JAYMOR

Maxi-Miser

SETWORKS

SUPPLIED BY:

AUTOMATION WORKS NZ LTD

www.automationworks.co.nz

This manual is intended as a guide for the installation and operation of the Jaymor Carriage Setworks. It is not an instructional manual on operating the Sawmill Carriage. It is recommended that professional advice be sought for the operation of the carriage and cutting procedures.

We would appreciate any feedback you may have on the layout of this manual. If there is anything you feel should be further explained or added to the manual, please inform your supplier, Automation Works NZ so that we may continue to improve the information supplied with our systems.

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1. INTRODUCTION

The **JAYMOR MaxiMiser Setworks** is the latest in Jaymor Dimension Control equipment technology, incorporating full digital control.

Years of industry involvement have lead to control operations that are streamlined, for fast, efficient and operator sensitive control functions. These control functions and adaptive design philosophies have been developed in conjunction with a number of sawmill operators and sawmilling personnel.

Operator interface is via a custom built operator console incorporating LED displays. These displays show the operator the current position and other relevant information. Set-up calibration, and programming information are easily entered and adjusted from the operator's console, through key press combinations with system parameters password protected to ensure security of the system. The console display can be manually adjusted to suit ambient light conditions. The configuration of the operator console and LED displays allows for simple, fast and accurate setting.

The computer equipment used is industry standard, state of the art computer electronics. The software used is custom designed through the Jaymor Industries In-House Design Facility.

The aim of this manual is to provide a reference to both the operator and the engineer or electrician responsible for the maintenance and service of the setworks. It aims to provide the relevant information and is to be used in conjunction with the training already provided by your suppliers personnel.

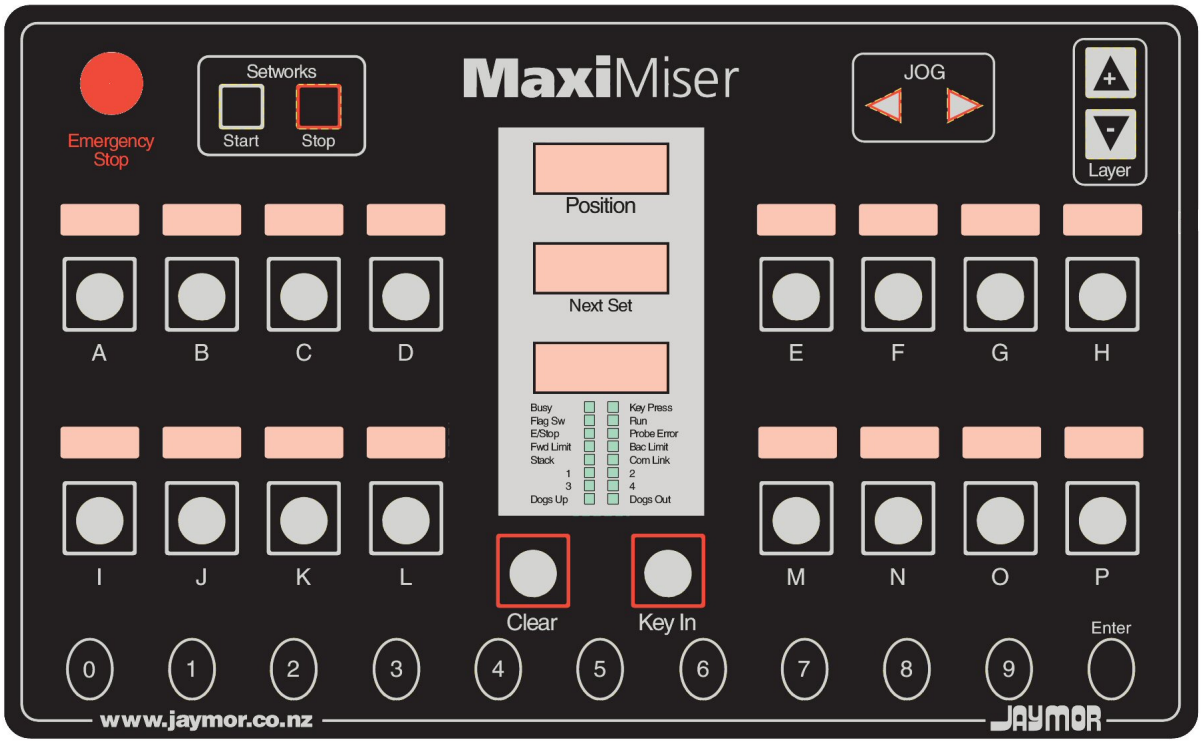
2. THE OPERATOR'S CONSOLE

This section provides a brief description of the operator's console of the Jaymor carriage setworks. It gives detailed descriptions of the layout and purpose of the displays in the console and how they relate to the status of the system.

The steps required to program the sizes into the preprogram buttons are outlined with examples, and the general operation of the setworks is detailed. The setting operations available are explained, as are the functions of the other buttons on the front of the operator's console.

2.1. CONSOLE LAYOUT

The MAXI-Miser console layout is illustrated below:



The functions of the buttons and displays on the operator's console are outlined in the following sections.

2.2. CONSOLE DISPLAYS

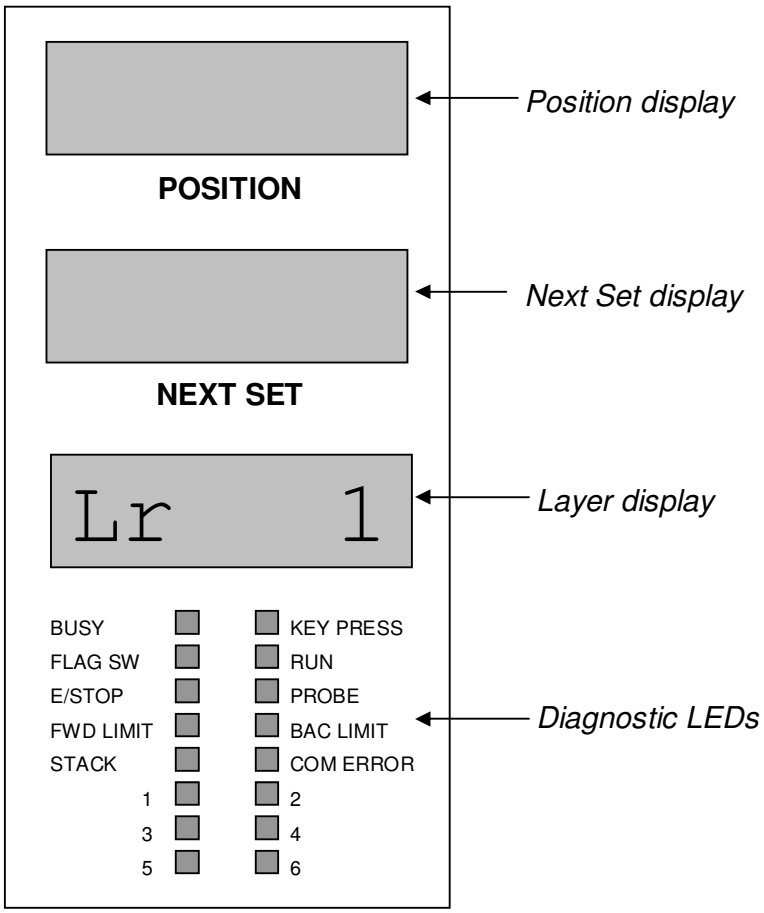


Figure 4.1: Display Layout

There are three 4-digit displays mounted vertically on the operator's console with 16 status LEDs mounted directly underneath. The brightness of these displays can be adjusted by parameter 23. The displays above the preprogram buttons have two brilliance control parameters and can be used so that the selected size is shown brighter than the others by the "PBD Dim" and "PBD Bright" brilliance parameters (P24 & P25).

The functions of the displays from top to bottom are as follows:

Position Display

In the normal operating mode this display will show the current backset position of the knees at any instant. The backset distance is the distance measured between the saw and the knees.

In parameter mode the position display will show the parameter number that is to be adjusted.

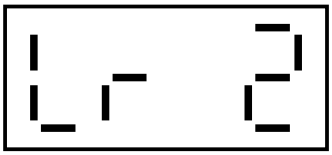
Next Set Display

This display will show the selected set value when the operator has selected a preprogram size via a pushbutton or has entered a random size via the random pushbuttons. The value of the last completed set will be constantly shown in the Next Set display until another set is entered or the next entry in the stack is ready to be performed.

If the setworks is operated in Stack Set mode, as the sets are completed the Next Set display will update to show the next pending set. Once all sets in the stack have been performed the Next Set display will constantly show the value of the last completed set, and the Stack LED in the diagnostic displays will switch off.

Layer Display

In the normal operating mode this display will show present operating layer number of the preprogram sizes. For example, if the operator is currently working on layer 2, the Layer Display will show:



When a random pushbutton is pressed, this display will show the value of the random number entered. If this number is then programmed to a pre-programmed pushbutton this random number disappears and the Layer number will return. If the “Enter” pushbutton is pressed this random number will shift up to the Next Set, or onto the stack, and the layer number will return.

In a multi axis system it is possible to display the position of the second loop in the Layer display. The “VPD 1 Format Select” parameter (P20) is used to determine if the second loop’s position is displayed or whether the layer display is used as normal. When the second axis position is shown in the Layer display, the layer number will only be shown momentarily after the layer has been changed.

Diagnostic LEDs

The diagnostic LEDs are used to provide the operator with information on the status of the setworks. The function of each LED is listed below:

BUSY

Illuminates when the setworks has issued a command to move and is in the process of completing the set. The display remains illuminated until such time as the command has been completed and the set has reached its target. The next command will not be recognised until this light has switched off.

KEY PRESS

Will switch on when any pushbutton on the membrane is pressed, regardless of whether the operation can be completed at that time or not.

FLAG SW*

This light will switch on when the flag switch is shut, indicating that there is timber in the saw.

RUN *

Illuminates when the “RUN” signal from the power pack is lost, indicating that the hydraulic power pack has stopped running, and as such not setting will be possible.

EMERGENCY STOP

Illuminates when the emergency stop button is activated.

PROBE ERROR

This light will switch on when the connection to the probe or encoder is lost, or if the current reading is outside the range set by Parameters 124 and 125.

FORWARD LIMIT

Illuminates when the knees reach the forward limit.

BACK LIMIT

Illuminates when the knees reach the back limit.

STACK ENTRY

This light will switch on if there is more than one entry in the stack, indicating that there is a set pending the completion of the current set.

COM ERROR*

Illuminates when the communication link in multiple controller systems is lost.

1*

In a two-axis system, this LED will light in conjunction will one of the above lights to indicate the state of Loop 1. For example if Loop1 has a probe error, both the “Probe Error” and “1” will light up. This LED is only used when there is one VPD display for multiple loop systems.

2*

In a two-axis system, this LED will light in conjunction will one of the above lights to indicate the state of Loop 2. For example if Loop2 has a probe error, both the “Probe Error” and “2” will light up. . This LED is only used when there is one VPD display for multiple loop systems.

3* (OFFSET)

This LED will illuminate when an offset operation has been performed. It will remain lit until the offset is cancelled by a set or another offset operation.

4* (PULLBACK)

This LED will light whenever the Pullback output is active.

5* (DOGS UP)

This LED will light whenever the “Dogs Up / Down” output from the controller is set to “UP”.

6* (DOGS OUT)

This LED will light whenever the “Dogs In / Out” output from the controller is set to “OUT”.

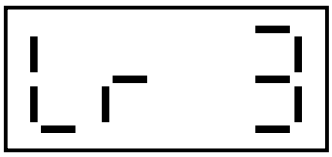
*** These LEDs may not be implemented depending on the individual setworks**

2.3. PROGRAMMING THE PREPROGRAM BUTTONS

Programming the preprogram buttons is a very simply procedure. Programming can be achieved while active in the normal operating mode and is achieved by the following steps:

1) Select the layer on which the preprogram size is to be programmed by pressing either layer up or layer down pushbuttons:

   The current layer is shown in the layer display as “Lr x”, where x is the layer number, for example if layer 3 were selected the Layer display would show:

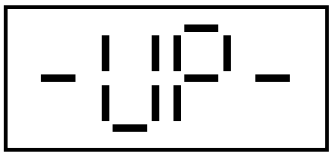


2) Enter the size to be programmed through the **RANDOM** pushbuttons (0 – 9). As you select the size the numbers will be displayed in the layer display area of the console.

3) Having obtained the correct size to be entered, hold down the **KEYIN** pushbutton while pressing the desired preprogram pushbutton (A - P). The size in the layer display area will disappear, and will appear in the push button display of the altered preprogram button. This indicates that the pushbutton has been programmed or changed.

NOTE: Sizes can only be programmed to the nearest millimetre.

The preprogram button displays indicate the size stored in each button for the current layer. If no size is programmed for a particular button on the current layer, its display will show:



2.4. ACTIVATING THE HYDRAULIC POWER PACK

The operator console and displays are active regardless of whether the power pack is started or not, although setting operations will not be possible until the power pack is running. This allows the operator to program the preprogram buttons and access diagnostic and set-up menus without starting the power pack.

Pressing the **START** button on the operator console activates the setworks' power pack. This action should be followed by the **"Run"** light of the diagnostic LEDs switching off (if implemented on the system), this light indicates that the power pack has received the start signal and is now operating.

If the run-confirm signal from the power pack is not received soon after the start request is sent from the console, the start signal will automatically drop out (this will occur within around half a second of the Start button press). This action can be bypassed by setting the "Run Confirm Bypass" parameter (P31) to zero. If the run confirm is bypassed in this manner, the start signal will stay on and "Run" LED will stay off, regardless of the state of the hydraulics.

NOTE: If the run confirm signal is bypassed, the setworks can no longer tell if the hydraulics are running and as such may attempt to drive the control valves when the power pack is switched off. It is recommended that the "Emergency Stop" button be used to ensure that all driving signals to the valves are halted when the hydraulics are off preventing possible damage to the valve coils.

2.5. SET MODE

The "Set Mode" parameter (P10) determines the behaviour of the system as it approaches a target. There are four modes to choose from as outlined below.

Normal Set Mode

In Normal Set Mode the setworks will set directly to the target in either direction, as long as the distance travelled in the set is greater than the Minimum Set Distance (P106).

If the distance to the target is less than the Minimum Set Distance, the setworks will travel back to a distance set by the Back Up Distance parameter (P107) beyond the target, and then set forward to the target.

Step Up Mode

In Step Up Mode the setworks will always travel forward to the target. If the target is behind the current position, or is closer than the Back Up Distance (P107) to the current position, the system will drive back until it is beyond the target by the Back Up Distance. The setworks will then travel forward to the target.

Absolute Set Mode

In Absolute Setting Mode the setworks will travel directly to the target in either direction, regardless of how close the target may be.

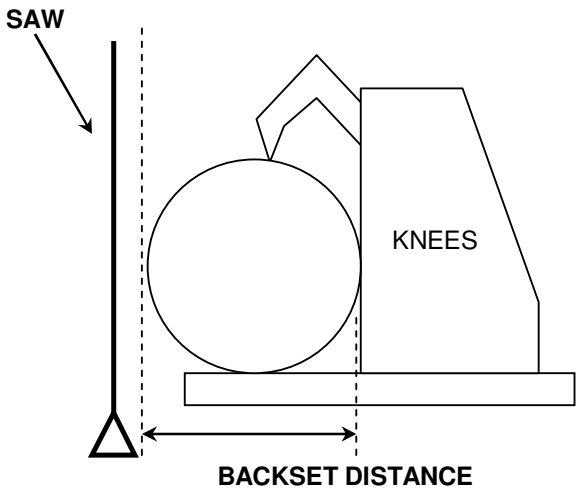
Always Set Backward Mode

In this mode the setworks will always travel back to the target. If the target is in front of the current position, or is closer than the Back Up Distance (P107) to the current position, the system will drive forward until it is beyond the target by the Back Up Distance. The setworks will then travel back to the target. (This mode is intended for use on Horizontal saws where the weight of the saw can affect the setting characteristics of the system)

2.6. SETTING TO A SIZE

Backset

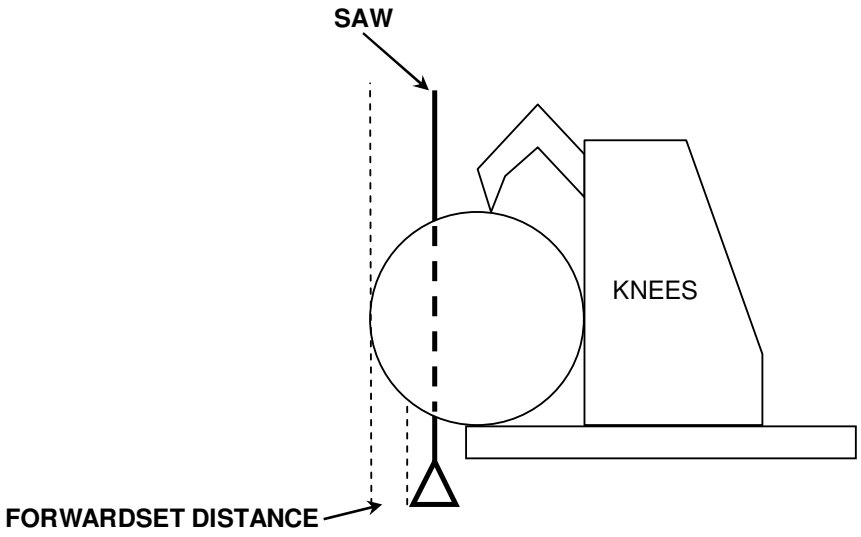
A backset operation is performed when the operator wants the knees to move to a set position from the saw. First the size to be set to must be selected either via the pre-programmed buttons, or via random entry with the buttons 0 – 9. Once the size is selected it will be displayed in the Next Set display on the console until the Backset button is pressed. The knees will then travel to the size indicated in the Next Set display, ready for the next operation.



Forwardset

A Forwardset operation is used to produce a board / flitch of a set size. The size is selected in the same manner to the Back Set operation, via the random or pre-programmed buttons, and is activated via the Forwardset pushbutton. The knees will travel forward the requested distance plus the kerf of the saw, producing a board / flitch on the other side of the saw which is equivalent to the selected size.

If the “Fwdset Counter Control” parameter (P26) is set to “1”, the forward set distance will be shown in the layer display and will update as the set is performed. For example, if a 52mm Forwardset were performed, the layer display would count up from 0 to 52mm, even though the knees will actually travel further than this by the width of the saw. This feature is useful on an open-loop system, where the setworks does not actively hold to the target, and as such may stop short or overshoot on occasion.



Reverse Forwardset

The Reverse Forwardset operation performs a forwardset operation in the reverse direction. When the Mode1 button is held down while the Fwdset button is pressed, the setworks will travel back the distance shown in the Next Set display plus the kerf of the saw. The operation may be used when the operator changes the size of board / flitch to be cut from the Backstand, or alternatively as an easy means of calculating the Backset sizes to be programmed into the system for a given combination of forwardsets.

Slab Set*

If the system is a two-axis Carriage / Slabber, the Slab Set operation is used to set the Slabber to a set size on the opposite side of the saw to the knees. The required size is selected in the same manner as with the Backset and Forwardset operations and is activated by the Slab Set button. The Slabber head will then set to the requested distance from the saw.

As the Slab Set size is often equal to the last performed Forwardset size, it is possible to perform both operations together once the size has been selected.

Slab Retract*

If the Mode1 button is held down when Slab Set is pressed, a Slab Retract operation will be performed. The slabber head will immediately set to the retract position defined by parameter 203. This operation is often performed to move the slabber head out of the way while not in use.

Slabber Inline*

If the Mode2 button is held down when the Slab Set button is pressed, a Slabber Inline operation will be performed. This operation will move the slabber head forward to be inline with the knees side of the saw. This operation is sometimes used to produce a cleaner cut with the slabber head and to prolong the life of the saw.

***NOTE** **some operations may not be available on all systems**

2.7. JOGGING OPERATIONS

Jogging the Knees

The knees of the system can be "jogged" to any desired position by using the Jog In and Jog Out buttons. This action will move the knees in the desired direction for as long as the button is held down. The direction of the two jog buttons can be swapped via the "Jog Button Invert" parameter (P4) to suit the individual set up of each system.

The speed at which the knees will jog is controlled by separate Jog Forward and Jog Back parameters (P148 & P158). It is possible to Slow Jog the knees by holding down the Mode1 button while the Jog button is pressed. The Slow Jog speeds are limited by parameters 149 & 159.

Slabber Jog

Holding the Mode2 button down while pressing the appropriate Jog button can jog the slabber head. The speed at which this jog occurs is controlled by parameters 248 & 258. The slabber head cannot be Slow Jogged.

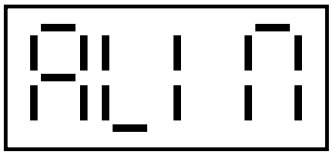
2.8. OFFSET

The Offset operation is used once a cut has been made and the carriage is about to be run back to begin another set. Its purpose is to ensure that the saw is cleared on the way back past the saw, as sometimes the back of the saw will catch on the log and can cause damage.

When the Offset button is pressed the knees will move back, away from the saw line by a distance set in parameter 104. Once the carriage has been run back to in front of the saw, the knees can be returned to their original position by pressing Offset again. Alternatively, the next set can be performed (either a forwardset or backset) and the setworks will account for the Offset distance automatically.

2.9. REALIGNING THE AXIS (TWIN AXIS SYSTEMS ONLY)

In a twin-axis system where the axes are supposed to remain in line at all times, an error will be generated if the difference between the axes exceeds the “Crash Tolerance” parameter (P14). This will prevent the system from racking too far and possibly causing damage. When the Crash Tolerance distance is breeched due to a mechanical fault or poor tuning of the system, the alignment error will appear in the Next Set display as shown below:



To realign the axis, the operator can press the Retract button on the console, which will give the axis that is further extended the target position of the other axis. Alternatively, the operator can use the Jog buttons to bring the axis into line, although it may not be possible to exactly align the axis in this manner.

2.10. DOGGING

Dogs In / Out

The Dog In / Out and Dog Up / Down buttons are used to control the dogs on the carriage. These functions are toggled on and off by repeatedly pressing the appropriate buttons. To prevent damage to the log while held on the carriage, it is only possible to move the dogs in and out when they are up. This is to prevent the dogs moving while holding the log.

Auto-Pullback

If Pullback is fitted to the dogs, the Auto-Pullback function can be enabled on the setworks, which will activate the pullback after a set delay once the dogs have been lowered. Auto-Pullback is enabled by parameter 35, and the delay before activating is set by parameter 36.

Half-Dogging

Some systems allow a Half Dog as well as the standard Dogs In / Out. Combining the Mode1 button with the Dogs In and Dogs Out buttons as outlined below will operate this function.

If Dogs are IN:

Press Mode1 and Dogs I/O to extend half distance.

Press Dogs I/O alone to extend to full distance.

If Dogs are at HALF distance

Press Mode1 and Dogs I/O to retract dogs.

Press Dogs I/O alone to extend to full distance.

If Dogs are at FULL distance

Press Mode1 and Dogs I/O to retract half distance.

Press Dogs I/O alone to retract fully.

2.11. TAPER (IF FITTED)

Some carriages will have a tapering ram fitted to each knee. These are used to account for the taper of the log and improve the timber recovered from the log. Such systems will be fitted with the following buttons to control these tapering rams.

Taper Left

When pressed will toggle the left-hand taper operation on the carriage on and off. This button can also be used to cancel a right-hand taper and realign the knees.

Taper Right

When pressed will toggle the right hand taper operation on the carriage on and off. This button can also be used to cancel a left-hand taper and realign the knees.

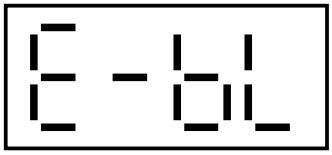
Taper Cancel

This button is used to cancel either of the above taper operations and realign the knees.

2.12. LIMIT PARAMETERS

Back Limit

There are two limit parameters that are used by the setworks to prevent the operator from accidentally setting to a position beyond the physical limits of the system. If the operator attempts to set to a distance beyond the value set in the limit parameters, the knees will not move and an error message will be displayed.



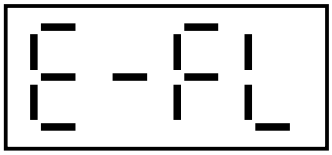
The Back Limit error will display whenever the requested target would cause the knees to retract beyond the distance set in the “Back Limit” parameter (P111). This limit ensures that the knees will never travel further out than the limit when completing a set. The displayed error can be removed by pressing any button on the console.

Forward Limits

There are several Forward Limit parameters used by the system to prevent the knees from travelling too far and causing damage. Not all limits are used on all systems, but below is an outline of the limits available:

Dogs In Limit (P112): limit used when dogs are retracted.
Dogs Out Limit (P113) limit used when the dogs are extended.
Half Dog Limit (P115) limit used when the dogs are at their half-dog position.
Taper Limit (P116) limit used when the taper is active.
Flipper Limit (P114) limit used when flipper is raised on the carriage.

If the relevant limit for the current status of the system will be breached by the requested set, the following error message will appear and the set will be cancelled.



The displayed error can be removed by pressing any button on the console.

Limit Type

Parameter 110, “Limit Type”, will determine the type of limits that the setworks will use to control the system. If this parameter is set to “1” (No Limits) the setworks will automatically determine the limits of the system by setting the Forward Limit equal to the Probe Offset, and the Back Limit equal to the Probe Offset plus the Probe Stroke. In this mode it is not possible to alter the value of the limit parameters.

If the Limit type is set to “2” (Manual Limits), then the limits of the system are set by the operator, although the Forward Limit cannot be set to less than the Probe Offset distance.

2.13. EMERGENCY STOP

The function of the Emergency stop button is to cease all outputs from the setworks to the Carriage/Slabber and cancel the current operation(s). The operation of the Emergency Stop button will also stop the hydraulic power pack of the system if it is controlled from the setworks console.

This pushbutton is a latching switch that must be twisted clockwise to release.

3. SETWORKS MODE DESCRIPTION

This section of the manual details the steps involved in changing the parameters of the setworks. This is a function that is not required in the general day-to-day running of the system, but is accessed to customise the setworks to the individual system.

Also outlined is the operation of the “Warm Up Cycle” functions. These may or may not be relevant to the system and are intended for hydraulic systems where the oil needs to be brought up to temperature before accurate setting can be achieved.

There is an explanation of the error messages the operator may find during operation of the system and a detailed description of the limit parameters used to restrict the movement of the axis to prevent any mechanical damage from occurring.

3.1. PARAMETER MODE

This mode is activated during commissioning or when any of the system parameters require adjustment.

Parameter mode is entered via the following steps:

1) Press and hold down the **KEYIN** pushbutton while at the same time press the **LAYER UP** pushbutton, then release both buttons. The setworks may prompt the operator to enter the security code for access to the parameter mode. The Position display will show **"Pin"**.

2) Enter the appropriate PIN number via the random pushbuttons (0-9). The Layer display will show a "**-**" every time a key is pressed (a maximum of 4 numbers is accepted). The Pin access code for the Jaymor console is **9290**. Press Enter.

   If the incorrect PIN number is entered an "**Err 1**" message is temporarily displayed in the Layer display. The operator is returned to the main operating mode and must restart this procedure.

3) If the correct PIN number has been entered, **"P"** will be displayed in the Position display. Enter the required parameter number via the random pushbuttons (0 - 9). As the random numbers are pressed they will be displayed in the Layer display. Press Enter to select the parameter.

   (Refer to **Appendix D:** Parameter Listing)

The parameter number will be displayed in the Position display with the current value of the selected parameter will be displayed in the Layer display. This will only occur if the parameter number entered is a valid parameter.

4) To adjust the parameter value, press the **LAYER UP** or **LAYER DOWN** pushbuttons. This will increase or decrease the parameter value one unit at a time, respectively.

To change the parameter in larger increments, the layer buttons can be pressed in conjunction with other buttons as outlined below:

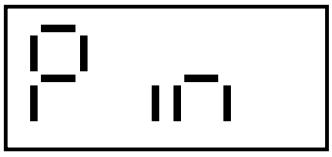
Hold	**KEYIN**	and press **LAYER UP**	The parameter will **increase by 10** units at a time.
Hold	**KEYIN**	and press **LAYER DN**	The parameter will **decrease by 10** units at a time.
Hold	**JOG IN**	and press **LAYER UP**	The parameter will **increase by 100** units at a time.
Hold	**JOG IN**	and press **LAYER DN**	The parameter will **decrease by 100** units at a time.
Hold	**JOG OUT**	and press **LAYER UP**	The parameter will **decrease by 1000** units at a time.
Hold	**JOG OUT**	and press **LAYER DN**	The parameter will **be set to its minimum** value.

5) Having adjusted the parameter to the required value press the ENTER pushbutton to save the new value. The letter "**P**" will flash in the Position display, as before, ready for the next parameter number to be entered.

6) When finished, press the CLEAR pushbutton to return the operator to the main operating mode.

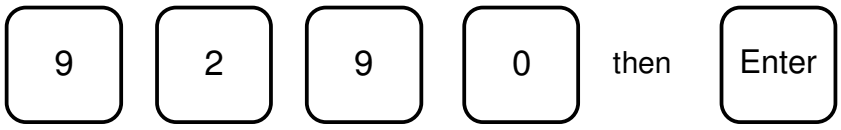
As an example, the Probe Offset is Parameter 122. If the operator needs to change the value of the offset from 10.5mm to 11.0mm they would follow the following procedure:

1) Enter Parameter Mode - Press **KEY IN** and **LAYER UP**



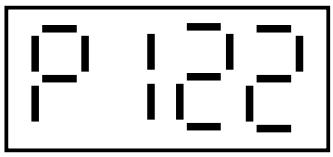
POSITION

2) Enter the PIN (if required)



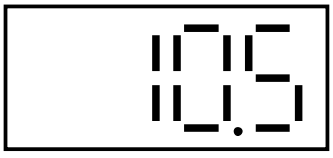
POSITION

3) Enter the Parameter number - Press **"122"** then **ENTER**

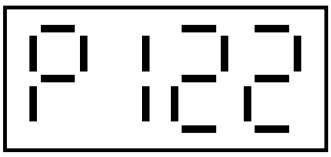


POSITION

NEXT SET

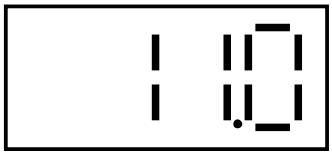


4) Use the layer buttons to alter the parameter value to 11.0mm



POSITION

NEXT SET



5) Press the **ENTER** button to return to the parameter selection stage

POSITION

6) Press **CLEAR** to return to the normal operating mode

3.2. FUNCTION MODE

To access Function Mode:

1) Press and hold down the **KEYIN** pushbutton while at the same time press the **LAYER DOWN** pushbutton, then release both buttons. The setworks may prompt the operator to enter the security code for access to the parameter mode. The Position display will show **"Pin"**.

2) Enter the appropriate PIN number via the random pushbuttons (0-9). The Layer display will show a "**-**" every time a key is pressed (a maximum of 4 numbers is accepted). The Pin access code for the Jaymor console is **9290**. Press Enter.

   If the incorrect PIN number is entered an "**Err 1**" message is temporarily displayed in the Layer display. The operator is returned to the main operating mode and must restart this procedure.

3) If the correct PIN number is entered, **"F"** is displayed in the Position display. This is a prompt for the operator to push a Preprogram pushbutton and activate the required function, which will then be activated automatically

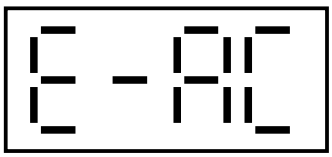
4) Once the function has begun its operation, the operator will be returned to the main operating mode automatically, with the layer display indicating which function was performed. The function's operation can be cancelled, and the layer display cleared, at any time by pressing the CLEAR pushbutton.

The available functions on the Carriage / Slabber setworks are outlined below.

Function A – Auto Calibrate

The auto calibrate function is used at the time of commissioning to calibrate the probe / encoder to the physical setup of the system.

Auto calibrate is only available if the “Auto Calibrate Inhibit” parameter (P13) is set to “1”. If an Auto Calibrate operation is attempted with this parameter set to inhibit, an Auto Calibrate Error is generated, the operator will be returned to the normal operating mode and the Layer display will show the following message:



When the Auto Calibrate function is entered, the operator may be prompted to enter the loop number that the function will be run on. This will only occur for multi-axis systems. If this is the case, the operator should enter the loop number via the random number keypad and press enter.

The console will then show **“ACAL run bAC”** indicating that the function is ready to start and run the ram of the setworks backward. To begin the calibration the operator will push Enter.

The setworks will then drive the ram backward and provide a countdown in the Layer display. After 10 seconds the layer display will display the number of counts that are received from the ram at this position. The operator should note the position of the knees at this point by either marking the ram or measuring its distance from a fixed point. Enter is then pressed to accept the count value and proceed with the calibration.

The console displays will show **“ACAL run For”** to indicate that the ram is about to be driven forward. Once the operator presses Enter, the layer display will again show a countdown while the ram is driven forward. A count value will be returned for this position of the knees and the operator should again note their physical position.

When Enter is pressed at this stage, the operator is sent to Parameter Mode to enter the distance the ram covered during calibration as the “Probe Stroke” parameter (P11). This distance is calculated from the two measurements that were recorded during the calibration.

The parameter is adjusted using the Layer buttons as usual, and is stored by pressing Enter. The operator is returned to normal operating mode by pressing Clear.

Function B – Upload Parameters to a PC

This function is used to upload the current parameter list used by the setworks console to a PC via the RS232 port. This function is to be used in conjunction with the “Jaymor Serial Interface” software by Jaymor technical staff.

Function C – Drive Valve Forward

This function will apply a drive signal to the forward valve indefinitely. **Limits do not apply when performing this function**.

POSITION

NEXT SET

After the “C” function has been selected, the displays in the centre of the console will appear as shown above. The operator will then press Enter to initiate the function. The drive signal will then be applied to the forward valve until the Clear button is pressed.

Function D – Drive Valve Backward

This function will apply a drive signal to the back valve indefinitely. **Limits do not apply when performing this function.**

After the "D" function has been selected, the displays in the centre of the console will show **"run bAC"**. The operator will then press Enter to initiate the function. The drive signal will then be applied to the back valve until the Clear button is pressed.

Function E – Valve Off

This function will stop any drive signal to either valve in a similar manner to the Emergency Stop Button, but will not stop the hydraulic power pack.

Function F – Store Parameters To Commissioning Area

This function is to be used at commissioning of the setworks to store the initial setup of the system. The function creates a backup file of the parameter list that can be restored at a later time if the working parameter list becomes corrupted.

Function G – Restore Parameters From Commissioning Area

This function will return the working parameter list of the setworks to that which was stored in the commissioning area of the memory. **Once parameters have been restored it is not possible to retrieve the previous working parameter list of the setworks**. The function may be used to restore a corrupted parameter list to the values that were set at the time of commissioning.

Function H – Write Default Parameters to Memory

Jaymor technicians will use this function when initialising a new Miser controller board. It is not to be used by the setworks operator.

3.3. WARM UP CYCLE

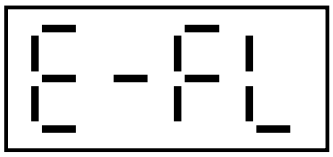
The warm up cycle of the setworks will run the knees in and out continually to heat up the hydraulics of the system and result in more stable operation. The cycle is activated by pressing and holding the Key In button while at the same time pressing the “9” button, then releasing the two together.

The warm up cycle will be cancelled by pressing any other button on the setworks console.

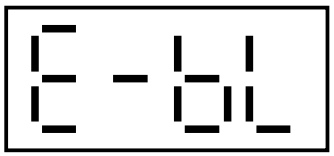
3.4. ERROR MESSAGES

The setworks console will display various error messages whenever the operator performs an illegal operation. The error messages and their meanings are outlined below:

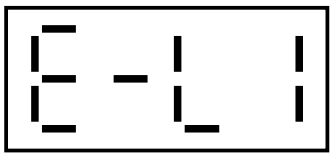
This message is shown when the operator has entered the incorrect PIN number to enter either Function or Parameter Mode. The message will be displayed in the Layer display for approximately 2 seconds.



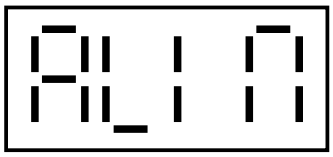
This message is displayed in the Layer display if the requested set would have caused the knees to travel beyond the appropriate forward limit for the current state of the system.



This message is displayed in the Layer display if the requested set would have caused the knees to travel beyond the Back Limit (Parameter 111) of the system.



This message is displayed when the control for Loop1 is passed a target it cannot reach without breaching a target. This message should not occur during normal operation and is used by Jaymor for debugging purposes. **“E-L2”** is the corresponding error for Loop 2.



This error will only occur in multi-axis systems, and is used to indicate that the two axes have racked beyond the Crash Tolerance (P14) of the system and are out of alignment. This message will appear in the Next Set display until the axes are realigned.

4. CALIBRATION AND TUNING

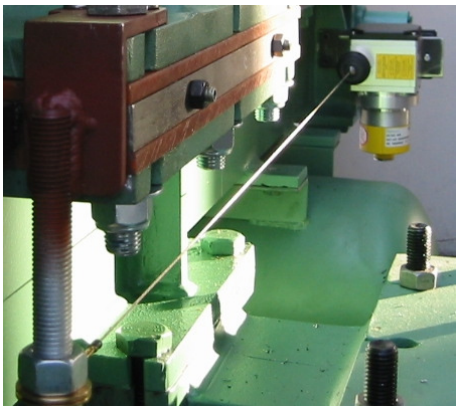
This section outlines the necessary steps to calibrate the position reading device for the system, either a wire rope encoder, or a transducer in a ram. These steps combined with the offset calculation examples give the operator a knowledge of how to recalibrate the system should either of these position sensors ever need replacing.

Also included in this section is a description of the tuning parameters available in the system to adjust and refine the setting characteristics of the setworks.

4.1. PROBE / ENCODER CALIBRATION

The probe / encoder will be calibrated when the setworks is commissioned.

A 'probe' generally refers to a type of measuring transducer that uses a rod style (for fitting internally to cylinders), or profile style (external/stand alone mounting) and has a magnet that slides along the device for purposes of measurement. These devices give approximately 22-23 raw counts/mm travel, and raw counts increase as the magnet moves away from the end with the electrical connector (usually as cylinders extend or machines move forward). Where a setworks has been configured for using a transducer the 'Probe Type' parameter (P120/220) will be set to '1' for a start/stop pulse type (most common), '2' for a PWM or L type, and '3' for an SSI type.



An 'encoder' refers to a rotary encoder fitted to a wire rope spring return mechanism. These devices usually give 20.48 raw counts/mm travel (but encoders can be programmed at the factory for different resolution). Where a setworks has been configured for using an encoder the 'Probe Type' parameter (P120/220) will be set to '3' for an SSI type.

Important: Additional steps are required when calibrating a machine that uses a rotary encoder with spring return wire rope mechanism. Please refer to the additional details in 'Note2' later in this section.

If for some reason the calibration needs repeating the easiest method is via the “Auto Calibrate” function as outlined in the “Functions” section.

Auto calibrate is not suitable for some systems where damage may occur if a drive signal is applied when the knees are at full extension (for example a chain-driven system). For a system such as this the recalibration must be done manually as outlined in the following steps:

Calibration Steps

1) Run the knees to their full extension. This may have to be done manually, to prevent the forward limits from restricting the movement. When at full extension note the value of Parameter 199 (Loop1 Probe Counts), also note the actual measurement of the knees as this will be required when calculating the Stroke of the system.

2) Retract the knees as far back as they will travel, again this may have to be done manually. Note the value of Parameter 199 (Loop1 Probe Counts) and again note the actual position measurement of the knees.

3) Calculate the distance between full extension and full retraction (measurements recorded in steps 1 and 2). This value will be the stroke of the probe (Parameter 123).

4) Enter the Probe Count values obtained from the above steps into the appropriate parameters, with the larger count value entered into “Probe Max Counts” (P124), and the lesser value entered as the “Probe Minimum Counts” (P125).

5) If the raw probe counts from parameter 199 were largest when the knees were extended, then the probe invert paramater (P121) should be set to '0'.
If the raw probe counts from parameter 199 were largest when the knees were retracted, then the probe invert paramater (P121) should be set to '1'.

5) Enter the actual measurement from step 1 (full extension) into offset parameter (P122) This will complete the calibration operation.

Note1: The method shown above is specific to the calibration of Loop1. Loop2 can be calibrated in the same manner, but will involve different parameter numbers as outlined in the parameter list.

ie - Loop1 parameters = 100 to 199

Loop2 parameters = 200 to 299

Note2: **Additional steps are required when calibrating a machine that uses a rotary encoder with spring return wire rope mechanism. Please refer to the following explanation.**

Encoders may be programmed at the factory in different configurations, and this may affect the calibration steps above. These differences can include the resolution, the count direction as the wire rope extends, and the reference count when the button on the encoder is pressed. It should also be noted that as the encoder counts go down towards '0' they will not stop counting at '0'. Instead the count will 'roll over' and start counting down from 65535.

1) Resolution

Normally encoders are configured for 20.48 raw counts/mm (4096 counts/200mm). This may be configured differently if the encoder is installed in a different wire rope mechanism or on another type of connection to the machine (ball screw for example). As long as the probe min and max counts fall within an allowable range and the resolution is enough to provide accurate control this should not present any problem.

2) Count direction

Encoders can be configured to count up or down as the wire rope extends. Before attempting to calibrate a machine it will be necessary to check what direction the encoder is currently counting. This will be necessary to know for step 3. To work this out it is recommended to check the raw counts (P199) at the current position, then get an assistant to pull the wire rope out a small amount (eg 50mm), and check P199 again to see if counts have increased or decreased.

3) Encoder reference

Encoders also do not have a fixed reference (0 raw count) position like 'probe' style transducers. Instead they have a button built into the encoder which, if pressed while power is on will immediately set the raw encoder count to a pre-defined number (usually '0', but could be configured for another set value, like '10,000' for example). Once the count direction has been determined in step 2 above, the encoder reference can be set. The

example below will assume the encoder references to '0' when the internal button is pressed.

Firstly, ensure the setworks electronics are powered on and the setworks hydraulics or electric motor drive are **off**/**stopped**.

Next remove the slotted coin sized cap with a screwdriver to give access to the button inside.

If the encoder count direction from step 2 proved counts increase as the wire rope extends then:

Disconnect the wire rope from the machine and carefully let the rope feed back into the encoder housing. With the rope fully retracted press the button in the encoder, then reconnect the wire rope to the machine.

(If this method results in a too large of a probe minimum counts value in parameter P125 during later stages of calibration, then this step may need to be repeated but do not let the wire rope return completely to housing). Ideally the encoder would be 'zeroed' with the wire rope at a position approx 100mm beyond the back limit position.

If the encoder count direction from step 2 proved counts decrease as the wire rope extends then:

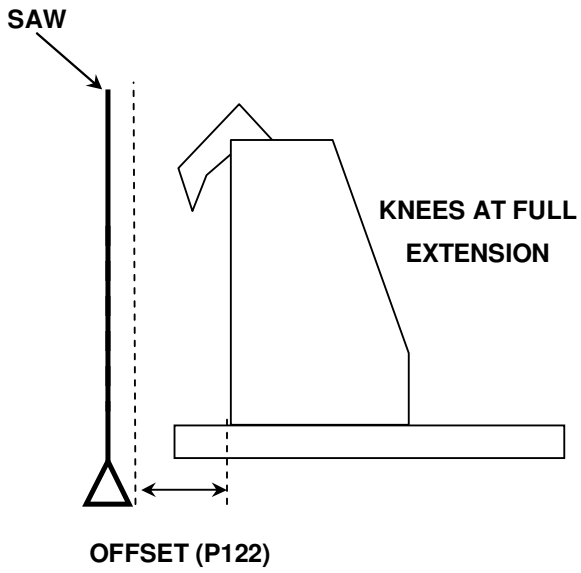
Pull the wire rope out from the return mechanism by approx 100mm more than the machines current distance to its forward limit (ie, if the machines actual position is currently at 400mm, then pull out 500mm of wire rope). With the rope held in this position press the button in the encoder, then carefully let the wire rope feed back into the return mechanism.

Replace the slotted cap that covers the button inside the encoder.

Once the encoder reference has been done, the normal calibration steps can be followed. It should be noted that the count direction found in step 2 will govern the setting of the 'probe invert' parameter (P121).

4.2. OFFSET ADJUSTMENT (P122)

The offset distance for the setworks is illustrated below:



The setworks' offset distance is stored in **Parameter 122**. This is the measured distance from the knees to the saw when they are fully extended as shown in the diagram above.

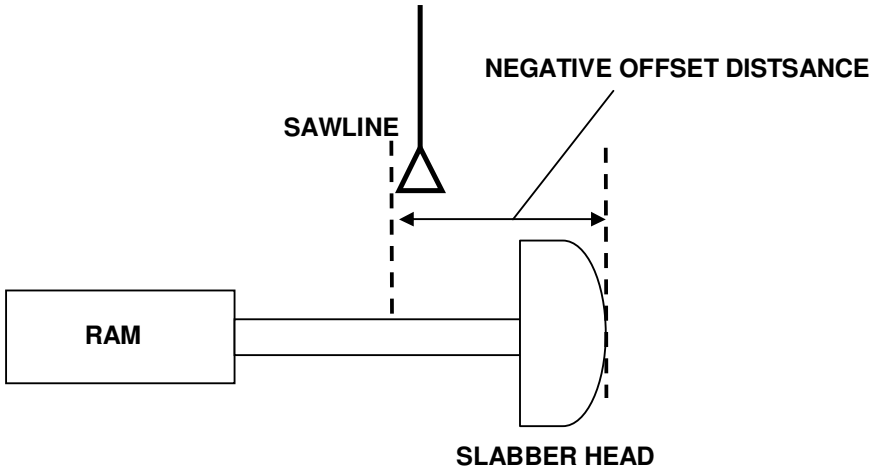
The Offset may need to be adjusted if the measured size of the board cut and the size shown in the position display of the console do not match. To correct the error in the Offset distance then the difference between the measure size and that in the position display should be calculated, then:

- If the measured size is **too big – INCREASE** the offset by the difference between the two amounts.
- If the measured size is **too small – DECREASE** the offset by the difference between the two amounts.

Refer to Section 3.1 of this manual for more details on how to adjust a parameter.

4.3. NEGATIVE OFFSET ADJUSTMENT

The Negative Offset parameters (P126 & P226) are only used when the knees or slabber head is able to travel further forward than the saw line. They are used to reference the probe / encoder to the maximum extension of the ram and ensure that the relative position of the saw line is accurate.



If it is possible for the ram to extend past the saw line in this manner, all Forward and Back Limits will then be referenced from the full extension distance. For example, if the ram can extend **25mm** beyond the saw line, and the Forward limit of the system is to be **50mm** from the saw line, then parameter 112 must be set to 75mm (25mm + 50mm). The negative offset will have to be added to any limit calculations in this manner.

4.4. CONSOLE PARAMETERS

The Jaymor Carriage / Slabber setworks has a number of features that the operator may wish to change which alter the way the console behaves and / or appears. The functions and their descriptions are outlined below.

Display Rounding (P1)

The rounding of the Position display can be turned on and off by adjusting parameter 1. It is recommended that the rounding be left ON under normal operating conditions, as the position can flick between 0.1mm, which can be distracting to the operator.

PIN Required (P2)

When the operator enters into Parameter or Function Mode, they will be asked to enter a PIN number. It is possible to set the "PIN Required" parameter (P2) to protect the parameter list of the setworks from unwanted tampering.

If this parameter is set to "0", the operator will require a PIN every time they enter Parameter or Function Mode. This can be frustrating if many parameters are to be altered, but is a useful of protecting the working parameter list of the system.

If the PIN Required parameter is set to "1", the operator will only be required to enter a parameter once after the console has been powered up. Every time Parameter or Function Mode is entered after this, the operator can bypass the PIN entry stage and go directly to the Parameter Selection stage.

Matrix Filter Counter (P3)

The sensitivity of the buttons on the console can be adjusted by the Matrix Filter Counter parameter (P3). The higher this parameter is set the less sensitive the buttons will be and the less likely accidental button presses will be.

Display Brightness (P23, 24, 25)

The brilliance level of the displays on the MINI-Miser console can be altered by the "Display Brightness" parameters. This parameter allows the operator to adjust the displays to compensate for the ambient lighting conditions by increasing or decreasing their brightness.

The pushbutton displays above the preprogram buttons can be set up to highlight the selected size. The displays' brightness is set by the "PBD Dim Brilliance" parameter (P25) until the corresponding size is selected, when it changes to the "PBD Bright Brilliance" parameter (P24) value. The highlighting of the selected sizes can be avoided by setting parameters P24 and P25 to the same value.

4.5. NON-PROPORTIONAL TUNING

Non-proportional setting can be selected for the system by setting the "Output Drive Select" parameter (P130) to 1 pr "Relay Mode". A Non-Proportional system is a relatively simple system to tune, as the setworks' outputs are either fully on or fully off. The setting behaviour of such a system can be adjusted for more efficient cutting by the following parameters.

Minimum Set Distance

If the setworks is operating in "Normal Set Mode" (as outlined in Section 2.5) the Minimum Set distance (P106) will set the smallest distance that will be directly set to without the system performing a Back Up action.

Back Up / Slow Distance

The Back Up distance (P107) is used when in Normal or Step Up setting modes (as outlined in Section 2.5) to set the distance that the system will back up before setting forward to the target.

In a **Two-Speed** system this parameter will also define the distance from the target at which the Slow Valve will become energised.

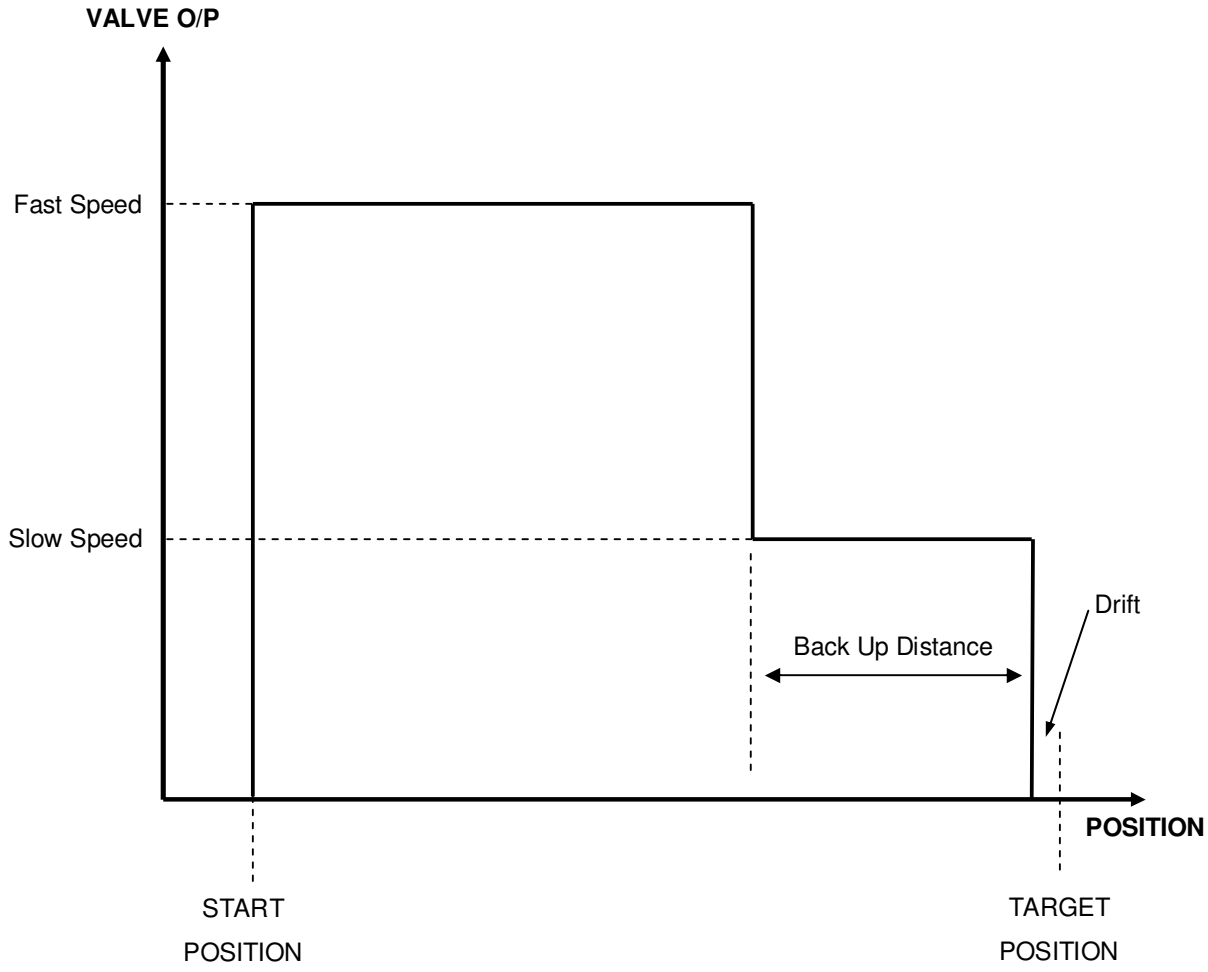
Drift Distance

The Drift parameters (P140 & P150) determine the distance from the target that the valve will be deenergised, allowing the inertia of the system to complete the set. This parameter will tune the accuracy of the system when reaching target.

Slow Valve Delay (2-Speed Systems only)

The Slow Valve Delay (P37) will determine how long after the main directional valve the slow valve will deenergise. This extra time delay is used to prevent the knees from surging forwards as can occur when both the main directional valve and the slow valve are switched off at the same time.

The graph below illustrates a typical set for a 2-Speed system:



PROPORTIONAL TUNING

A Proportional system has many more parameters involved in the setting control and is much more complex than a Non-Proportional system. It is not recommended that the tuning of a Proportional system be altered unless the operator is confident with the effects that the following parameters have on the response of the system.

Deadband

The Deadband parameters (P141 & P151) defined the amount of signal that needs to be applied to the valve before any response can be detected. As such, the deadband percentage is added to all other calculations of the driving signal.

If the deadband is set too low, the setworks will be slow to respond and may also have trouble reaching the target.

If the deadband is set too high, the setting of the system can be very harsh, with the set stopping very abruptly when the target is reached. In Closed Loop, a high deadband may cause the knees to oscillate about the target.

Ramp Up

The acceleration of the knees from a stand still to its Maximum Speed is determined by the Ramp Up parameters (P144 & P154). These parameters define the increase in valve output per millimetre travelled in the set. The higher the value of this parameter, the faster the ram will reach maximum speed and as such, the more suddenly the set will begin.

A lower value of Ramp Up will cause a softer ramp to full speed, but is the value is too low it may prevent the system from reaching top speed at all and cause the time taken to perform a set to become too long.

Ramp Up Boost

The Ramp Up Boost parameter (P133) defines the extra percentage output added to the Deadband value to start the ram moving more quickly from a stand still. The system will then ramp up to full speed from this value instead of from the lower Deadband value. If the Ramp Up Boost is set too high, the set may begin too harshly, but if it is too low the system can be slow to respond at the start of a set.

The Ramp Up Boost parameter only effects the initial start up speed of the knees during a set.

Maximum Speed

The maximum speed of the ram when setting forward and backward are determined by parameters 145 and 155. When jogging in and out the maximum speeds are limited by parameters 148 and 158. These parameters set the maximum output speed the ram can reach when performing a set or jog operation.

If the Maximum Speed parameters are set too high the system can have trouble slowing down in time to reach target and may overshoot. If the parameters are set too low, the time it takes to perform a set can become too slow for efficient cutting.

Ramp Down

The ramp down parameters determine the deceleration rate of the ram when performing a set or jog operation. The Ramp Down parameters set the reduction rate in valve output from the Maximum Speed to a stop. The higher the value of the ramp down parameters, the more quickly the ram will reduce speed although this may cause the ram to overshoot its target. If the parameter is set too low, it can prevent the system from reaching full speed, as it will begin to slow almost immediately after the set begins, thus slowing the time taken to perform a set.

Ramp Down Boost

The Ramp Down Boost parameter (P134) is used in a similar manner to the Ramp Up Boost, but defines the output level that the valve will switch off at after a set. This parameter speeds up the set as the system doesn't ramp all the way down to the deadband value, and will stop from a greater speed. If this parameter is set too high it can cause the system to overshoot the target or require the Drift value to be increased.

Drift Distance

The Drift parameters (P140 & P150) determine the distance from the target that the valve will be shut off. This parameter will tune the accuracy of the system when reaching target.

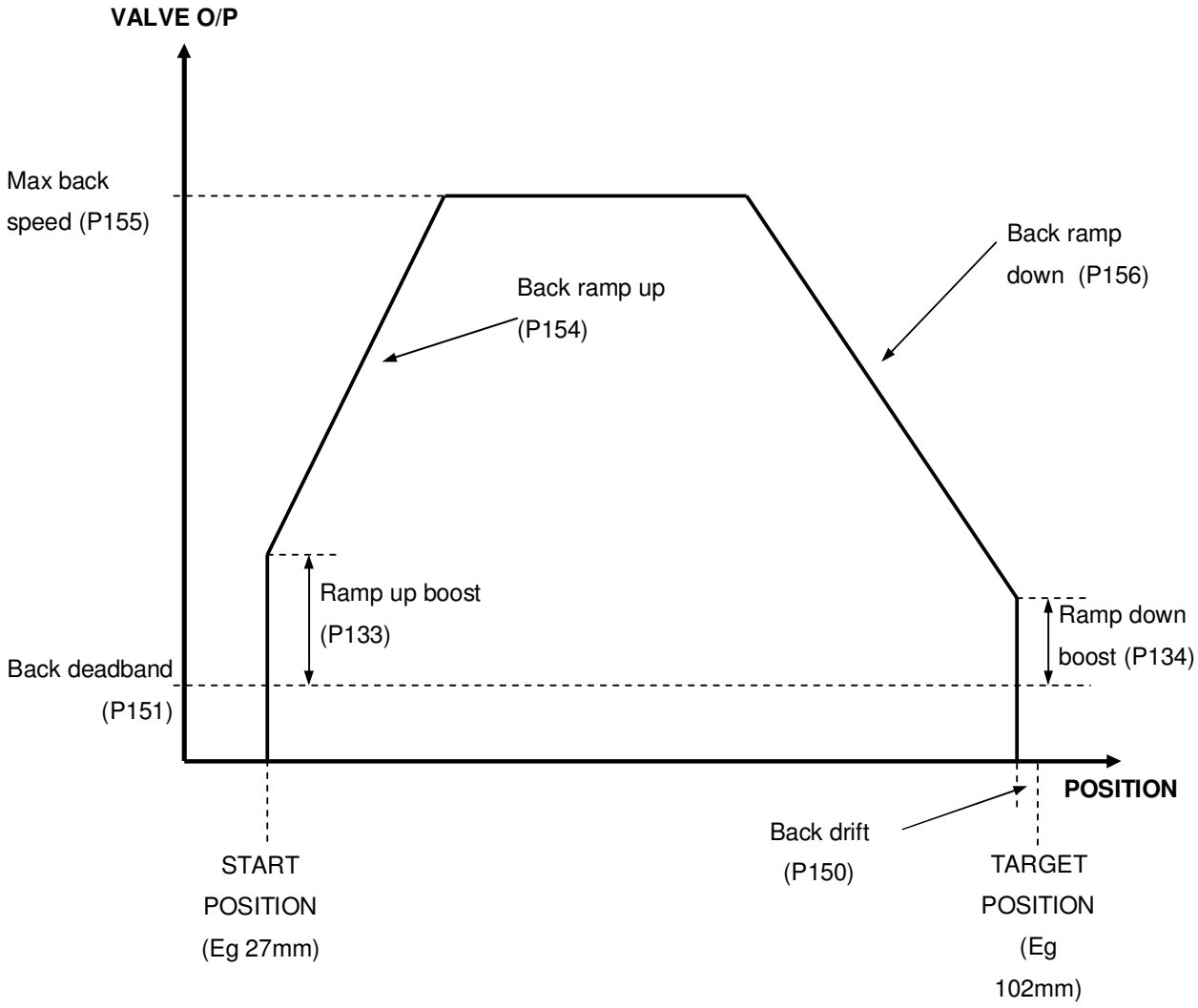
In an Open Loop system, the inertia of the system will complete the set by drifting into the target. If the value is too high the system may fail to reach target, but if it is too low the system will overshoot.

In a Closed Loop system, the PID parameters will be used to drive the knees to the target.

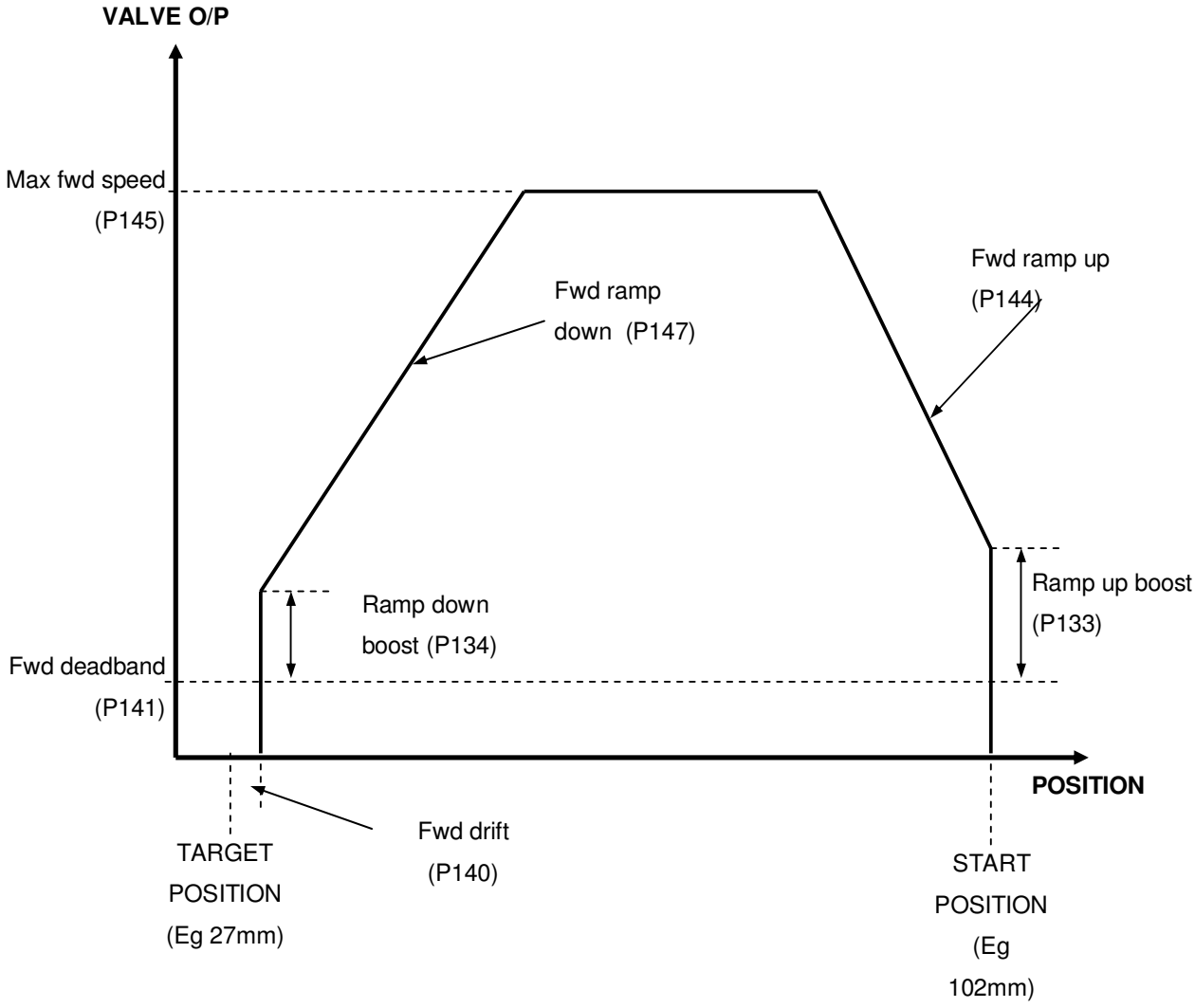
Overview of Setting Parameters

The effects of all of the above parameters are outlined in the diagrams below. The parameter numbers for different parts of the setting process are given in brackets.

Setting back from a small size to a larger size



Setting forward from a large size to a smaller size



5. TROUBLESHOOTING

The troubleshooting section of the manual outlines a few of the common faults experienced due to incorrect setup or operation of the setworks. It is recommended that this chapter be consulted before contacting Jaymor technicians for assistance.

5.1. CANNOT CHANGE A LIMIT PARAMETER

Cause 1: If the operator is unable to change any of the limit parameters for the system, it is likely that the "Limit Type" parameter (P110) is set to "1" (No Limits).

Solution: Set parameter 110 to "2 = Manual Limits". The operator can then alter all limit parameters manually, in the usual manner.

5.2. CANNOT PERFORM THE AUTO-CALIBRATE FUNCTION

Cause 1: The "Auto-Calibrate Inhibit" parameter (P13) is set to "0", inhibiting the function.

Solution: Set parameter 13 to "1 = Auto-Calibrate allowed".

Cause 2: The Emergency Stop button is latched ON.

Solution: Release the Emergency Stop button.

5.3. KNEES OSCILLATE ABOUT THE TARGET

Cause 1: The Deadband parameters are set too high.

Solution: Reduce the deadband parameters (P141 & P151) until the oscillation is eliminated.

Cause 2: The PID position hold parameters are set too high (Closed Loop only).

Solution: Contact Jaymor for help in reducing these PID parameters.

Note: Care should be taken to ensure that the overall setting of the system is not compromised by any alterations made.

5.4. SYSTEM IS SLOW TO RESPOND TO A SET

Cause 1: The deadband parameters are set too low.

Solution: Raise the appropriate deadband parameter (P141 or P151) depending on which direction is slow to respond.

Cause 2: "Ramp Up Boost" parameter (P133) is set too low.

Solution: Raise parameter 133 to increase the initial step up for the set. If this parameter is set too high the system may be too harsh when starting a set.

Cause 3: "Ramp Up" parameters (P144 & P154) are set too low.

Solution: Raise the appropriate ramp up parameter depending on which direction is slow to begin a set.

Cause 4: There is a mechanical fault with the system.

Solution: Check over the mechanics of the system to determine the cause of the fault.

Note: Care should be taken to ensure that the overall setting of the system is not compromised by any alterations made.

5.5. SYSTEM DOES NOT REACH TARGET AFTER A SET

Cause 1: Deadband parameter (P141 or P151) is set too low.

Solution: Raise the appropriate deadband until target is reached consistently.

Cause 2: "Ramp Down Boost" parameter (P134) is set too low.

Solution: Raise parameter 134 until target is reached consistently.

Cause 3: The PID position hold parameters are set too high (Closed Loop only).

Solution: Contact Jaymor for help in reducing these PID parameters.

Cause 4: "Drift Distance" parameter (P140 or P150) needs adjustment.

Solution: Adjust the appropriate drift parameter until the target is reached consistently.

Note: Care should be taken to ensure that the overall setting of the system is not compromised by any alterations made.

5.6. DIAGNOSTIC LED "KEY PRESS" ALWAYS ON

Cause 1: One of the buttons in the membrane has become stuck.

Solution: Press every button on the membrane repeatedly in an attempt to locate and free the faulty button. If the problem persists then contact Jaymor.

5.7. DIAGNOSTIC LED "FLAG" IS ALWAYS ON

Cause 1: The Flag switch on the carriage is jammed on.

Solution: Examine and operate the Flag switch manually, checking that the Diagnostic LED is only on when the switch is activated.

Cause 2: There is no Flag switch present in the system but the "Flag Operation" parameter (P32 or P33) has not been set to "Bypass".

Solution: Set parameter 32 or 33 to "0" to bypass the flag operation.

Cause 3: The cable between the Flag switch and setworks console has a break in it.

Solution: With reference to the cable schedule in the back of this manual, check the "Flag" and "24/0V" lines for continuity.

5.8. DIAGNOSTIC LED "RUN" IS ALWAYS ON

Cause 1: The cable from the power pack's contactor to the setworks console has a break in it.

Solution: With reference to the cable schedule in the back of this manual, check the "Run" and "24/0V" lines for continuity.

Cause 2: The power pack is not running.

Solution: Check that the isolating switch for the power pack is on. Start the power pack from the setworks console as usual.

Cause 3: The run confirm signal is not utilised in this system, but the “Run Confirm Bypass” parameter (P31) has not been set to “Bypass”.

Solution: Set parameter 31 to “0” to bypass the run confirm signal.

5.9. DIAGNOSTIC LED “E/STOP” IS ALWAYS ON

Cause 1: There is a fault in the wiring inside the setworks console.

Solution: Open the console and check the terminals at the back of the “Emergency Stop” pushbutton. If unable to locate the fault then contact Jaymor for further assistance.

5.10. DIAGNOSTIC LED “PROBE” IS ALWAYS ON

Cause 1: The “Probe Type” parameter (P120) has not been set correctly.

Solution: Refer to the complete parameter list in the rear of this manual and set parameter 120 to the appropriate value for the system.

Cause 2: There is a break in the cable from the probe to the setworks console.

Solution: With reference to the cable schedule in the rear of this manual, check the continuity of the “Probe” cable.

Cause 3: The knees have extended the probe beyond the maximum / minimum count parameters as set during the last probe calibration.

Solution: Check the value of the appropriate “Probe Reading” parameter (P199) and compare this to the “Maximum Counts” (P124) and “Minimum Counts” (P125) parameters. If these parameters have been exceeded, the mechanics of the system may have changed and as such the probe may need recalibrating.

Cause 4: There is a fault with the probe / encoder.

Solution: Contact Jaymor for further assistance with the fault.

5.11. POWER PACK WILL NOT RUN

Cause 1: The “Run Confirm” signal is not being received from the power pack.

Solution: Check the continuity of the “H/W I/O” cable as outlined in the cable schedule. If the run confirm signal is not utilised in this system ensure parameter 31 is set to “0” to bypass the signal.

Cause 2: The Emergency Stop button is latched on.

Solution: Release the Emergency Stop and retry starting the hydraulics.

5.12. THE DOGS WILL NOT MOVE IN OR OUT

Cause 1: The dogs are not raised.

Solution: As the dogs cannot be moved in or out when they are down, the operator must raise the dogs before trying the Dogs In / Out operation.

Cause 2: The “Dogs Out” limit parameter (P113) would be breached if the dogs were extended.

Solution: Move the knees back to a position where the dogs can be extended without breeching this forward limit.

5.13. THE KNEES DRIVE IN THE WRONG DIRECTION

Cause 1: The directional valves are on the wrong way around.

Solution: If there is a separate lead to each directional valve, simply swap the two plugs over. Failing this, it is possible to invert the valve output by adjusting parameter 131.

5.14. BUTTONS ARE NOT SENSITIVE ENOUGH

Cause 1: The “Matrix Filter Counter” parameter (P3) is set too high.

Solution: Reduce parameter 3 until the sensitivity of the buttons is at an acceptable level. Try not to reduce this parameter below the optimum level for the desired sensitivity, as it will provide filtering against electrical noise for the system.

5.15. JOG ARROWS ARE AROUND THE WRONG WAY

Cause1: The “Jog Button Invert” parameter (P4) has not been set correctly.

Solution: Adjust parameter 4 to correct the output direction for the Jog arrows.

5.16. THE SETWORKS WILL NOT SET

Cause 1: The power pack is not running.

Solution: The run confirm is not being received, check the possible solutions in Section 5.9 above.

Cause 2: The “Setworks Type” parameter (P5) has not been set correctly.

Solution: Check parameter 5 has been set to the appropriate value for the system.

Cause 3: The Emergency Stop button is latched on.

Solution: Release the Emergency Stop button and ensure the power pack is running.

Cause 4: The setworks is still busy from the previous set.

Solution: If this is the case, the diagnostic LED “Busy” will still be lit. If this is the case then consult Sections 5.5 & 5.6 to determine why the previous set wasn’t finished.

Cause 5: The Flag switch is on.

Solution: If this is the case, the diagnostic LED “Flag” will be illuminated. If this is the case consult Section 5.8 to determine the possible cause.

5.17. CLEAR MUST BE PRESSED BETWEEN SETS

Cause 1: The system does not utilise a Flag switch but is in “Stack Mode.

Solution: Change the “Setting Mode” parameter (P10) to “2 = Instant Set”.

5.18. THE DISPLAYS ON THE CONSOLE ARE OFF

Cause 1: The console’s isolating switch has been turned off.

Solution: Turn on the isolator for the console.

Cause 2: The plugs for the displays on the MSR1-0 controller board in the setworks console have become loose.

Solution: Check that all plugs on the control board inside the console as sitting correctly on their headers.

Cause 3: There is a faulty power supply in the setworks console.

Solution: Contact Jaymor for further assistance with this fault.

APPENDICES

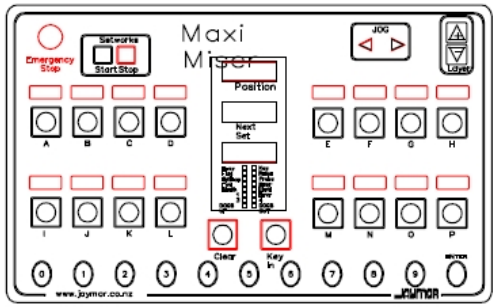
This section contains technical information about the Jaymor MULTI-Miser setworks. It contains the Cable Schedule for the interconnecting leads to the console and technical notes for the MSR1-0 controller and matrix.

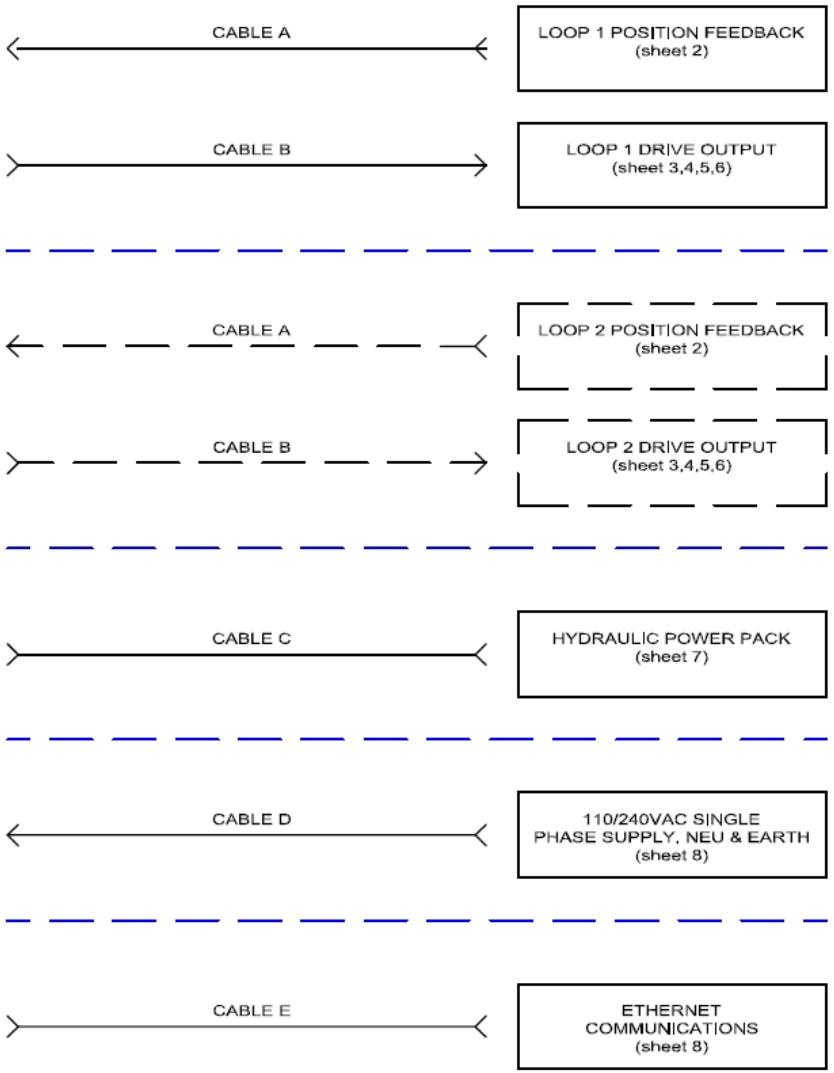
A full parameter list is included and a list of parameter values at the time of commissioning for the specific system.

These appendices are intended as a reference for Jaymor technicians, but may also be of some help to the operator in thoroughly understanding the system.

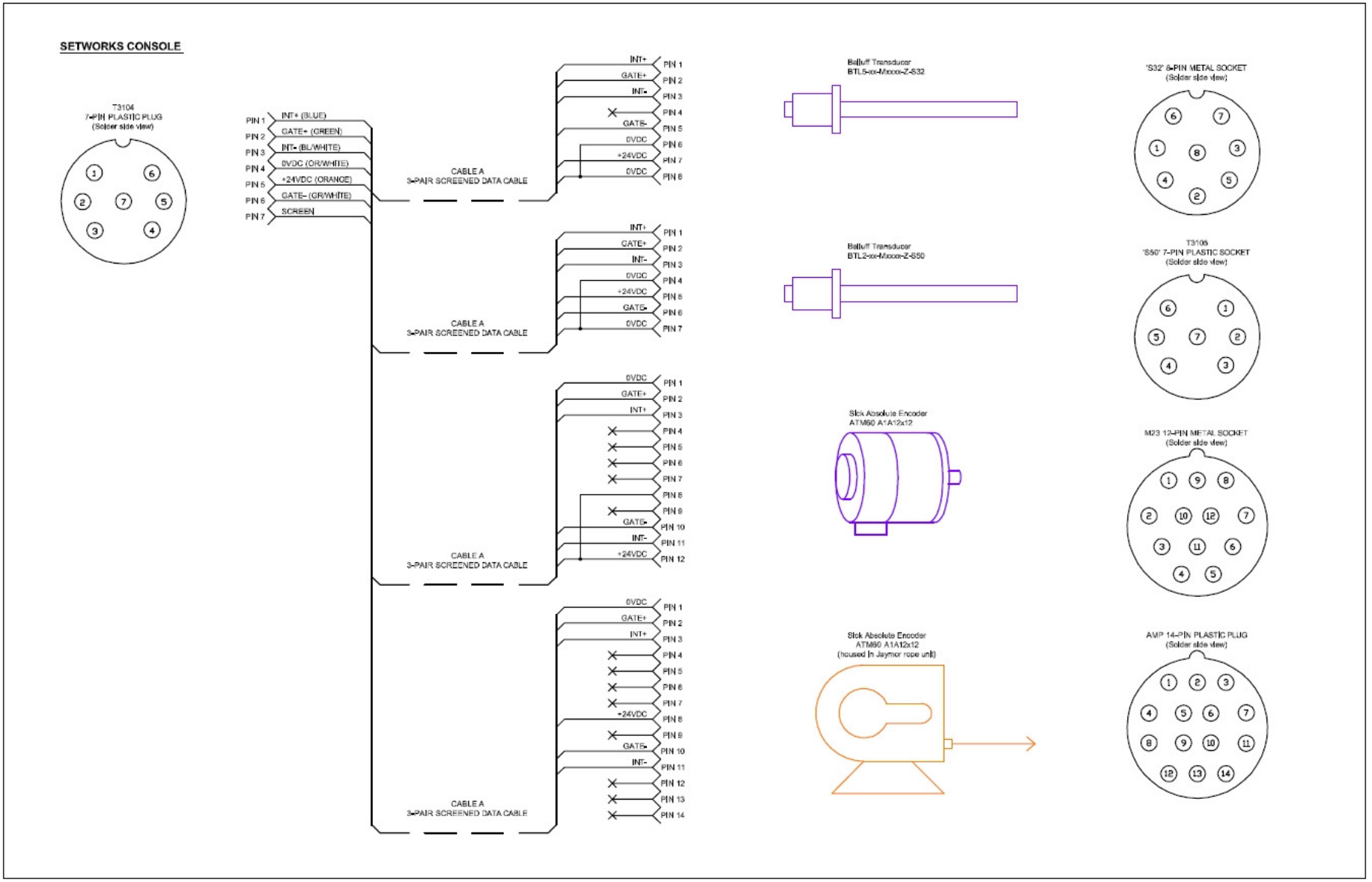
A. CABLE SCHEDULE

A.1 MAXIMISER CABLING OVERVIEW

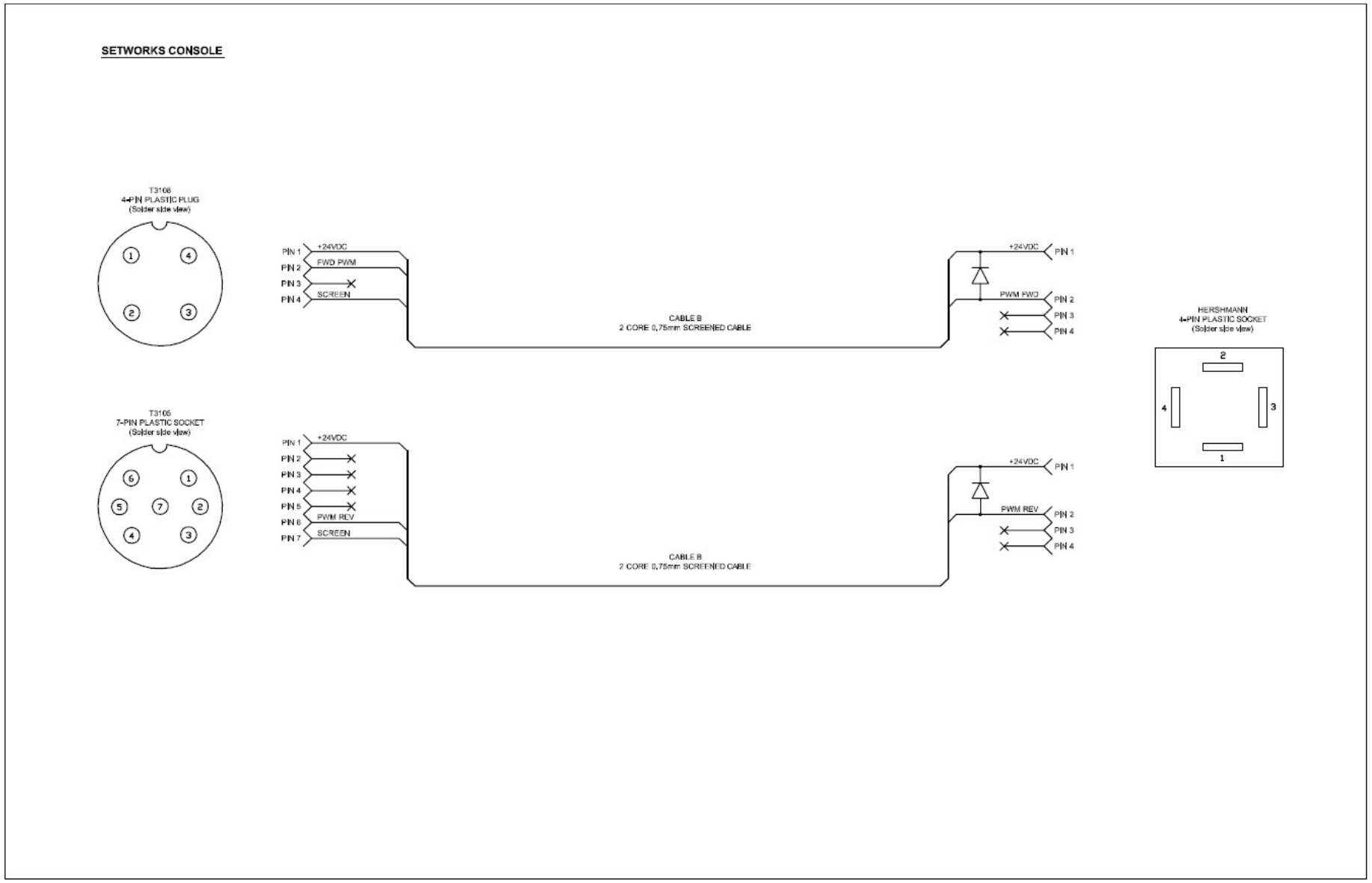




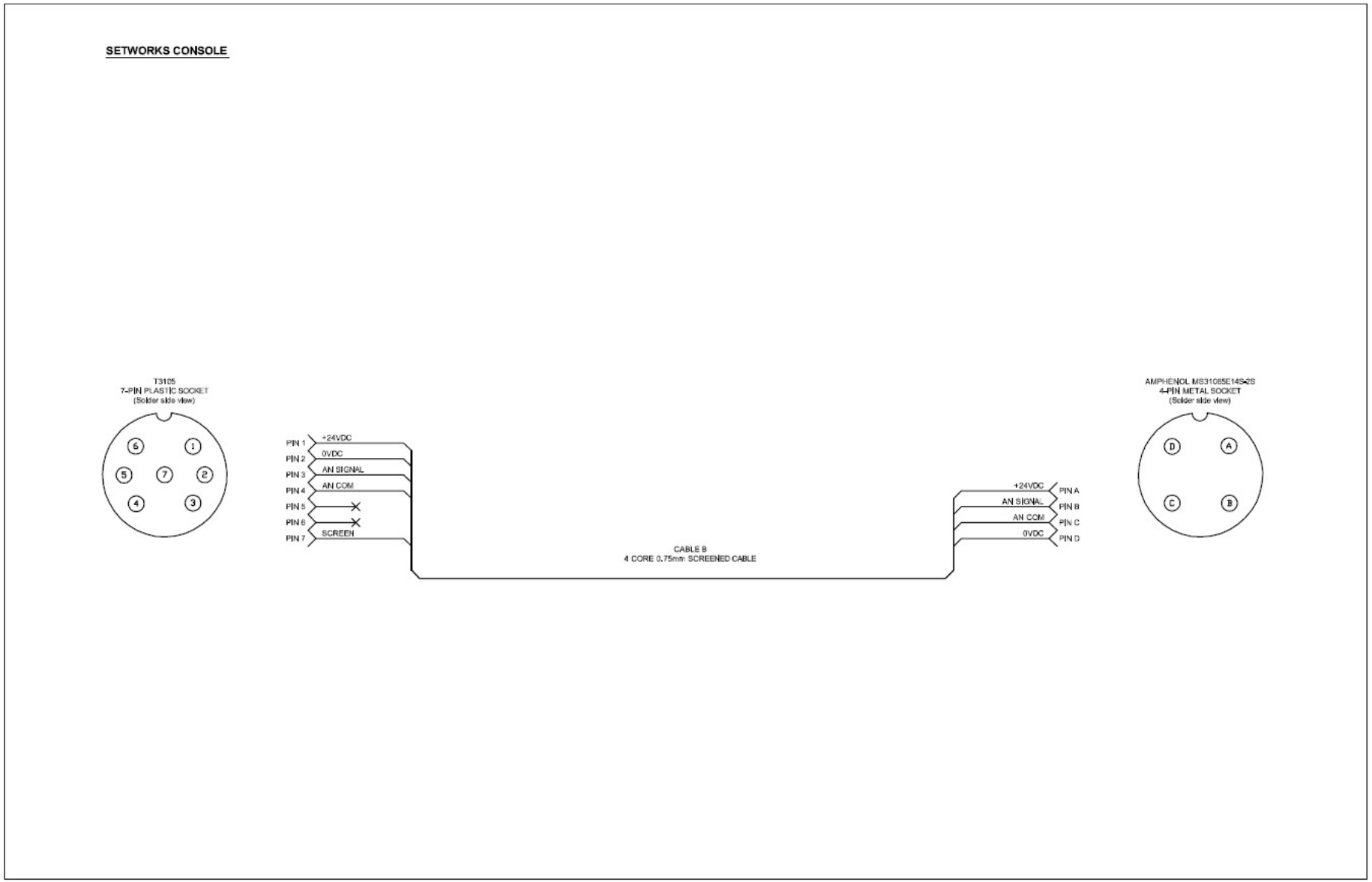
A.2 POSITION FEEDBACK WIRING



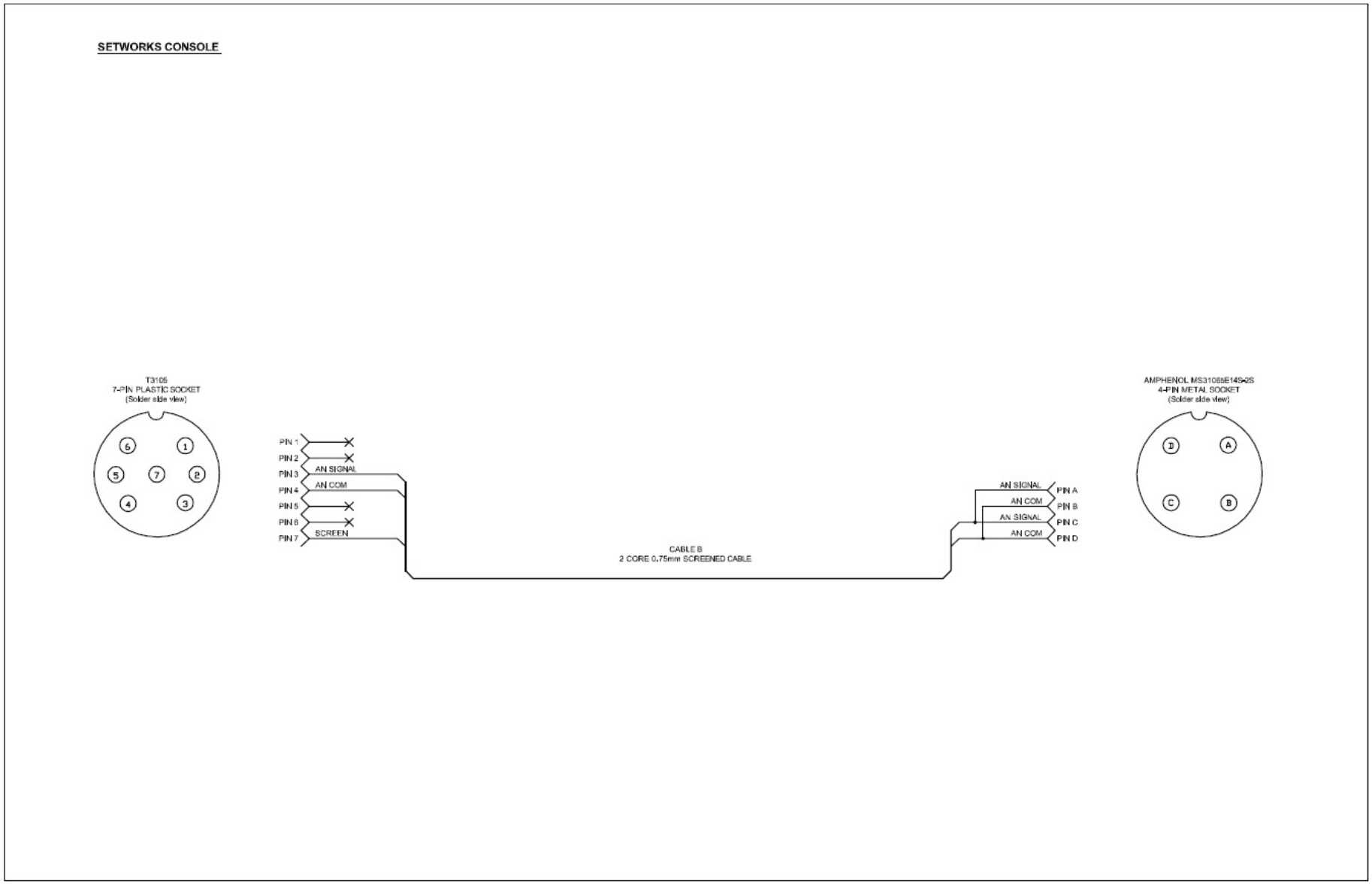
A.3 PWM DRIVE OUTPUT WIRING



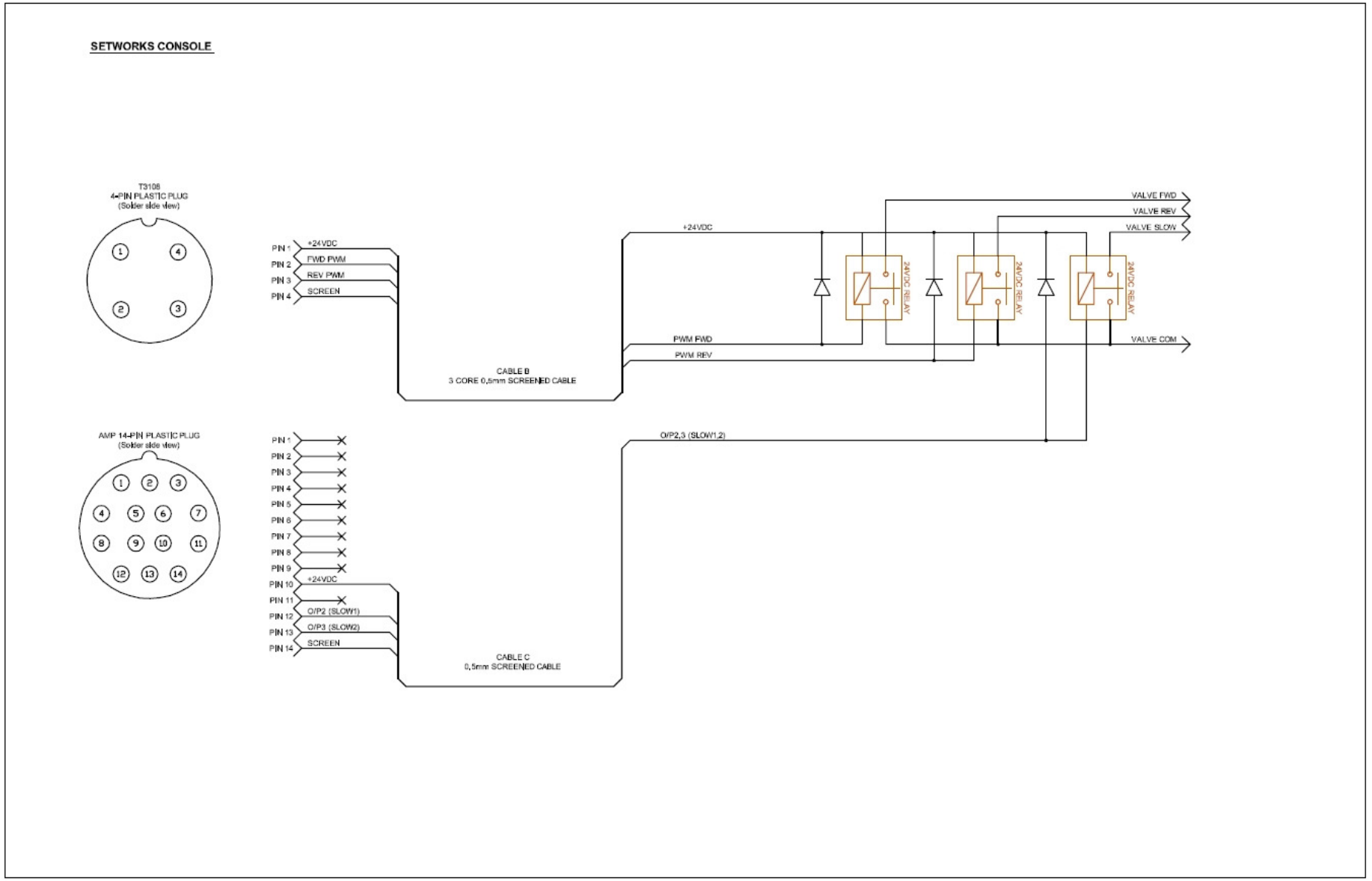
A.4 TEXTRON SERVO VALVE WIRING



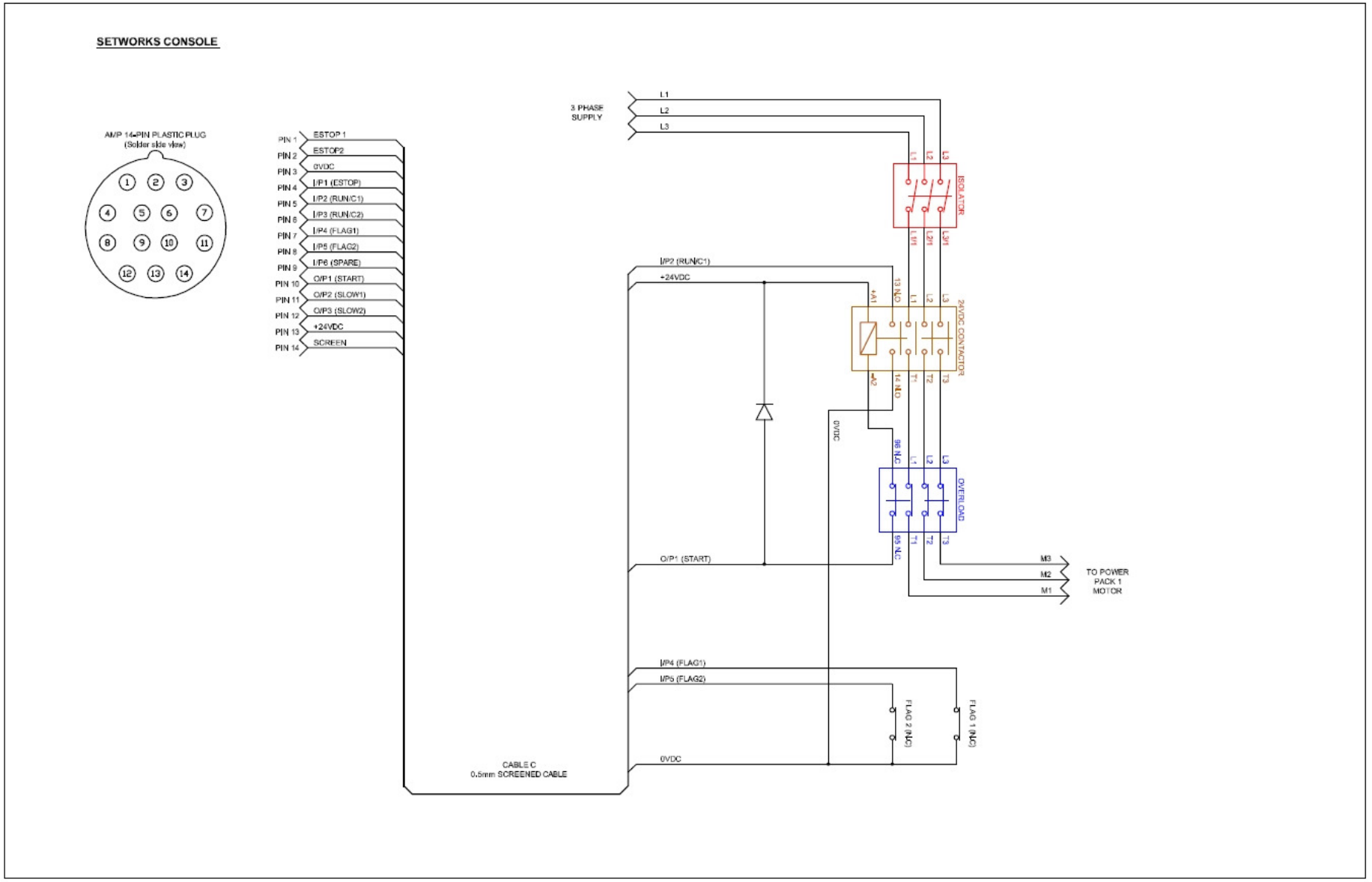
A.5 MOOG SERVO VALVE WIRING



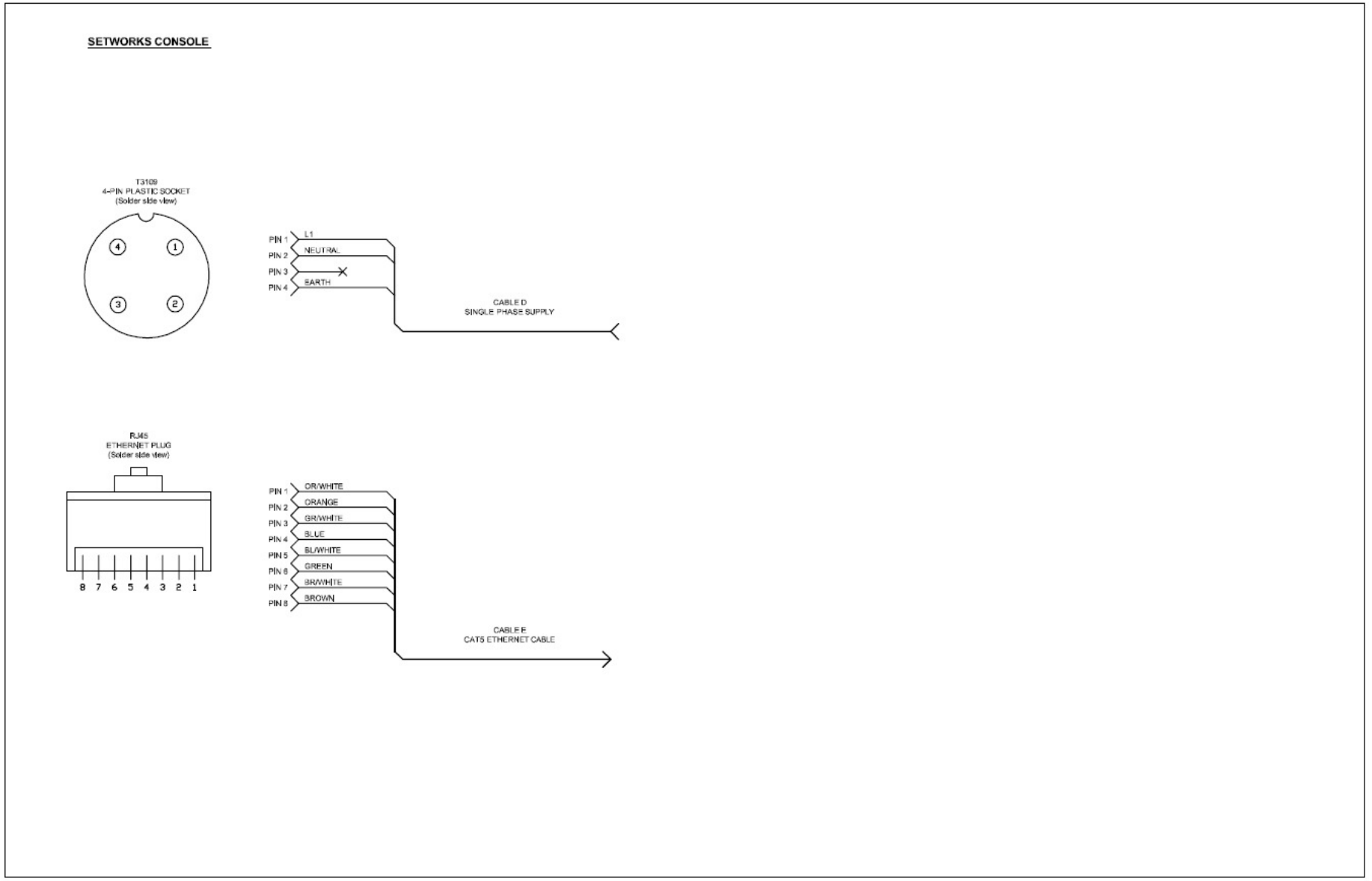
A.6 TWO SPEED RELAY DRIVE SYSTEM WIRING



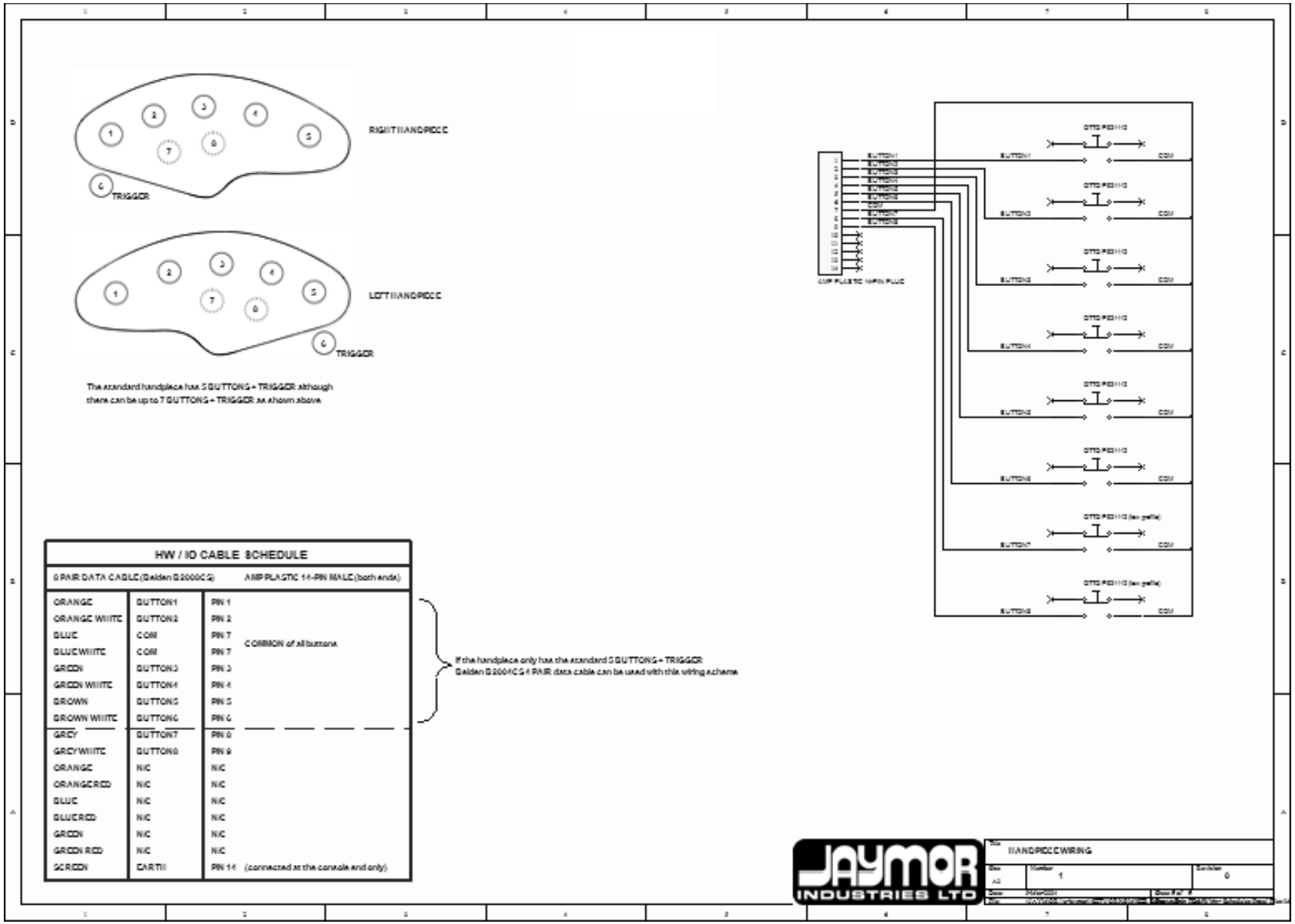
A.7 HYDRAULIC POWER PACK WIRING



A.8 SUPPLY AND COMMUNICATIONS WIRING



A.9 HANDPIECE WIRING



B. ELECTRICAL DRAWINGS

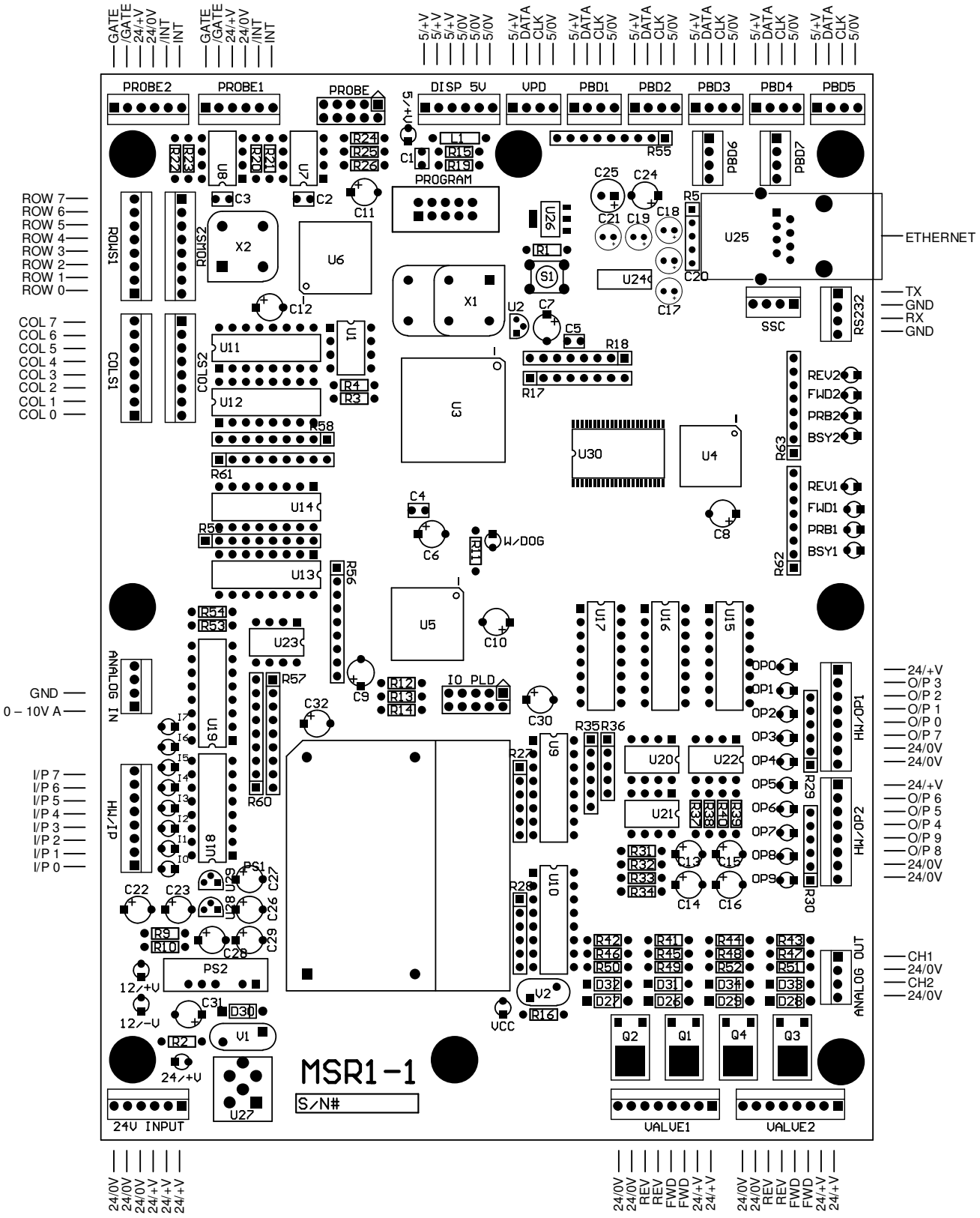
B.1 KEYBOARD MATRIX

	C1	C2	C3	C4	C5	C6	C7	C8
R1	0	1	2	3	4	5	6	7
R2	A	B	C	D	E	F	G	H
R3	I	J	K	L	M	N	O	P
R4	8	9	ENTER	CLEAR		RETRACT LOOP1	RETRACT LOOP2	
R5	LAYER UP		SET RECALL			PARK LOOP1	PARK LOOP2	
R6	LAYER DOWN		START	STOP	SLAB SET			TAPER CANCEL
R7	DOGS U/D	DOGS I/O	FWD SET	BACK SET	P/BACK ON/OFF	T/DOG	OFFSET	TAPER LEFT
R8	MODE1	KEYIN BS	JOG IN	JOG OUT	KEYIN FS	MODE2	FLIPPER	TAPER RIGHT

Matrix Wiring Colours:

R1 / C1	WHITE
R2 / C2	RED
R3 / C3	ORANGE
R4 / C4	YELLOW
R5 / C5	GREY
R6 / C6	BLUE
R7 / C7	PURPLE
R8 / C8	BROWN

B.2 MSR1-1 CONTROL BOARD LAYOUT



B.3 DIAGNOSTIC LEDS

The diagnostic LEDs located to the right edge of the electronic controller board are used to indicate the conditions as labelled, i.e. Busy, Probe Error and Drive outputs Fwd and Rev.

The watchdog LED (**W/DOG)** indicates that the controller is running correctly and should flash rapidly at all times. If the LED is either continuously on or off the controller has locked up and will require resetting.

There is also an LED for every input / output on the controller board.

C. PARAMETER LIST

C.1 FRONT END PARAMETERS

NO:	NAME:	DESCRIPTION:	UNITS:	RANGE:
CONSOLE PARAMETERS				
1	Display Rounding	0 = Display rounding off. 1 = Display rounding on.	1	0 – 1
2	PIN Required	0 = PIN is always required to enter parameter mode. 1 = PIN is only required once after boot up to access parameter mode.	1	0 – 1
3	Matrix Filter Counter	Controls the amount of filtering applied to the pushbutton matrix.	0.1s	0.0 – 10.0
4	Jog Button Invert	Swaps the function of the Jog buttons on the setworks console: 0 = Normal jog buttons. 1 = Jog buttons inverted.	1	0 – 1
5	Setworks Type Select	0 = MiniMiser single/dual axis system. 1 = Carriage / Slabber system. 2 = Two axis stacked edger system.	1	0 - 2
6				
7				
8				
9				
SET PARAMETERS				
10	Set Mode	0 = Instant set; no stacking of sizes. 1 = Flag set; flag used to move through the set.	1	0 – 1
11	Clear Operation	0 = Standard Operation (entire stack is emptied when Clear is pressed). 1 = Retain Stack (only the entry at the top of the stack is erased).	1	0 - 1
12	Program size precision	0 = Sizes are saved to nearest whole mm. 1 = Sizes are saved to nearest 0.1 mm.	1	0 - 1
13	Auto-calibrate Inhibit	0 = Auto-calibrate inhibited. 1 = Auto-calibrate allowed.	1	0 – 1
14	Crash Tolerance	Crash or racking tolerance in a multi-axis system.	0.1mm	0.0 – 2000.0
15				
16				
17				
18				
19				

DISPLAY PARAMETERS				
20	VPD 1 Format Select	Specifies the data to be displayed in the Loop 1 Vertical Position Display: **POS NEXT SET LAYER STATUS** 0 = L1 pos; L1 Next Set; Layer; L1, L2. 1 = L1 pos; L1 Next Set; L2 pos; L1, L2. 2 = L1 pos; L1 Next Set; L3 pos; L1, L3. 3 = L1 pos; L1 Next Set; L4 pos; L1, L3, L4. 4 = L1 pos; L1 Next Set; Pick State; L1, L3, L4. 5 = L1 pos; L1 Next Set; L1 counts; L1, L2. 6 = L1 pos; L1 Next Set; L2 counts; L1, L2. 7 = L1 pos; L1 Next Set; L1 drive; L1, L2. 8 = L1 pos; L1 Next Set; L2 drive; L1, L2. 9 = L1 pos; L1 Next Set; L1 An I/P; L1, L2. 10 = VPD1-0 10 bar LED status display	1	1 - 9
21	VPD 2 Format Select	Specifies the data to be displayed in the Loop 2 Vertical Position Display: **POS NEXT SET LAYER STATUS** 0 = L2 pos; ---- ---- ---- 1 = L2 pos; L2 Next Set; ---- L2. 2 = L2 pos; L2 Next Set; L3 pos; L2. 3 = L2 pos; L2 Next Set; L4 pos; L2. 4 = L2 pos; L2 Next Set; Pick State; L2. 5 = VPD1-0 10 bar LED status display	1	1 - 4
22	PBD Format Select	Specifies the format of the data to be displayed in the consoles pushbutton displays: 0 = Standard button layout 1 = Standard button layout, saw numbers shown 2 = Button layout 2 3 = Button layout 2, saw numbers shown	1	0 - 3
23	VPD Brilliance Level	Sets the brilliance level of the main displays on the setworks console.	1	1 – 7
24	PBD Dim Brilliance Level	Sets the brilliance level of the pushbutton displays when they are in “dim” (default) mode.	1	1 - 7
25	PBD Bright Brilliance Level	Sets the brilliance level of the pushbutton displays when they are in “bright” mode.	1	1 - 7
26	Forwardset Counter Control	0 = F/S counter disabled 1 = F/S counter enabled	1	0 - 1
27				
28				
29				

HW I/O PARAMETERS				
30	Hardwired Filter Delay	The time delay used to filter the hardwired inputs to the system to avoid the possibility of switch bounce problems.	0.1s	0.0 – 10.0
31	Run Confirm Operation	0 = Run confirm input bypassed. 1 = Run confirm input used.	1	0 – 1
32	Flag 1 Operation	0 = Flag input bypassed. 1 = Normal flag operation – interrupted set resumes when flag clears. 2 = Current set is cancelled when flag is opened.	1	0 – 2
33	Flag 2 Operation	0 = Flag input bypassed. 1 = Normal flag operation – interrupted set resumes when flag clears. 2 = Current set is cancelled when flag is opened. 3 = Use “Flag 1” as the input for “Flag 2”.	1	0 - 3
34	Jog Back Flag Override	0 = “Jog Back” overrides the flag input. 1 = “Jog Back” is stopped when the flag opens.	1	0 – 1
35	Pullback Operation	0 = Pullback disabled. 1 = Manual pullback. 2 = Auto pullback.	1	0 - 2
36	Pullback Delay	Time delay after the dogs are lowered before the auto-pullback is engaged.	0.1s	0.0 – 10.0
37	Slow Valve Delay	The time delay between the “Fast” and “Slow” valves closing on a two-speed system	0.1s	0.0 – 10.0
38				
39				

HW INPUT SELECTION PARAMETERS				
40	HW IP0 Selection	Specifies the function that HW IP0 will perform: 0 = IP is not used. 1 = Estop. 2 = Run Confirm. 3 = Loop1 Flag. 4 = Loop2 Flag. 5 = Prox Switch 1. 6 = Other Prox switches.	1	0 - 6
41	HW IP1 Selection	Specifies the function that HW IP1 will perform.	1	0 – 6
42	HW IP2 Selection	Specifies the function that HW IP2 will perform.	1	0 – 6
43	HW IP3 Selection	Specifies the function that HW IP3 will perform.	1	0 – 6
44	HW IP4 Selection	Specifies the function that HW IP4 will perform.	1	0 – 6
45	HW IP5 Selection	Specifies the function that HW IP5 will perform.	1	0 – 6
46	HW IP6 Selection	Specifies the function that HW IP6 will perform.	1	0 – 6
47	HW IP7 Selection	Specifies the function that HW IP7 will perform.	1	0 - 6
48	HW IP8 Selection	Specifies the function that HW IP8 will perform.	1	0 – 6
49	HW IP9 Selection	Specifies the function that HW IP9 will perform.	1	0 – 6
50	HW IP10 Selection	Specifies the function that HW IP10 will perform.	1	0 – 6
51	HW IP11 Selection	Specifies the function that HW IP11 will perform.	1	0 – 6
52	HW IP12 Selection	Specifies the function that HW IP12 will perform.	1	0 – 6
53	HW IP13 Selection	Specifies the function that HW IP13 will perform.	1	0 – 6
54	HW IP14 Selection	Specifies the function that HW IP14 will perform.	1	0 – 6
55	HW IP15 Selection	Specifies the function that HW IP15 will perform.	1	0 – 6
56				
57				
58				
59				

HW OUTPUT SELECTION PARAMETERS				
60	HW OP0 Selection	Specifies the function that HW 0P0 will perform: 0 = OP is not used. 1 = Start. 2 = Dogs U/D. 3 = Dogs I/O. 4 = Half Dog. 5 = Tong Dog. 6 = Pullback. 7 = Flipper. 8 = Valve Lock1. 9 = Valve Lock2. 10 = Taper Left. 11 = Taper Right. 12 = Slow Valve1. 13 = Slow Valve2. 14 = Taper Isolate. 15 = Taper Cancel.	1	0 - 15
61	HW OP1 Selection	Specifies the function that HW 0P1 will perform.	1	0 – 15
62	HW OP2 Selection	Specifies the function that HW 0P2 will perform.	1	0 – 15
63	HW OP3 Selection	Specifies the function that HW 0P3 will perform.	1	0 - 15
64	HW OP4 Selection	Specifies the function that HW 0P4 will perform.	1	0 - 15
65	HW OP5 Selection	Specifies the function that HW 0P5 will perform.	1	0 - 15
66	HW OP6 Selection	Specifies the function that HW 0P6 will perform.	1	0 – 15
67	HW OP7 Selection	Specifies the function that HW 0P7 will perform.	1	0 - 15
68	HW OP8 Selection	Specifies the function that HW 0P8 will perform.	1	0 – 15
69	HW OP9 Selection	Specifies the function that HW 0P9 will perform.	1	0 – 15
70	HW OP10 Selection	Specifies the function that HW 0P10 will perform.	1	0 – 15
71	HW OP11 Selection	Specifies the function that HW 0P11 will perform.	1	0 – 15
72	HW OP12 Selection	Specifies the function that HW 0P12 will perform.	1	0 – 15
73	HW OP13 Selection	Specifies the function that HW 0P13 will perform.	1	0 – 15
74	HW OP14 Selection	Specifies the function that HW 0P14 will perform.	1	0 – 15
75	HW OP15 Selection	Specifies the function that HW 0P15 will perform.	1	0 – 15
76				
77				
78				
79				

SLAVE CARD PARAMETERS				
80	Card Type	Defines the type of card that this controller is: 0 = Master controller. 1 = Slave controller.	1	0 – 1
81	Card Address	Specifies the address of this controller on the local network.	1	1 – 199
82	Slave 1 Address	Specifies the address of the Slave card.	1	1 - 199
83	Slave 2 Address	Specifies the address of the Slave card.	1	1 - 199
84	Slave 3 Address	Specifies the address of the Slave card.	1	1 - 199
85	Slave 4 Address	Specifies the address of the Slave card.	1	1 - 199
86	Slave 5 Address	Specifies the address of the Slave card.	1	1 - 199
87	Slave 6 Address	Specifies the address of the Slave card.	1	1 - 199
88	Slave 7 Address	Specifies the address of the Slave card.	1	1 - 199
89	Slave 8 Address	Specifies the address of the Slave card.	1	1 - 199
DIAGNOSTIC PARAMETERS				
90	Maximum Loop Time	The maximum time the system has taken to perform a loop since this parameter was last read.	0.1ms	-
91	Running Time	The amount of time the system has been running since the master controller card was last reset.	1 min	-
92	Software Version	The version of software currently running in the master controller card.	0.1	-
93	Plot Sample Period	The length of time after a set is initiated that the system will record the data for the set plotting software.	1 sec	1 - 10
94	Serial Baud Rate	Sets the baud rate for serial communications: 1 = 9600 bps 2 = 14400 bps 3 = 19200 bps 4 = 28800 bps 5 = 38400 bps	1	1 - 5
95				
96				
97				
98				
99				

C.2 LOOP PARAMETERS

NOTE: When adjusting a parameter on the operator's console, the parameter number is **preceded by the loop number**, e.g Loop 1 parameter 2 = 102.

NO:	NAME:	DESCRIPTION:	UNITS:	RANGE:
		GENERAL LOOP SETTINGS		
*01	Kerf	Width of the saw cut.	0.1mm	0.0 – 100.0
*02	Loop Type	0 = Loop disabled. 1 = Open loop set; no position hold. 2 = Open loop set; PID position hold. 3 = Closed loop profile set; no position hold. 4 = Closed loop profile set; PID position hold.	1	0 – 4
*03	Park / Retract Distance	The target for the system when performing a "Park" or "Retract" operation	0.1mm	1.0 – 2000.0
*04	Offset Distance	The distance used on a carriage when performing an "Offset" operation	0.1mm	0.0 – 2000.0
*05	Set Type	1 = Normal mode (absolute set unless within "Minimum Set Distance" P*06) 2 = Always set forward 3 = Absolute setting in both directions 4 = Always set backwards	1	1 – 4
*06	Minimum Set Distance	When P*05 = 1, requested sets of a distance less than specified here will cause a backup and set forward to the target	0.1mm	0.0 – 100.0
*07	Backup Distance	Distance to backup when P*05 = 1 or 2	0.1mm	0.0 – 100.0
*08				
*09				
		LIMIT PARAMETERS		
*10	Limit Type	1 = No limits 2 = Manual limits	1	1 – 2
*11	Back Limit	The maximum distance from the saw that the system can safely travel to	0.1mm	1.0 – 2000.0
*12	Forward Limit / Dogs In Limit	This is the forward limit of a resaw / breastbench setworks. It is also the "Dogs In" limit for a carriage setworks	0.1mm	0.0 – 2000.0
*13	Dogs Out Limit	This is the "Dogs Out" limit for a carriage setworks	0.1mm	0.0 – 2000.0
*14	Flipper Limit	This is the "Flipper Extended" limit for a carriage setworks	0.1mm	0.0 – 2000.0
*15	Half Dog Limit	This is the "Half Dogs" limit for a carriage setworks	0.1mm	0.0 – 2000.0
*16	Taper Limit	This is the "Taper" limit for a carriage setworks	0.1mm	0.0 – 2000.0
*17	Tong Dog Limit	This is the "Tong Dog" limit for a carriage setworks	0.1mm	0.0 – 2000.0
*18				
*19				

PROBE PARAMETERS				
*20	Probe Type	0 = Simulate mode 1 = “P-Type” probe 2 = “L-Type” probe 3 = Stegmann encoder	1	0 – 3
*21	Probe Invert	0 = Normal probe (extended = small position) 1 = Inverted probe (extended = large position)	1	0 – 1
*22	Probe Offset	The distance to the saw at maximum extension	0.1mm	0.0 – 2000.0
*23	Probe Stroke	The distance covered by the probe / encoder when travelling between “Probe Max Counts” and “Probe Min Counts”	0.1mm	0.0 – 2000.0
*24	Probe Max Counts	The maximum number of counts the probe / encoder will receive when in operation	1	100 - 50000
*25	Probe Min Counts	The minimum number of counts the probe / encoder will receive when in operation	1	100 - 50000
*26	Loop Negative Offset	Used when Loop is able to travel through the saw line, and as such go to a negative position.	0.1mm	0.0 – 2000.0
*27				
*28				
*29				
GENERAL DRIVE PARAMETERS				
*30	Output Drive Select	1 = Relay 2 = PWM 3 = Analog	1	1 - 3
*31	Drive Output Invert	0 = Normal drive output 1 = Inverted drive output	1	0 – 1
*32	Valve Dither	Amount of physical dither added to the output drive signal	0.1%	0.0 – 100.0
*33	Ramp Up Boost	Extra % added to drive output when accelerating	0.1%	0.0 – 100.0
*34	Ramp Down Boost	Extra % added to drive output when decelerating	0.1%	0.0 – 100.0
*35	Jog Limit Ramp	Ramp down deceleration used when jogging toward a limit	0.1m/s/s	0.1 – 10.0
*36				
*37				
*38				
*39				

FORWARD DRIVE PARAMETERS				
*40	Forward Drift	In “Open Loop” this will set the drift distance for the system when setting forward. In “Closed Loop” this will define the PID position hold region	0.1mm	0.0 – 100.0
*41	Forward Deadband	Forward deadband % drive of the system	0.1%	0.0 – 100.0
*42	Forward Null	Constant bias added to the forward drive output when in “Open Loop Position Hold” (this parameter should be set to zero if P52 is set)	0.1%	0.0 – 100.0
*43	Maximum Forward Drive	Limits the forward drive output	0.1%	0.0 – 100.0
*44	Forward Ramp Up	Acceleration rate when setting or jogging forward	0.1m/s/s	0.1 – 10.0
*45	Forward Maximum Speed	Target forward speed when setting	0.05m/s	0.05 – 5.00
*46	Forward Ramp Down	Deceleration rate when setting forward	0.1m/s/s	0.1 – 10.0
*47	Jog Forward Ramp Down	Deceleration rate when jogging forward	0.1m/s/s	0.1 – 10.0
*48	Jog Forward Maximum Speed	Target forward speed when jogging	0.05m/s	0.05 – 5.00
*49	Jog Forward Slow Speed	Target speed when performing a “Slow” jog forward operation	0.05m/s	0.05 – 5.00
BACK DRIVE PARAMETERS				
*50	Back Drift	In “Open Loop” this will set the drift distance for the system when setting back. In “Closed Loop” this will define the PID position hold region	0.1mm	0.0 – 100.0
*51	Back Deadband	Back deadband % drive of the system	0.1%	0.0 – 100.0
*52	Back Null	Constant bias added to the back drive output when in “Open Loop Position Hold” (this parameter should be set to zero if P42 is set)	0.1%	0.0 – 100.0
*53	Maximum Back Drive	Limits the back drive output	0.1%	0.0 – 100.0
*54	Back Ramp Up	Acceleration rate when setting or jogging back	0.1m/s/s	0.1 – 10.0
*55	Back Maximum Speed	Target back speed when setting	0.05m/s	0.05 – 5.00
*56	Back Ramp Down	Deceleration rate when setting back	0.1m/s/s	0.1 – 10.0
*57	Jog Back Ramp Down	Deceleration rate when jogging back	0.1m/s/s	0.1 – 10.0
*58	Jog Back Maximum Speed	Target back speed when jogging	0.05m/s	0.05 – 5.00
*59	Jog Back Slow Speed	Target speed when performing a “Slow” jog back operation	0.05m/s	0.05 – 5.00

SETTING GAIN PARAMETERS				
*60	Kp (setting)	The proportional gain factor used when setting forward		0 - 1000
*61	Kp Limit (setting)	Limits the amount that the proportional gain factor (P*60) can become in the PID calculations		0 - 1000
*62	Ki (setting)	The integral gain factor used when setting fwd		0 - 1000
*63	Ki Limit (setting)	Limits the amount that the integral gain factor (P*62) can become in the PID calculations		0 - 1000
*64	F.F Ramp Up Forward	Feed-forward factor used when ramping up in the forward direction		0 – 1000
*65	F.F Ramp Up Backward	Feed-forward factor used when ramping up in the back direction		0 – 1000
*66	F.F Max Speed Forward	Feed-forward factor used when travelling at maximum speed in the forward direction		0 - 1000
*67	F.F Max Speed Back	Feed-forward factor used when travelling at maximum speed in the backward direction		0 – 1000
*68	F.F Ramp Down Forward	Feed-forward factor used when ramping down in the forward direction		0 – 1000
*69	F.F Ramp Down Backward	Feed-forward factor used when ramping down in the backward direction		0 - 1000
POSITION HOLD GAIN PARAMETERS (ONLY USED IF P*02 = 2 OR 4)				
*70	Kp (position hold)	The proportional gain factor used when holding position about a target in “Closed Loop”		0 – 1000
*71	Kp Limit (position hold)	Limits the amount that the proportional gain factor (P*70) can become in the PID calculations		0 - 1000
*72	Ki (position hold)	The integral gain factor used when holding position about a target in “Closed Loop”		0 – 1000
*73	Ki Limit (position hold)	Limits the amount that the integral gain factor (P*72) can become in the PID calculations		0 – 1000
*74				
*75				
*76				
*77				
*78				
*79				

*80				
*81				
*82				
*83				
*84				
*85				
*86				
*87				
*88				
*89				
DIAGNOSTIC PARAMETERS				
*90				
*91				
*92				
*93				
*94				
*95				
*96	Software Version	Displays the version number of the software running in the loop controller.	0.1	-
*97	Probe Error Type	Explains the reason for the probe error: 0 = No probe error present for this axis 1 = No probe / encoder present 2 = Too many magnets detected 3 = No magnet detected on the probe 4 = Counts received exceed maximum 5 = Counts received less than minimum	1	0 – 5
*98	Probe Scale	The calculated scale used by the loop control to convert from counts to mm	0.1	-
*99	Raw Probe Counts	The current reading from the probe / encoder in counts.	1	-

C.4 FUNCTION MODE OPERATION

KEY	FUNCTION DESCRIPTION
A	Auto-Calibrate
B	Upload Serial Parameters to a PC
C	Valve Forward
D	Valve Backward
E	Valve Off
F	Store parameters to commissioning area of EEPROM
G	Read from commissioning area of EEPROM and write these values to the current EEPROM location
H	Write default parameter values to EEPROM

D. COMMISSIONING PARAMETERS

D.1 FRONT END PARAMETERS

No	Name	Value
0		
1	Display Rounding	
2	PIN Required	
3	Matrix Filter Counter	
4	Jog Button Invert	
5	Setworks Type Select	
6		
7		
8		
9		
10	Set Mode	
11	Clear Operation	
12	Program Size Precision	
13	Auto-calibrate Inhibit	
14	Crash Tolerance	
15		
16		
17		
18		
19		
20	VPD 1 Format Select	
21	VPD 2 Format Select	
22	PBD Format Select	
23	VPD Brilliance Level	
24	PBD Dim Brilliance Level	
25	PBD Bright Brilliance Level	
26	Forwardset Counter Control	
27		
28		
29		
30	Hardwired Filter Delay	
31	Run Confirm Operation	
32	Flag 1 Operation	
33	Flag 2 Operation	
34	Jog Back Flag Override	
35	Pullback Operation	
36	Pullback Delay	
37	Slow Valve Delay	
38		
39		
40	HW IP0 Selection	
41	HW IP1 Selection	
42	HW IP2 Selection	
43	HW IP3 Selection	
44	HW IP4 Selection	
45	HW IP5 Selection	
46	HW IP6 Selection	
47	HW IP7 Selection	
48	HW IP8 Selection	
49	HW IP9 Selection	

No	Name	Value
50	HW IP10 Selection	
51	HW IP11 Selection	
52	HW IP12 Selection	
53	HW IP13 Selection	
54	HW IP14 Selection	
55	HW IP15 Selection	
56		
57		
58		
59		
60	HW OP0 Selection	
61	HW OP1 Selection	
62	HW OP2 Selection	
63	HW OP3 Selection	
64	HW OP4 Selection	
65	HW OP5 Selection	
66	HW OP6 Selection	
67	HW OP7 Selection	
68	HW OP8 Selection	
69	HW OP9 Selection	
70	HW OP10 Selection	
71	HW OP11 Selection	
72	HW OP12 Selection	
73	HW OP13 Selection	
74	HW OP14 Selection	
75	HW OP15 Selection	
76		
77		
78		
79		
80	Card Type	
81	Card Address	
82	Slave 1 Address	
83	Slave 2 Address	
84	Slave 3 Address	
85	Slave 4 Address	
86	Slave 5 Address	
87	Slave 6 Address	
88	Slave 7 Address	
89	Slave 8 Address	
90	Maximum Loop Time	
91	Running Time	
92	Software Version	
93	Plot Sample Period	
94	Serial Baud Rate	
95		
96		
97		
98		
99		

D.2 LOOP 1 POSITION CONTROL PARAMETERS

No	Name	Value
100		
101	Kerf	
102	Loop Type	
103	Park / Retract Distance	
104	Offset Distance	
105	Set Type	
106	Minimum Set Distance	
107	Backup Distance	
108		
109		
110	Limit Type	
111	Back Limit	
112	Forward Limit (Dogs In)	
113	Dogs Out Limit	
114	Flipper Limit	
115	Half Dog Limit	
116	Taper Limit	
117	Tong Dog Limit	
118		
119		
120	Probe Type	
121	Probe Invert	
122	Probe Offset	
123	Probe Stroke	
124	Probe Max Counts	
125	Probe Min Counts	
126	Loop Negative Offset	
127		
128		
129		
130	Output Drive Select	
131	Drive Output Invert	
132	Valve Dither	
133	Ramp Up Boost	
134	Ramp Down Boost	
135	Jog Limit Ramp	
136		
137		
138		
139		
140	Forward Drift	
141	Forward Deadband	
142	Forward Null	
143	Maximum Fwd Drive	
144	Forward Ramp Up	
145	Fwd Maximum Speed	
146	Forward Ramp Down	
147	Jog Fwd Ramp Down	
148	Jog Fwd Max Speed	
149	Jog Fwd Slow Speed	

No	Name	Value
150	Back Drift	
151	Back Deadband	
152	Back Null	
153	Maximum Back Drive	
154	Back Ramp Up	
155	Back Max Speed	
156	Back Ramp Down	
157	Jog Back Ramp Dwn	
158	Jog Back Max Speed	
159	Jog Back Slow Speed	
160	Kp setting	
161	Kp limit	
162	Ki setting	
163	Ki limit	
164	F.F ramp up fwd	
165	F.F ramp up back	
166	F.F max speed fwd	
167	F.F max speed back	
168	F.F ramp down fwd	
169	F.F ramp down back	
170	Kp (position hold)	
171	Kp Limit (position hold)	
172	Ki (position hold)	
173	Ki Limit (position hold)	
174		
175		
176		
177		
178		
179		
180		
181		
182		
183		
184		
185		
186		
187		
188		
189		
190		
191		
192		
193		
194		
195		
196	Software Version	
197	Probe Error Type	
198	Probe Scale	
199	Raw Probe Counts	

D.3 LOOP 2 POSITION CONTROL PARAMETERS

No	Name	Value
200		
201	Kerf	
202	Loop Type	
203	Park / Retract Distance	
204	Offset Distance	
205	Set Type	
206	Minimum Set Distance	
207	Backup Distance	
208		
209		
210	Limit Type	
211	Back Limit	
212	Forward Limit (Dogs In)	
213	Dogs Out Limit	
214	Flipper Limit	
215	Half Dog Limit	
216	Taper Limit	
217	Tong Dog Limit	
218		
219		
220	Probe Type	
221	Probe Invert	
222	Probe Offset	
223	Probe Stroke	
224	Probe Max Counts	
225	Probe Min Counts	
226	Loop Negative Offset	
227		
228		
229		
230	Output Drive Select	
231	Drive Output Invert	
232	Valve Dither	
233	Ramp Up Boost	
234	Ramp Down Boost	
235	Jog Limit Ramp	
236		
237		
238		
239		
240	Forward Drift	
241	Forward Deadband	
242	Forward Null	
243	Maximum Fwd Drive	
244	Forward Ramp Up	
245	Fwd Maximum Speed	
246	Forward Ramp Down	
247	Jog Fwd Ramp Down	
248	Jog Fwd Max Speed	
249	Jog Fwd Slow Speed	

No	Name	Value
250	Back Drift	
251	Back Deadband	
252	Back Null	
253	Maximum Back Drive	
254	Back Ramp Up	
255	Back Max Speed	
256	Back Ramp Down	
257	Jog Back Ramp Dwn	
258	Jog Back Max Speed	
259	Jog Back Slow Speed	
260	Kp setting	
261	Kp limit	
262	Ki setting	
263	Ki limit	
264	F.F ramp up fwd	
265	F.F ramp up back	
266	F.F max speed fwd	
267	F.F max speed back	
268	F.F ramp down fwd	
269	F.F ramp down back	
270	Kp (position hold)	
271	Kp Limit (position hold)	
272	Ki (position hold)	
273	Ki Limit (position hold)	
274		
275		
276		
277		
278		
279		
280		
281		
282		
283		
284		
285		
286		
287		
288		
289		
290		
291		
292		
293		
294		
295		
296	Software Version	
297	Probe Error Type	
298	Probe Scale	
299	Raw Probe Counts	

E. FAULT SHEET

Please fill out the sheet below, scan and email to Automation Works NZ at **info@automationworks.co.nz** if a fault should occur. The information you provide will help us resolve your problem.

1) What is the fault you are experiencing?

---

2) What operation were you performing prior to the fault?

---

3) How often does the fault occur?

---

4) What is showing on the console displays?

POSITION DISPLAY: ---

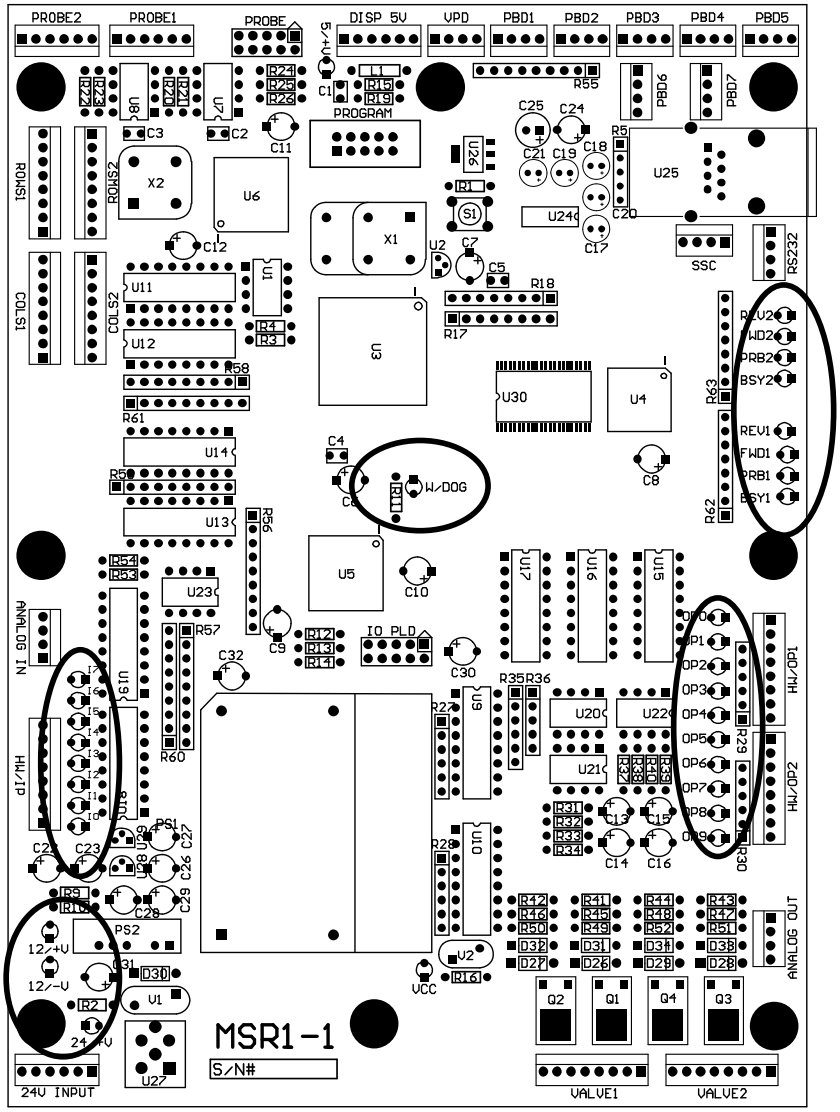
NEXT SET DISPLAY: ---

LAYER DISPLAY: ---

STATUS DISPLAYS (please mark the diagram below)**:**

RUN			KEY PRESS
FLAG			RUN
E/STOP			PROBE
FWD LIM			BACK LIM
STACK			COM
1			2
3			4
5			6

What lights are on the control board? Please mark on the diagram below:

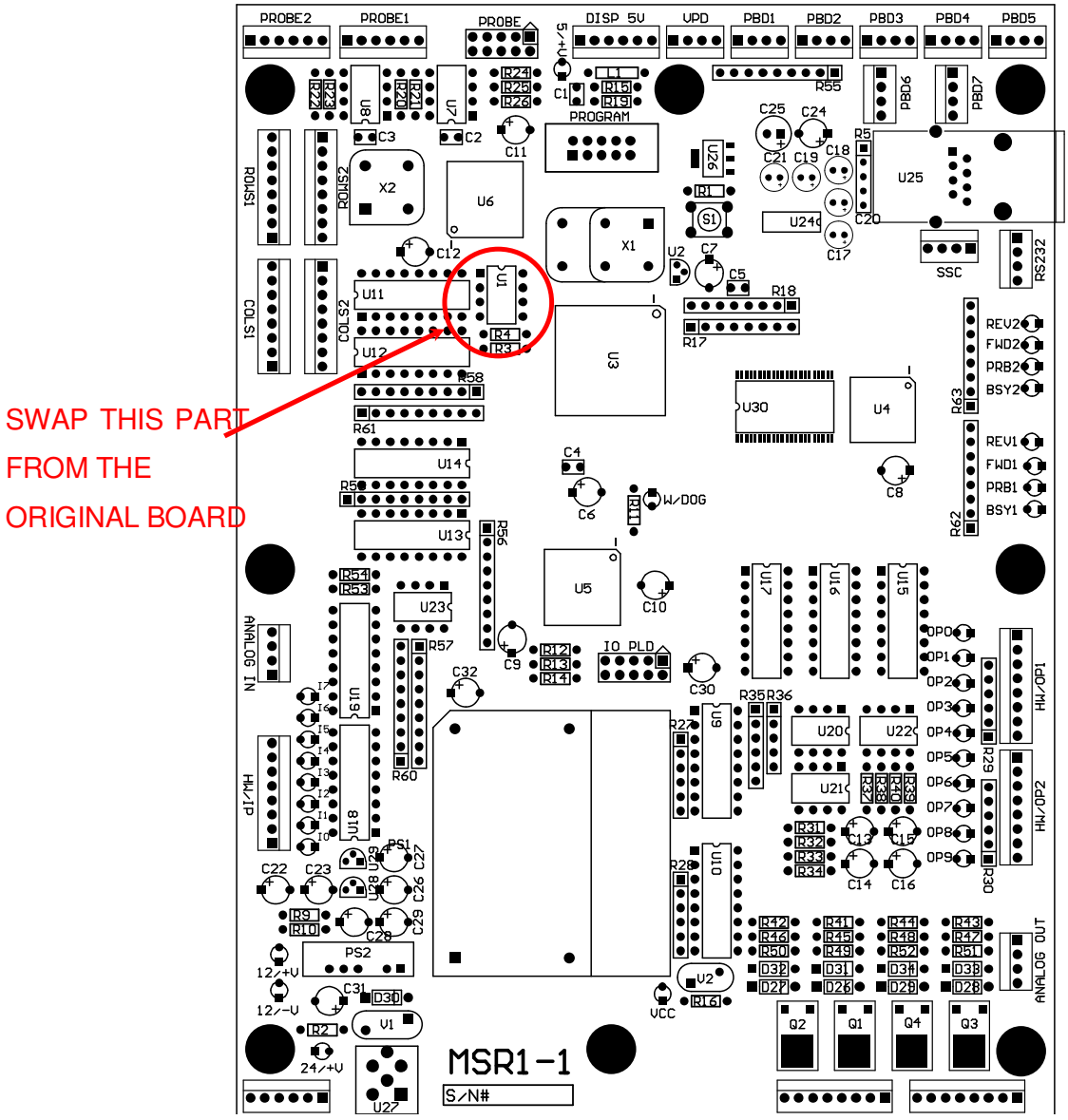


F. MSR1-1 EEPROM SWAP

Instructions for changing EEPROM memory chip on MSR1-1

To keep your settings in the system when replacing the MSR1-1 controller board, you will need to swap one of the small integrated circuits 'chips'. **Make sure that the power supply to the board has been turned off before removing or inserting any components.** This part stores all of the setworks parameters and pushbutton sizes.

A small screwdriver tip can be used to lift the chip of the existing controller board, but care should be taken that the legs are kept straight, and that the part is inserted in the replacement board the same way around as in the original board (the small notch in the chip should be at the same end as the notch in the chip-holder on the controller board). Care should also be taken that the legs of the chip are inserted into the metal slots of the socket and that it sits securely.



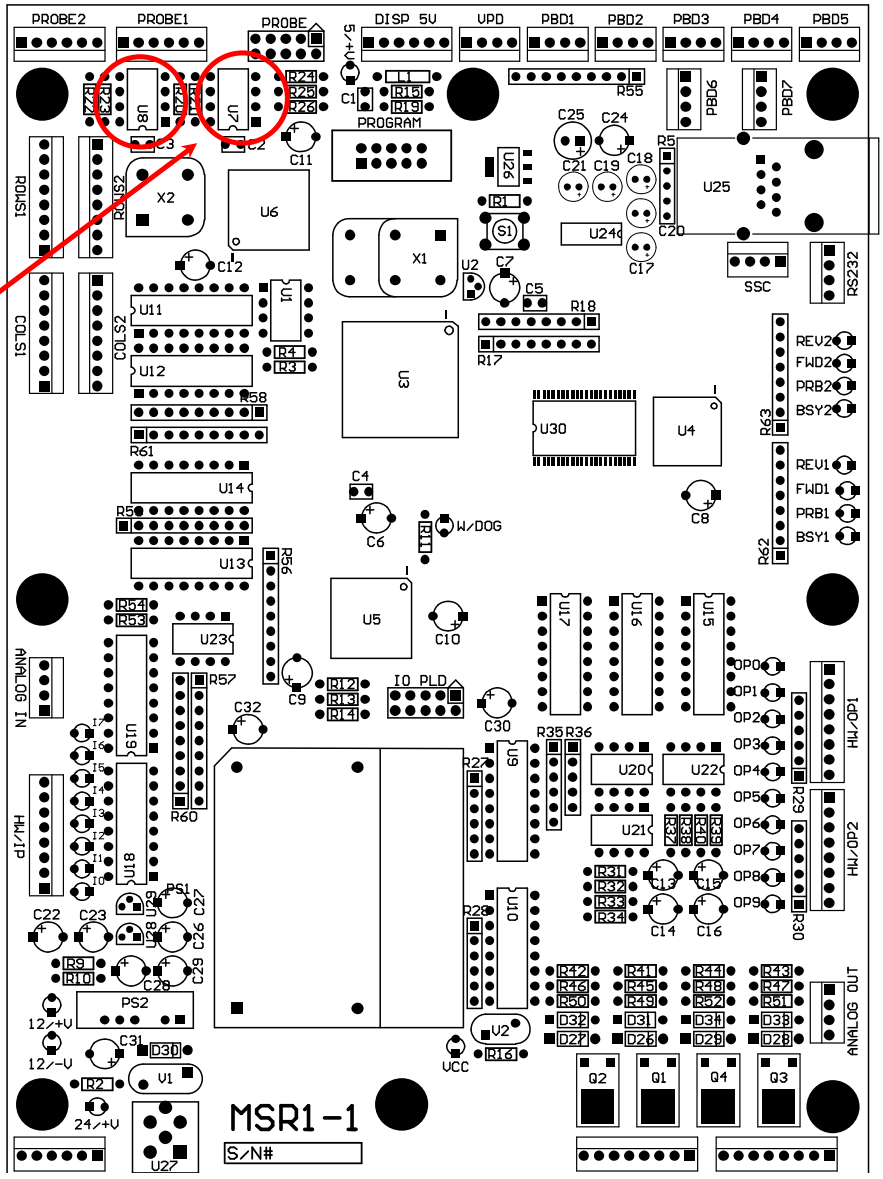
G. MSR1-1 TRANSDUCER/PROBE INTERFACE REPLACEMENT

Instructions for changing Transducer/Probe interface chips on MSR1-1

In some cases the integrated circuit 'chip' that receives the transducer position signal can be damaged (eg, damaged cable, welding etc) causing a 'probe error' on the setworks console. When the setworks is controlling one axis of movement, there is a spare probe interface chip on the MSR1-1 controller card. **Make sure that the power supply to the board has been turned off before removing or inserting any components.**

A small screwdriver tip can be used to lift the chips from the controller board, but care should be taken that the legs are kept straight, and that the parts are replaced the same way around as they were originally (the small notch in the chip should be at the same end as the notch in the chip-holder on the controller board). Care should also be taken that the legs of the chip are inserted into the metal slots of the socket and that it sits securely.

SWAP THESE TWO CHIPS



H. PUSHBUTTON MEMBRANE REPLACEMENT

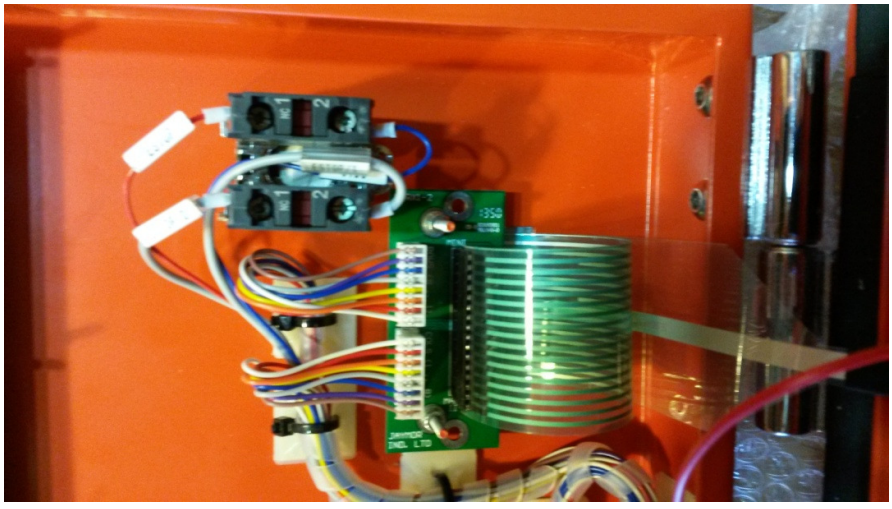
The pushbutton membrane on the setworks console may fail in time due to normal wear/tear. The following photos will assist in the replacement of a membrane.

It is recommended that 2 people carry out the replacement when unfamiliar with the steps required.

Read through these instructions completely to fully understand the operations that will take place before proceeding. The example shows a Mini-Miser membrane replacement, but the steps for a Maxi-Miser membrane will be the same.

Notes: **Take extreme care not to fold/crease the ribbon from the pushbutton membrane as this can cause permanent damage.**
Once a membrane has attached to the console with its self adhesive backing it will likely not be possible to remove it without damage, so correct alignment beforehand is critical.

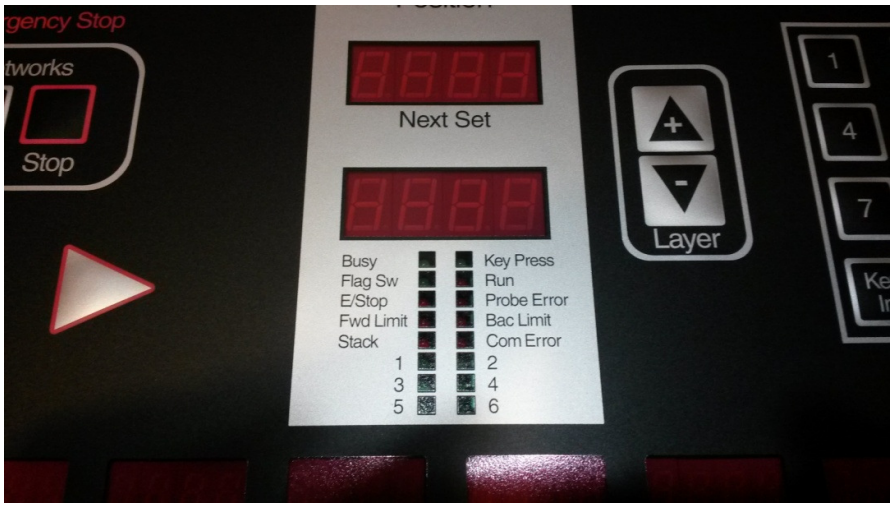
1. Turn off power to the setworks console, then disconnect the emergency stop button, shield wire and ribbon connector from inside the operator console taking note of where the ribbon was plugged in.



2. Remove the existing membrane and clean the setworks console with suitable cleaner like was and grease remover and allow to dry completely.

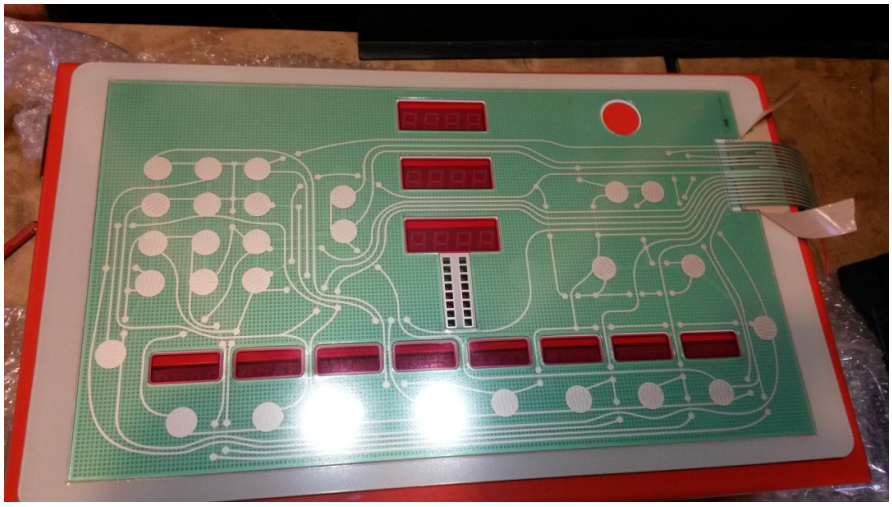
3. Place the new membrane on the operator console, with the ribbon not yet inserted into the operator console.

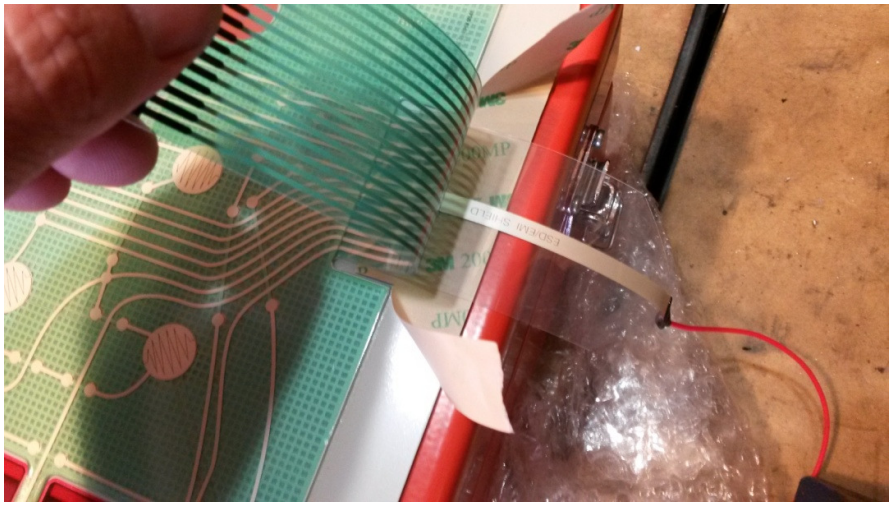
4. Position the membrane so all displays are viewable through the red transparent windows, the hole for the emergency stop button is correctly aligned and the status LED's are viewable through the 5mm square clear windows.



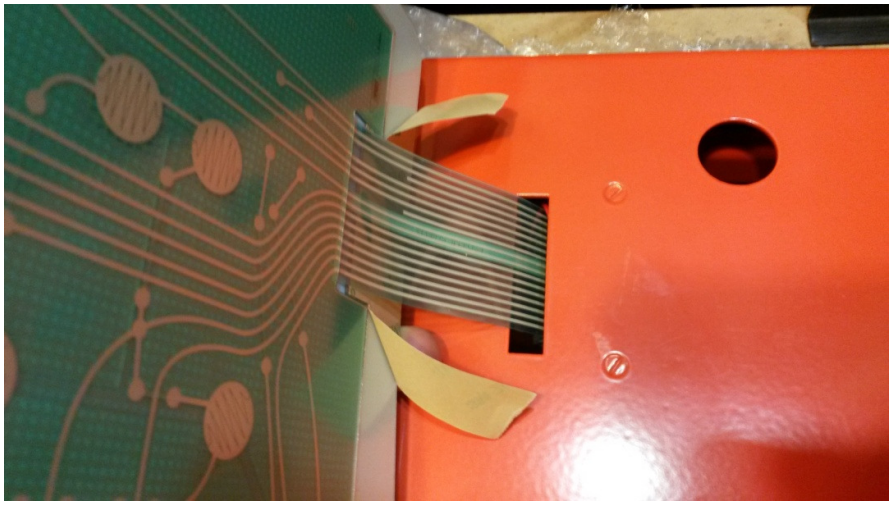
5. Mark the outline of the membrane on the setworks console.

6. Remove the membrane, turn over and remove the protective layer from the self adhesive side of the membrane, leaving a small portion under the ribbon so that it does not stick to the membrane.





7. Begin placing the membrane on the console by carefully inserting the shield wire and ribbon into the slot in the setworks console.



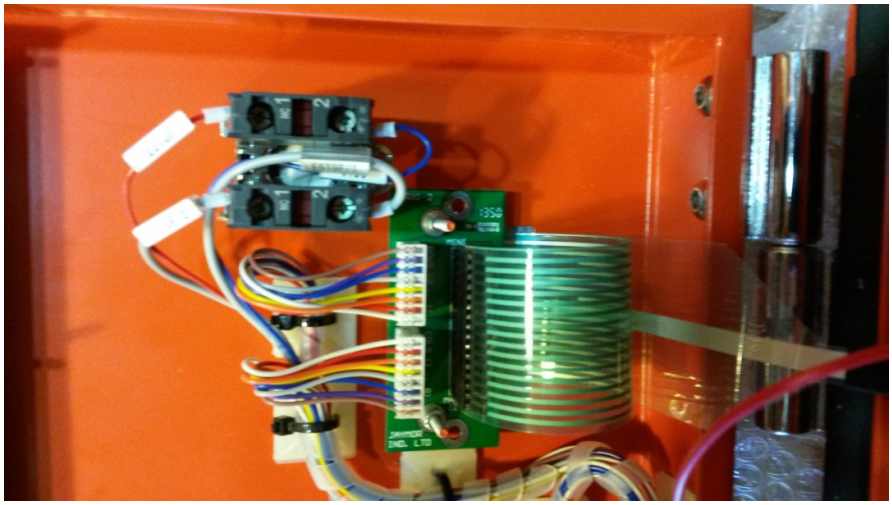
8. Once the ribbon and shield wire are through the slot position the membrane over the console aligned with the outside marking made previously. Attempt to lay the membrane on the console from the opposite side of the ribbon first, then before the ribbon side is laid on the console, remove the last piece of the protective backing from under the ribbon.
Take care at all times not to fold/crease the ribbon,

9. Once the membrane is on the console, go over the surface area around the pushbuttons and display windows making sure the entire surface has been pressed onto the console to adhere.

10. Replace the emergency stop button.

11. Re-attach the ribbon and shield wire (crimp terminal required).

    The ribbon has 2 possible connections, and the circuit board will be labelled showing the mini-miser connection.



12. Re-power the setworks console and check all pushbutton operations.