each stroke. For example, use it to detect that a part moved past a monitor.

Transition Diagram	For These Expected Transitions	Input is NOT ALLOWED When Sensor:	Which Results in a Fault Signal Sent After:
	Sensor turns ON then OFF within window	1. stays ON beyond window	window goes OFF
		2. turns ON outside window	sensor turns ON
		3. remains OFF for the cycle	next window goes ON

Cyclic (CYC) N.C. Use this mode to verify that a pulse from the sensor (ON-OFF-ON) occurred within the window once each stroke. For example, use it to detect that a part moved past a monitor.

Transition Diagram	For These Expected Transitions	Input is NOT ALLOWED When Sensor:	Which Results in a Fault Signal Sent After:
	Sensor turns OFF then ON within window	1. stays OFF beyond window	window goes OFF
		2. turns OFF outside window	sensor turns OFF
		3. remains ON for the cycle	next window goes OFF

In-position (POS) N.O. Use this mode to verify that the sensor signal remained ON within the entire window once each stroke. The signal must cycle OFF outside the window. Use it to detect if an ejector and other automation parts are retracted to home position.

Transition Diagram	For These Expected Transitions	Input is NOT ALLOWED When the Sensor Signal:	Which Results in a Fault signal Sent After:
	Sensor turns ON before, and OFF after window	1. turns OFF before window goes OFF	sensor turns OFF
		2. does not turn OFF outside window	next window goes ON
		3. remains OFF for the cycle	next window goes OFF

In-position (POS) N.C. Use this mode to verify that the sensor signal remained OFF within the entire window once each stroke. The signal must cycle ON outside the window. Use it to detect if an ejector and other automation parts are retracted to home position.

Transition Diagram	For These Expected Transitions	Input is NOT ALLOWED When the Sensor Signal:	Which Results in a Fault signal Sent After:
	Sensor turns OFF before, and ON after window	1. turns ON before window goes ON	sensor turns ON
		2. does not turn ON outside window	next window goes OFF
		3. remains ON for the cycle	next window goes ON

DEFINITION OF DIE MONITORING WINDOW

Intermittent Cyclic (ICYC) Use this mode to verify that a pulse from the sensor (OFF-ON-OFF) occurred within the window once after a preset number of press cycles.

Transition Diagram	For These Expected Transitions	Input is NOT ALLOWED When Sensor:	Which Results in a Fault Signal Sent After:
³	Sensor turns ON then OFF within window	1. stays ON beyond window	window goes OFF
		2. turns ON outside window	sensor turns ON
		3. remains OFF for the cycle	next window goes ON

DEFINITION OF DIE MONITORING WINDOW

Static Mode (STC) Use this mode to detect that an event occurred independent of the press stroke. When a static-mode input turns Off, the programmed output is turned On. For example, use it to detect end of stock.

OUTPUT RESPONSES FOR DIE MONITORING CHANNELS

When the software detects a channel fault, it displays the channel number and type of fault on the Operator Interface screen. The software also sets a fault response that you select from the following:

- Warning (displays alarm banner on the active screen)
- Top Stop
- E-Stop
- Output bypassed (no fault response)

SECTION 3:

BASIC OPERATING INSTRUCTIONS

- Turn power on
- Set CONTROL POWER to ON
- Press CONTROL POWER RESET, to reset the safety relay
- Start the Oil/Coolant pumps, button will turn green when all pumps running
- Set the press MODE selector switch to INCH mode
- Set the Main Motor selector switch to FORWARD
- Press Main Motor Start
- Verify that the current job/recipe matches the part being produced
- Set the press MODE selector switch: Inch, single, or Continuous

Job No. : NNN	Syster		\$\$\$\$\$\$\$\$\$\$\$\$\$		
Position: NNN	SPM: NNN		4/15/.	2009 2:18:	48 PM
	NNN NNN"	A	ROBO	FAILED T	O CYCLE
SHOT HEIGHT: NNN.NNN B GREASE MOTOR CONTACTOR FAULT Motor Status PLS Status Tonnage Reverse 1 2 3 4 Robot Cycled 5 6 7 8 Die Monitoring Status NNN NNN Right FROM 1 2 3 4 5 6 7 8				RIGHT REAR RIGHT REAR RIGHT FRONT NNN	
Part Counter Batch Counter Setpoint NNNNNNNN Actual NNNNNNNN				mter INNNNNN INNNNNN	
Login	Motor Control	Syste Set-i	A me vO qu	ctive erview	Recipe Overview

The Main Menu screen is the initial startup screen.

Fault conditions are indicated on the top of the screen in the alarm banner. Clear any faults by pressing the FAULT RESET button on the operator station.

Press is ready to start – Refer to Mode of Operation

- To EMERGENCY STOP the press push E-STOP
- To stop the press in a non-emergency press TOP STOP

MODE OF OPERATION

Off	Disable operation of clutch/brake control.
Inch	Press and release both RUN buttons on side of Operator Interface enclosure to inch slide. Hold RUN buttons in and press will make one complete cycle, stopping at the top of the cycle, if inch stop on top is enabled
Single Stroke	Press and hold RUN buttons for entire down stroke of press, past 180. Press will stop at the top of the cycle.
Continuous Run	In this application Continuous is being used to operate the press in a Single-On-Demand mode. Press CONTINUOUS SETUP button. Press both RUN buttons within 5 seconds of pressing the CONTINUOUS SETUP button. Hold the RUN buttons for the entire down stoke of the first cycle. Release the RUN buttons on the upstroke of the first cycle. The press should now be operating in Single-On-Demand mode. The press will stop at the top of the press stoke, waiting for the robot to leave and initiate another stroke. The press will wait at top for an amount of time determined in the Job Recipe.

SHUT DOWN SYSTEM

To shut down the Helm-Pak:

- Stop the press
- Shut off Main Motor
- Shut Control Power off.
- Turn panel power off.

SECTION 4:

SCREEN NAVIGATION

MAIN MENU



The MAIN SCREEN provides a display of pertinent information about the current run, including the FAULT description when a machine stop occurs.

If recipe is incorporated into your system, the current job number is displayed. If shutheight monitoring is installed, the current shutheight is displayed.

Entering a Preset

Most of the screens allow you to set a preset by touching the field for entry area on the screen. A data entry field will pop up and you will use the numeric or alphanumeric keys to enter the value. Use the ENTER key to store the value.

All Setup screens require a user to be logged in with sufficient privileges; this is done through the Login Screen. Users can logout manually from the login screen or they will be automatically logged out after 30 minutes of no activity on the HMI.

By pressing on the various sections of the main menu, the user will be directed to that specific screen. For example Tonnage will take the user to the main tonnage screen, Counters to counters screen, etc.

Login



Runtime Version - displays the current version of the HMI Application

Login - will bring up a user/password message, which will allow for value entry.

Logout - will log a user out and return the system to the "Default" user.

A user will automatically be logged out if there is no screen activity for 30 minutes.

Counters



Parts Per Stroke - Identifies the number of parts each counter will be incremented by per press stroke

Counter:

- Preset the value at which the count will continue to accumulate
- Actual the current value of the counter
- Counter On/Off enables the counter
- Reset Resets the Actual value

Motor Control



This screen allows the user to Start and Stop the Filter Motor, as well as displaying the current status of the motor.

Tonnage Main



The 4 channels of Tonnage are all displayed individually, along with corresponding trending displays, and the Total Tonnage.

The Monitor Parts/Peak Push Button Determines the mode of the Tonnage Module

- Peak Mode capacity alarms are active, trend alarms are inactive
- Monitor Mode both capacity and trend alarms are active

The Reverse Load Off/On Push Button Determines the mode of the Tonnage Module

- Off The module monitors standard load/force.
- On The module monitors the measurement of negative load/force being exerted on machine following the break-through of material, also referred to as snap through.

Tonnage Alarms

4/15/2009	A	ssssssssssss			
2:23:13 PM	Positio	on: NNN °	SPM: N	INN	Job No. : NNN
	FAILED TO CY	(CLE	B GREASE	MOTOR CON	TACTOR FAULT
		HIGH CAPACITY (Tons)	HIGH TREND (%)	LOW TREND (%)	
LEFT	FRONT			NNN	
LEFT	REAR		NNN	NNN	
RIGH	T FRONT	NNNN	NNN	NNN	
RIGH	T REAR		NNN	NNN	
					Return

High Capacity – displays the current High Capacity Alarm Setpoint.

• These values are set for each channel and are typically established as press capacity alarms. Each channel is typically set based on the formula:

Press Capacity divided by number of strain gage channels. This value can be set lower that press capacity on each channel, but no higher than 195% of scale factor.

High / Low Trend % - Displays the current Trend Percentage for the running tonnage

 These values, set independently on each channel, are based on a percent of allowable change from a sampled tonnage. This value can range from 1% to 99%. A setting of 0% disables the trend alarms.

SECTION 5:

System Setup



On the main System Setup screen, the user has 5 entry options, 4 page buttons, and an exit to configuration screen button. The Exit to Configuration screen button exits out of the current running application, to the built in HMI interface.

Resolver Setup

This is used to calibrate the resolver input module during initial installation. Move the crank position to 0 degrees and press Zero Resolver. Calibrate the resolver input module in both PLC A & PLC B processors.

DM Inch Bypass

This buttons will allow Die Monitoring Inch Bypass to be enabled or disabled (Enabled by Default)

Inch Stop On Top

This buttons will allow Inch Stop On Top to be enabled or disabled (disabled by Default)

Top Stop Setup

Run the press at maximum speed.

Enter the arbitrary number into the minimum angle. (350)

Run a Single stroke.

Add or subtract the top stop angle value to get an accurate top stop and enter that value into the top stop angle.

For instance if the press stops at 30°, Subtract 30 from the top stop and enter that value of 350(350-30=320). Enter 320 into the minimum angle.

Brake Monitor Setup

Shows the brake stop time in milliseconds and brake fault preset time, which is the amount of time in milliseconds allowed before the system alarms on a brake fault time fault.

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Tonnage Calibrate



This screen should only be accessed by Service Technicians when the press needs to be calibrated.

The 4 channels of Tonnage are all displayed individually

The Setup/Peak Push Button Determines the mode of the Tonnage Module

The Look window Start / Stop Values are the angles in which the system samples the tonnage inputs

The Low Alarm Inhibit Count displays the number of consecutive machine cycles where low alarm is inhibited. Used in a process where machine cycles several times before running speed is established.

The Samples button displays the number of machine cycles to establish a sample value (default 16)

The Scale Button displays the value used to describe the press/machine overall tonnage. Set for maximum value of one channel. For example, settings for a 150 ton two channel press = 75.

From this window you can return to the Main System Setup screen or the Main Tonnage screen.

Shutheight Setup



The Set Initial Config button is used to setup the shutheight module for the first time, or if the module has been replaced.

The Set Zero button is used to clear the internal offset value of the shutheight resolver module, which should be done anytime the resolver needs to be recalibrated, for example if the coupling breaks and the slide or resolver shaft have been moved even slightly. The Zero should be set at the maximum shutheight, or just before the maximum limit is reached.

Set Max by moving slide position to near maximum, enter the measured distance as the maximum and press the Set Max button.

Set Min by moving slide position to near minimum, enter the measured distance as the minimum and press the Set Min button.

Auto Slide Adjust can be enabled or disabled from this window, and is only used when a recipe is being downloaded.

The current position of the Slide Adjust key Switch is also displayed on this screen.

Motor Setup



The Setup Speed Enable/Disable is used to manually control the speed of the Main Motor, when enabled what ever percentage entered in the manual speed will be used as the speed reference.

Manual Speed – displays the speed reference percentage used when speed setup is enabled.

Drive Status displays if the drive is moving forward, reverse, or is off.

The Job Drive Push Button will send a signal to the drive to manually jog the drive forward.

- Drive Reset is only to be used when the Fault Reset Push Button is unable to clear the Drive Fault, this button will reboot the drive.
- Speed Settings are the speed reference the main motor runs at then the press is in one of the listed modes.

Robot Setup



The Robot Interface Enable/Disable is used to Enable or Disable the Robot system operating with the press. If Disabled, the ok and enable signals will not be sent to the robot control, which cause the robots not to cycle if the press is stroked. Though the press will not stroke if the robots out of press signal is not on, weather the Robot Interface is Enabled or not.

The Manual OK Push Button is used to send initiate the ok to enter press signal to the robots, as long as the press is not moving, and all necessary conditions are met.

Robot Program displays the current robot program the press is set to initiate, this is being compared in the robotics control, to verify the programs match. This value can only be changed in the Robot Recipe screen

Robot Settings displays the active settings for the robot cycle and robot in press emergency stop, these values can only be changed in the Active Robot or setup in the Robot Recipe Screens.

SECTION 6:

Recipe Setup and Download

Touch the Select button for the job number to create, edit or download parameters to the PLC. Once recipe data is stored, enter this Recipe screen to select a job for downloading. Press Download Job to PLC to move values to the PLC registers.

4/	4/15/2009 Recipe Overview								
.10							SSSSSS		
Seither's		aboladidada			D	IE NO:	SSSSSSS	ssssss	SSSSSS
JOB	#	PART NO			JOB	ŧ	PART NO		
1	SSSS	ssssssssss	SSSSSSS	SELECT	11	SSSSS		SSSSSS	SELECT
2	SSSS	ssssssssss	SSSSSSS	SELECT	12	SSSSS		SSSSSSS	SELECT
3	SSSS	SSSSSSSSSSS	SSSSSSS	SELECT	13	SSSSS	\$\$\$\$\$\$\$\$\$\$\$	SSSSSSS	SELECT
4	SSSS	SSSSSSSSSSS	SSSSSSS	SELECT	14	SSSSS	SSSSSSSSSSS	SSSSSSS	SELECT
5	SSSS	ssssssssss	SSSSSSS	SELECT	15	SSSSS	ssssssssss	SSSSSSS	SELECT
6	SSSS	SSSSSSSSSSS	SSSSSSS	SELECT	16	SSSSS		SSSSSSS	SELECT
7	SSSS	ssssssssss	SSSSSSS	SELECT	17	SSSSS	ssssssssss	SSSSSSS	SELECT
8	SSSS	SSSSSSSSSSS	SSSSSSS	SELECT	18	SSSSS		SSSSSSS	SELECT
9	SSSS	ssssssssss	SSSSSSS	SELECT	19	SSSSS	ssssssssss	SSSSSSS	SELECT
10	SSSS	SSSSSSSSSSS	SSSSSSS	SELECT	20	SSSSS	SSSSSSSSSSS	SSSSSSS	SELECT
D Monit	ie toring	PLS	JOB	ROB	от		LOAD TO PLC		Return

Enter or Change Job Descriptions

Press yellow text area under Part No. or Die No. to enable keyboard for entry of alphanumeric characters. Press yellow text area under Main Motor to enable a numeric keyboard to enter the speed reference. Press yellow text area under Shut Height to enable a numeric keyboard to enter the Shut Height setpoint. The current Shut Height is being displayed above the setpoint.

Press Save to store in recipe.

4/15/2009 Job R	ecipe				
JOB SELECTED >> JOB #: NN	DIE NO: SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS				
PART NO.	DIE NO.				
SSSSSSSSSSSSSSSS	SSSSSSSSSSSSSSSS				
Main Motor —	Shut Height —				
FORWARD NNN %	Current Position				
	Setpoint NNN.NNN "				
	SETPOINT ONLY ACTIVE IF AUTO SHUTHEIGHT IS ENABLED				
	SAVE				

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Enter or Change Recipe Die Monitoring Settings

Press Blue Die Monitoring button at the bottom of the overview screen to jump to DM Recipe screen

4/15/20	7/2009 Recipe Die			itoring		\$\$\$\$\$\$\$\$\$\$\$\$
2:21:12	PM	Position: NNN [°]	5	SPM: NNN		ь No. : NNN
A	ROBOT	FAILED TO CYCLE	B	GREASE MOTO	R CONTAC	TOR FAULT
Cha	innel	Select NN				
Name	Track	Empty			Setpoint	
Mode	Static			On Angle	NNN	•
Input	Norma	ally Open		Off Angle	NNN	•
Output	Bypas	sed	İ.	Intermittent Cycles	NNN	
				DATA SAVE	D TO RE	CIPE
		S Ch	Save anges	JOB	PLS	Return

Touch the yellow field indicated by channel select, to enter the desired channel, or use the arrow keys

Touch the Name Button select the desired name, these names need to be set in the HMI Application and downloaded to the HMI .

Touch the Mode Button to select the mode of operation, these is explained on page 8.

- Static
- Cyclic
- Intermittent Cycle
- In Position
- Intermittent In Position

Touch the Input Button select if the sensor is Normally Open or Normally Closed

Touch the Output Button to select the necessary response from the press control

- Bypass Channel is not being used
- Emergency Stop Alarm will indicate, Press will stop immediately when fault occurs
- Top Stop Alarm will indicate, Press will stop at top when a fault occurs
- Warning Alarm will indicate, but press movement will not be impaired.

Touch Angle On/Off to enter values.

Touch Intermittent Interval window to select interval count if Intermittent Mode is selected.

Press Save Changes to save settings permanently in the Recipe.

Enter or Change Recipe PLS Settings

4/15/2009 Recipe PLS Position: NNN ° SPM: NNN Job No. : NNN 2:22:00 PM в А Channel Channel Channel Channel Channel Channel Channel Channel 4 5 Off Angle On Angle NNN NNN Mode Intermittent Cycles Timer NNN NN DATA SAVED TO RECIPE Die Save JOB Return Change Monitoring

Press Blue PLS button at the bottom of the overview screen to jump to PLS Recipe screen

Touch the fields indicated by CH1, CH2, etc. to select each PLS channel.

Touch the Mode window to select the desired mode, these are explained on page 7.

Touch Angle On/Off to enter values.

Touch Timer window to enter value if Timer Mode is selected.

Touch Intermittent Interval window to select interval count if Intermittent Mode is selected.

Press Save Changes to save settings permanently in the Recipe.

Enter or Change Robot Recipe Settings

Press Blue Robot button at the bottom of the overview screen to jump to Robot Recipe screen

	4/15/2009		Robot Recipe				\$\$\$\$\$\$\$\$\$
	2:22:38 PM	Pos	ition: NNN °		SPM: NNN	Job N	o.∶ NNN
A	ROB	OT FAILED TO	CYCLE	в	GREASE MOTOR C	ONTACTOR	FAULT
	ROBOT CYCLE ROBOT	obot Set ON ANGLE NNN	OFF ANGLE NNN		Robot Pro	gram— N Time -	
	E-STOP	NNN	NNN		NNN Save Changes	s	Return

Robot Setup:

Robot Cycle – The on and off angles represent the OK to enter press window

Robot in press E-stop – If the robot is in the press within this window, the press well immediately stop

Robot Program:

Program # - is used by the robot control to compare the current job running in the press with the current job in the robot control.

Robot Wait Time – Is the amount of time the press will wait, at top, for the initiation signal from the robot control. Once timed out the press will need to be armed and started by the operator.

Press Save Changes to save settings permanently in the Recipe.

Downloading Recipe Settings

Press should be in safe position, and not operating, when a recipe is downloaded

Press the Select button next to the Job that is to be loaded, the Job number will appear in the job selected box in the screen banner.

Press the Download to PLC Button

The Confirm Download message will appear.

ARE YOU SURE YOU WANT TO DOWLOAD SELECTED JOB TO PLC?						
YES		CANCEL				

If the Shutheight is different from the current setpoint, and Auto adjust is Enabled, the Auto Adjust Confirmation message will appear on the HMI. If is did not appear verify Auto Adjust is enabled, and download the job recipe again.

NEW JOB REQUIRES SLIDE ADJUSTMENT AUTO SHUT HEIGHT IS ENABLED							
PLEASE TURN ON SLIDE ADJUST AND PRESS CONFIRM							
SLIDE ADJUST	OFF						
AUTO ADJUS	T IN PROGRES	s					
AUTO ADJUS							
CONFIRM	CLOSE						

This screen will indicate the current position of the slide adjust Key switch.

Press Confirm if you wish to move the slide, you can press close to allow the slide to remain in its current position.

While adjusting the "Auto Adjust in Progress" message will flash, once finished the "Auto Adjust Complete" will appear.

Active Job Setup

From the main menu, select the Active Overview

4/15/200	9	Active DM/PLS Menu							
10:30:55 /	AM P	osition: NN	IN °	SPM: NNN	Job N	•. : NNN			
A	ROBOT FAILED	TO CYCLE	В	GREASE MOTO	R CONTACTOR	FAULT			
	Note Press this button to save active values to active recipe. Save to Recipe DATA SAVED TO RECIPE								
Die Monitoring	PLS	doL	ROBOT			Return			

From this screen the user can select to edit any of the four current job recipe sections. Once changes are made, they can be saved to the current job recipe by pressing the "Save to Recipe" button.

Change Active Die Monitoring Settings

Press Die Monitoring button at the bottom of the Active Overview screen to jump to Active DM screen

4/15/20	109 Active Die	Monitoring	SSSS	SSSSSSSSSS
10:29:27	AM Position: NNN °	SPM: NNN	Job N	™: 100
A	ROBOT FAILED TO CYCLE	B GREASE MOT	OR CONTACTOR	R FAULT
Cha	annel Select NN			ut Status OFF
Name	DM	[Setpoint	Actual
Mode	Bypassed	On Angle	NNN °	NNN °
Input	Normally Open	Off Angle	NNN °	NNN °
Output	Top Stop	Intermitten Cycles		
		DATA SAVI	D TO PLC	
	Cr	Save Job	PLS	Return

Touch the yellow field indicated by channel select, to enter the desired channel, or use the arrow keys.

Input Status – displays the current status of the selected channels DM sensor.

Touch the Name Button to select the desired name, these names need to be set in the HMI Application and downloaded to the HMI.

Touch the Mode Button to select the mode of operation, these are explained on page 8.

- Static
- Cyclic
- Intermittent Cycle
- In Position
- Intermittent In Position

Touch the Input Button to select if the sensor is Normally Open or Normally Closed.

Touch the Output Button to select the necessary response from the press control.

- Bypass Channel is not being used
- Emergency Stop Alarm will indicate, Press will stop immediately when fault occurs
- Top Stop Alarm will indicate, Press will stop at top when a fault occurs
- Warning Alarm will indicate, but press movement will not be impaired.

Touch Angle On/Off to enter values, the current setpoints are displayed to the right under Actual.

Touch Intermittent Interval window to select interval count if Intermittent Mode is selected.

Press Save Changes to save these settings to the current job.

Change Active PLS Settings

4/15/20	009	Active PLS					\$\$\$\$\$\$\$\$\$\$\$\$\$	
10:31:39	AM	Position:	NNN °	NNN ° SPM: NNN			Job No. : NNN	
A	ROBOT FAI	LED TO CYCLE		B	GREASE MOTO	R CONTACTOR	RFAULT	
Channel 1	Channel 2	Channel 3	Channel 4	Channe 5	el Channe 6	el Channe 7	Channel 8	
0n	Off	Off	Off	Off	Off	Off	Off	
Mode	Bypasse	d			ngle Off			
	Intermitte Cycles	nt -	Fimer NNN Sea		DATA SAVE	D TO PLC		
			S Cha	ave anges	Job	Die Monitoring	Return	

Press PLS button at the bottom of the Active Overview screen to jump to Active PLS screen

Touch the fields indicated by CH1, CH2, etc. to select each PLS channel, the current status of the output is displayed below in the ON/OFF box.

Touch the Mode window to select the desired mode, these are explained on page 7.

Touch Angle On/Off to enter values.

Touch Timer window to enter value if Timer Mode is selected.

Touch Intermittent Interval window to set the interval count if Intermittent Mode is selected.

Press Save Changes to save these settings to the current job.

Change Active Job Settings

4/15/2009		Active Job			SSSSS	sssssssss	
1:51:35 PM	Position: N	NN °	SF	PM: NNN		Job N	o. : NNN
A R	OBOT FAILED TO CYCLE	В	e	REASE MOTO	R CONT	ACTOR	FAULT
Ma	ain Motor Speed			Shut	Hei	ght—	
Se I	etpoint Active	%		Setpoint NNN.NN Active NNN.NNI	<mark>7</mark>		Auto Enabled
				DATA SAVE	ED TO	PLC	
		Save Chang	es	Die Monitoring	PL	S	Return

Press JOB button at the bottom of the Active Overview screen to jump to Active Job screen

Press yellow text area under Main Motor to enable a numeric keyboard to enter the speed reference.

- Press yellow text area under Shut Height to enable a numeric keyboard to enter the Shut Height setpoint. The current Shut Height is being displayed above the setpoint.
- Press the Auto Enable/Disable to Enable or Disable Auto Slide Adjust.

Press Save Changes to save these settings to the current job.

Change Active Job Settings

4/15/2009	Robot	555555555555555555555555555555555555555			
2:22:18 PM	Position: NNN °	SPM: NNN	Job No. : NNN		
	FAILED TO CYCLE	B GREASE MOTOR CONTACTOR FAULT			
Setpo ROBOT CYCLE NNI ROBOT N PRESS E-STOP	Robot Setup ANGLE int Active Setpoi NNN NNN NNN NNN NNN	OFF ANGLE nt Active NNN NNN	-Robot Program NN - Robot Wait Time NNN s NNN s Save Changes		
			Return		

Press JOB button at the bottom of the Active Overview screen to jump to Active Job screen

Yellow windows represent area values that can be changed.

Green Text boxes display values that are currently being used in the PLC.

Robot Setup:

Robot Cycle – The on and off angles represent the OK to enter press window

Robot in press E-stop – If the robot is in the press within this window, the press well immediately stop

- Robot Program:
 - Program # is used by the robot control to compare the current job running in the press with the current job in the robot control.

Robot Wait Time – Is the amount of time the press will wait, at top, for the initiation signal from the robot control. Once timed out the press will need to be armed and started by the operator.

Press Save Changes to save these settings to the current job.

Appendix A:

Alarm Explanations

BATCH COUNTER FULL

This fault occurs when all of the following events occur:

• The actual batch count is greater than the preset specified on the Counter Screen Clearing fault:

- 1. Press the fault reset push button; this will clear the actual count.
- 2. Set preset to zero to bypass this alarm.

BRAKE STOPPING TIME FAULT

This fault occurs when all of the following events occur:

- The brake output is off
- The actual stopping time is greater than the limit set in the SETUP Screen on the HMI
- The Key switch is in single or auto stroke mode

Clearing fault:

- 1. Check the SYSTEM SETUP screen and observe the current BRAKE STOP TIME and the current limit
- 2. Press the fault reset push button

CHANNEL (1, 2, 3, 4) HIGH CAPACITY ALARM

This fault occurs when all of the following events occur:

- The tonnage was higher than the capacity alarm setpoint
- Clearing fault:
 - 1. Verify die height
 - 2. Press the fault reset push button

CHANNEL (1, 2, 3, 4) HIGH CAPACITY ALARM EQUALS "0"

This fault occurs when all of the following events occur:

- The high capacity alarm setpoint is equal to zero
- Clearing fault:
 - 1. Verify and adjust the setpoint
 - 2. Press the fault reset push button

CHANNEL (1, 2, 3, 4) HIGH TREND

This fault occurs when all of the following events occur:

• When the current peak load has met or exceeded the high tolerance percentage or tonnage setting from the sample tonnage.

Clearing fault:

- 1. Verify die height
- 2. Press the fault reset push button

CHANNEL (1, 2, 3, 4) LOW TREND

This fault occurs when all of the following events occur:

- When the current peak load has met or become below the low tolerance percentage or tonnage setting from the sample tonnage.
- Clearing fault:
 - 1. Verify die height
 - 2. Press the fault reset push button

CLUTCH/BRAKE MODE CHANGE

This fault occurs when all of the following events occur:

- When the clutch is engaged and the mode selector switch is changed
- Clearing fault:
 - 1. Inch the press to top if needed
 - 2. Press the fault reset push button

CLUTCH COOLANT FAULT

This fault occurs when all of the following events occur:

- The Grease Motor is ON
- There is no input to I:6/0 on processor B
- A thirty second timer has be satisfied

Clearing fault:

- 1. Verify they Coolant Fault Input, B I:6/0
- 2. Press the fault reset push button

CLUTCH VALVE FAULTED

This fault occurs when all of the following events occur:

• When there is no input to I:4/12 on processor B

Clearing fault:

1. Press the fault reset push button; this will energize the reset solenoid.

CLUTCH VALVE FAILED TO TURN OFF

This fault occurs when all of the following events occur:

- When either processor is not outputting the valve signal but the other processor is outputting
- A two second timer has been satisfied

Clearing fault:

1. Press the fault reset push button

CLUTCH VALVE FAILED TO TURN ON

This fault occurs when all of the following events occur:

- When either processor is outputting the valve signal but the other processor is not
- A two second timer has been satisfied

Clearing fault:

1. Press the fault reset push button

COOLANT PUMP CONTACTOR FAULT

This fault occurs when all of the following events occur:

- The contactor output and aux contact input did not match
- Clearing fault:
 - 1. Function check the contactor
 - 2. Press the fault reset push button

COUNTER BALANCE LOW AIR PRESSURE

This fault occurs when all of the following events occur:

• The counter balance pressure switch input is not present, Processor A I:6/2 Clearing fault:

- 1. Check air pressure
- 2. Press the fault reset push button

DRIVE FAILED TO START

This fault occurs when all of the following events occur:

- When the start signal to the drive is on O:5/0
- The zero speed input (B I:4/6) is ON or the Main Drive Running (B I:0/8) is NOT ON
- A thirty second timer has been satisfied

Clearing fault:

1. Press the fault reset push button

EMERGENCY STOP

This fault occurs when all of the following events occur:

- When the input from the SAFETY RELAY drops out, I:4/0
- Clearing fault:
 - 1. Satisfy E-stop loops
 - 2. Press Control Power Reset push button
 - 3. Press the fault reset push button

FILTER CLOGGED

This fault occurs when all of the following events occur:

- The filter clogged input B I:6/7 is not present
- Clearing fault:
 - 1. Check the filter status, replace if necessary
 - 2. Press the fault reset push button

FILTER MOTOR CONTACTOR FAULT

This fault occurs when all of the following events occur:

• The contactor output and aux contact input did not match Clearing fault:

- 1. Function check the contactor
- 2. Press the fault reset push button

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This fault occurs when all of the following events occur:

- The low level input B I:6/4 is present
- A three second timer was satisfied

Clearing fault:

- 1. Verify the grease level, add if needed.
- 2. Press the fault reset push button

GREASE MOTOR CONTACTOR FAULT

This fault occurs when all of the following events occur:

The contactor output and aux contact input did not match
agring foult:

Clearing fault:

- 1. Function check the contactor
- 2. Press the fault reset push button

HYDRAULIC OVERLOAD

This fault occurs when all of the following events occur:

- The overload limit switch input is not present (B I:6/8)
- The press is between 270 to 90 and the selector switch is set to test Clearing fault:
 - 1. Verify the switch position and the limit input
 - 2. Press the fault reset push button

LUBE SENSOR 1-7 (warning only)

This fault occurs when all of the following events occur:

• The lube sensor is not ON for longer than 40 seconds

Clearing fault:

- 1. Verify the lube is flowing and the sensor is operating
- 2. Press the fault reset push button

MAIN MOTOR DRIVE FAULT

This fault occurs when all of the following events occur:

- The Drive Fault signal is not present on Processor B I:4/5 Clearing fault:
 - 1. Press the fault reset push button

MAIN MOTOR NOT RUNNING FORWARD

This fault occurs when all of the following events occur:

- The Key Switch is in the Single or Auto Stroke position
- The Motor is not running forward

Clearing fault:

- 1. Place Key Switch in the Inch Position
- 2. Start the Main Motor
- 3. Press the fault reset push button

NO CLUTCH/BRAKE AIR PRESSURE

This fault occurs when all of the following events occur:

- The C/B Pressure switch input is not present for more than one second, I:0/4 Clearing fault:
 - 1. Check air pressure
 - 2. Press the fault reset push button

NO MOTION DETECTED

This fault occurs when all of the following events occur:

- The C/B valve outputs are on
- The press is not in motion for longer than two seconds
- Clearing fault:
 - 1. Check that press is able to move
 - 2. Check resolver coupling
 - 3. Press the fault reset push button

NO VALID CLUTCH/BRAKE MODE

This fault occurs when all of the following events occur:

 The PLC is not detecting a setting from the C/B Key Switch for more than one second

Clearing fault:

- 1. Check that the Key Switch is in a definite position, (Off, Inch, Single, or Auto)
- 2. Verify that one of the inputs is being received

OIL PUMP #1 CONTACTOR FAULT

This fault occurs when all of the following events occur:

- The contactor output and aux contact input did not match
- Clearing fault:
 - 1. Function check the contactor
 - 2. Press the fault reset push button

OIL PUMP #2 CONTACTOR FAULT

This fault occurs when all of the following events occur:

- The contactor output and aux contact input did not match
- Clearing fault:
 - 1. Function check the contactor
 - 2. Press the fault reset push button

OIL PRESSURE LOW

This fault occurs when all of the following events occur:

- The OIL PUMP #1 contactor output is on
- The Pressure switch input is not present (B I:6/6)
- A thirty second timer was satisfied

Clearing fault:

- 1. Verify the pump is coming on and working.
- 2. Verify pressure is being built and the switch is working
- 3. Press the fault reset push button

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OVERLOAD PRESSURE

This fault occurs when all of the following events occur:

- The input from the Oil Overload Pressure Switch is not present, Processor B I:6/1
- A three second timer has been satisfied

Clearing fault:

- 1. Check that the pressure switch is functioning properly
- 2. Press the fault reset push button

PARTS COUNTER FULL

This fault occurs when all of the following events occur:

• The actual parts count is greater than the preset specified on the Counter Screen Clearing fault:

- 1. Press the fault reset push button; this will clear the actual count.
- 2. Set preset to zero to bypass this alarm.

PRESS NOT AT TOP

This fault occurs when all of the following events occur:

- The Key Switch is in the Single or Auto Stroke Position
- The Clutch valve is off, meaning the press is stopped
- The Press in Motion bit from the resolver is not present

• The resolver angle is not between 0-30 or 320-359 Clearing fault:

- 1. Place Key Switch into Inch mode and inch press to between 320 and 30 degrees
- 2. Press the fault reset push button

RESOLVER MODULE FAULT

This fault occurs when all of the following events occur:

• The resolver module has determined there is a fault with the resolver or cabling Clearing fault:

- 1. Press the fault reset push button
- 2. If fault persists check resolver cable connection, and cycle power on control

ROBOT OUT OF POSITION E-STOP

This fault occurs when all of the following events occur:

- The robot is IN Press signal is not present
 - IN Press signal is low when robot is in press. (A I:2/12 I:2/13, B I:6/13 I:6/14)
- The press is in Robot E-stop window (Default: 85-220 degrees)

• The Push Button switches are depressed or inputs received to indicate this position Clearing fault:

- 1. Verify the robot is out of the press
- 2. verify robot in press signals are high (A I:2/12 I:2/13, B I:6/13 I:6/14)
- 3. Press the fault reset push button

ROBOT FAILED TO CYCLE

This fault occurs when all of the following events occur:

- The press has completed a stroke in Continuous Mode
- The robot has not cycled to initiate another stroke
- The robot wait timer has been satisfied

Clearing fault:

- 1. Adjust robot wait timer in robot recipe
- 2. Determine why robots did not cycle
- 3. Press the fault reset push button

RUN P.B. TIEDOWN

This fault occurs when all of the following events occur:

- The E-stop safety relay Input (I:4/0) is HIGH.
- The press is not in motion
- The Push Button switches are depressed or inputs received to indicate this position
- The timer has counted for TWO seconds

Clearing fault:

- 1. Release Push Buttons
- 2. Press the fault reset push button

SHUTHEIGHT RESOLVER FAULT

This fault occurs when all of the following events occur:

- The resolver module has determined there is a fault with the resolver or cabling
- Clearing fault:
 - 1. Press the fault reset push button
 - 2. If fault persists check resolver cable connection, and cycle power on control

SLIDE ADJUST CONTACTOR FAILED OFF

This fault occurs when all of the following events occur:

- The slide adjust up or down contactor output is off, but the aux contact is on. Clearing fault:
 - 1. Function check the contactor
 - 2. Press the fault reset push button

SLIDE ADJUST CONTACTOR FAILED ON

This fault occurs when all of the following events occur:

• The slide adjust up or down contactor output is on, but the aux contact is off. Clearing fault:

- 1. Function check the contactor
- 2. Press the fault reset push button

SLIDE ADJUST DOWN LIMIT

This fault occurs when all of the following events occur:

• The slide adjust lower limit is not made, signal A I:2/8 should be high.

Clearing fault:

- 1. Move slide up, until switch is made and signal is high.
- 2. Verify switch is working
- 3. Press the fault reset push button

SLIDE ADJUST IN ON POSITION

This fault occurs when all of the following events occur:

- The slide adjust key switch is in the on position Clearing fault:
 - 1. Turn the slide adjust key switch OFF
 - 2. Press the fault reset push button

SLIDE ADJUST UP LIMIT

This fault occurs when all of the following events occur:

- The slide adjust upper limit is not made, signal A I:2/7 should be high. Clearing fault:
 - 1. Move slide down, until switch is made and signal is high.
 - 2. Verify switch is working
 - 3. Press the fault reset push button

TANK LUBE LOW LEVEL

This fault occurs when all of the following events occur:

- The level switch input is not present (B I:6/3)
- A three second timer was satisfied

Clearing fault:

- 1. Verify Tank Lube Level, add if needed.
- 2. Verify Level switch input (B I:6/3)
- 3. Press the fault reset push button

TONNAGE CHANNELS SCALE FACTOR EQUALS "0"

This fault occurs when all of the following events occur:

• When the SCALE FACTOR is equal to 0

Clearing fault:

- 1. Adjust the SCALE FACTOR
- 2. Press the fault reset push button

TONNAGE LOOK WINDOW FAULT

This fault occurs when all of the following events occur:

- When either the ON or OFF angle is equal to 0
- When the ON and OFF angles are equal

• When the OFF angle is less than the ON angle

- Clearing fault:
 - 1. Adjust the ON or OFF angles.
 - 2. Press the fault reset push button

UNCOMMANDED MOTION

This fault occurs when all of the following events occur:

- When the cross check between processors does not match up Clearing fault:
 - 1. Verify each processors indicated position on the setup screen
 - 2. Press the fault reset push button

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