PROMATION ENGINEERING

Precision Actuation for Industry

Installation & Operation Manual

This IOM is for the following ProMation Engineering Products:

P2-120MN4
P2-230MN4

P3-120MN4
P3-230MN4

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PROMATION ENGINEERING

Precision Actuation for Industry

Field Manual
P2/3 HV MN4
Proportional Control, Modbus RTU Network
ISO5211 F07 8P22

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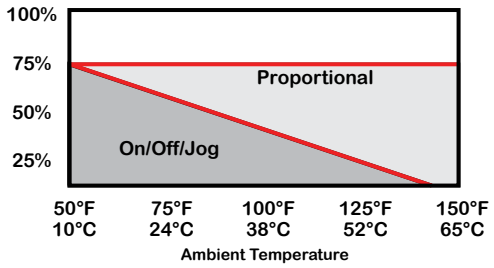
Product Specifications



Actuator Specifications	P2		P3	
Torque "lb/Nm	800"lbs/90Nm		1335"lbs/150Nm	
Supply Voltage	120vac	230vac	120vac	230vac
Max Inrush Current	1.8A	0.8A	1.8A	1.2A
Running Current	1.0A	0.5A	1.2A	1.0A
Motor	Split Phase Capacitor			
Runtime (90°@60Hz/vdc)	15 sec		22 sec	
Runtime (90°@50Hz)	17 sec		26 sec	
Duty Cycle	Proportional: Managed (75% maximum)			
Motor Starts	1200 per hour			
Weight	26lbs/12kg			
Mechanical Connections	ISO5211 F07 8pt 22mm			
Electrical Entry	(2) 3/4" NPT			
Electrical Terminations	12-18ga			
Environmental Rating	NEMA 4/4X			
Manual Override	5" Handwheel			
Control	Proportional			
Actuator Case Material	Aluminum Alloy, Powder coated			
Motor Protection	230°F/110°C Thermal F* Class *Totally Enclosed Non-Ventilated Motors			
Ambient Temperature Operating Range	-22°F to +125°F -30°C to +52°C			

Introduction

This document provides necessary information for set-up, calibration, testing and use of the P Series quarter-turn electric actuators stated on the cover page. Each unit is shipped from the factory with initial calibration of mechanical stops, cams and switches completed for 0-90 degree operation. However, these are general settings and serve as a starting point for proper calibration of the actuator in its real-world application.

Safety

Safety is a basic factor any time you maintain and operate mechanical equipment. Appropriate handling methods and proper use of tools and clothes can help prevent serious accidents -- accidents which can cause injuries to you or a fellow worker. This manual was created to enable a trained user to install, adjust and troubleshoot your ProMation actuator.

Only competent and trained personnel should install, maintain and operate ProMation actuators. Any work related to this actuator must be carried out in accordance with this manual and related codes and regulations. Local workplace health and safety rules should always be followed.

Duty cycle

Duty cycle is the percent of time that an actuator spends running as a fraction of the total time. Duty Cycle is directly related to heat; excessively repositioning an actuator typically results in motor overheating which can cause permanent damage and/or reduced service life.

Duty cycle can be calculated as follows:
(example P2 series actuator running 3 seconds ON and 30 seconds OFF)
Runtime = 3s, Total time = 3s + 30s = 33s, therefore this duty cycle would be 9% (3/33)
Additionally, ProMation P series actuators are designed for a maximum of 1200 starts per hour (one start every 3 seconds maximum).

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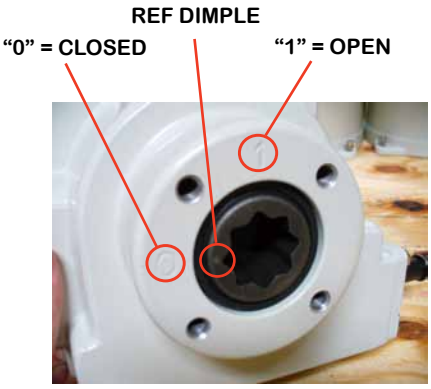
Shipping and Handling



1. This actuator is shipped in the FULLY CW position (2 color position indicator shows "CLOSE" and the Reference Dimple aligns with "0"). (The "1" mark is the FULLY CCW position).
2. ***NOTE, THIS ACTUATOR MUST HAVE WATER TIGHT EMT FITTINGS, WITH CONDUIT DRAINAGE INSTALLED AND POWER SUPPLIED TO UNIT TO KEEP THE HEATER WARM AT THE TIME OF INSTALLATION.***
3. **Storage: This unit should NOT be stored outside unless it is powered up and has proper conduit terminations. When NOT powered up, it should be stored in a clean, dry environment at all times.**
4. This actuator has been **factory calibrated to operate between 0 degrees and 90 degrees. Most quarter-turn products will not require recalibration of these settings.** If any travel adjustment is necessary, please refer to pages 7-13 for instructions.
5. ***The actuator CANNOT operate with a rotation greater than 95 degrees.***

Product Mounting and Setup

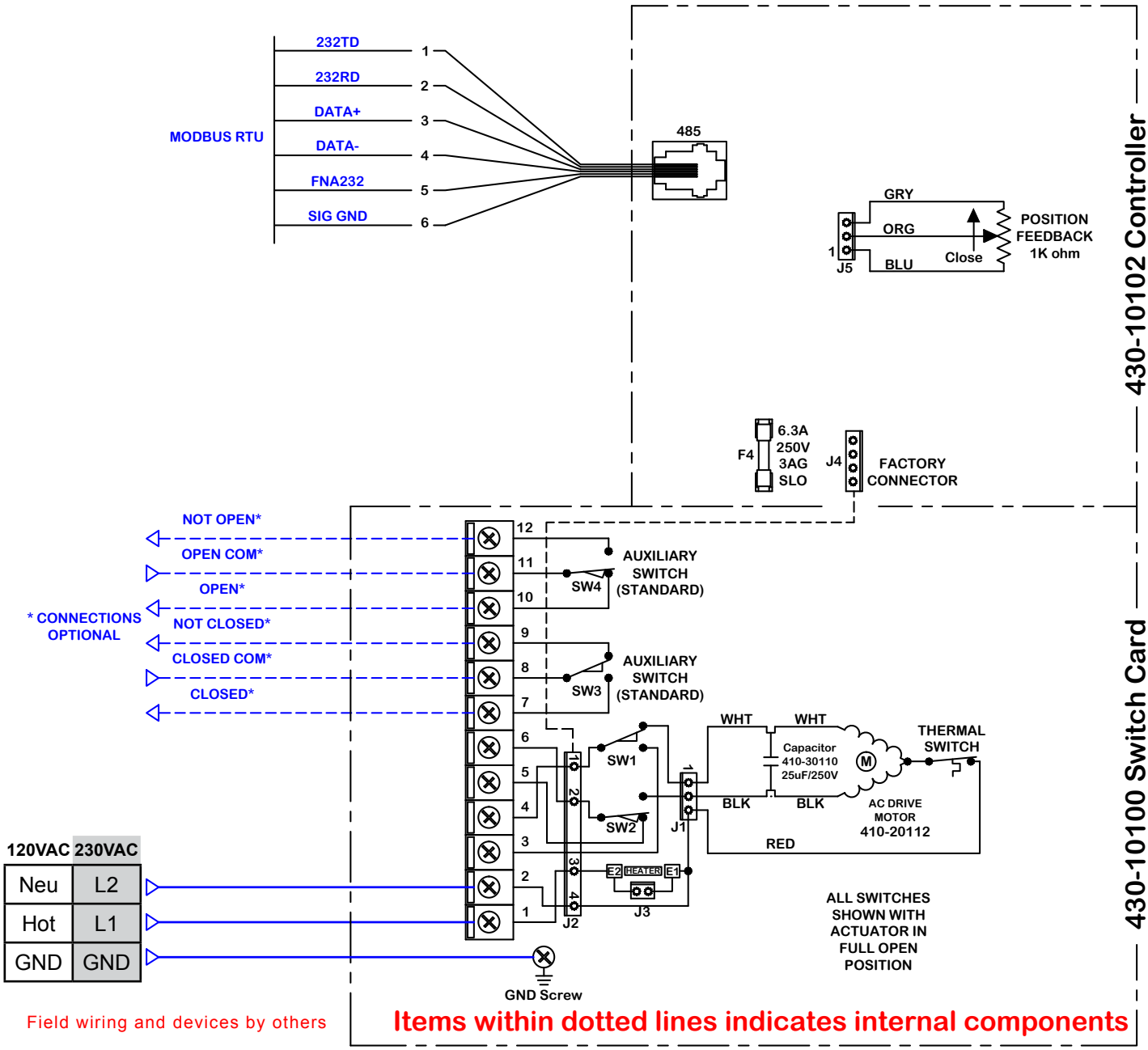
1. Fully CLOSE the valve or damper to which the actuator is to be mounted.
   - Keep in mind this actuator rotates CW (as viewed from above the unit) when driving CLOSED.
2. Assemble necessary linkage components and attach the actuator to the driven device.
3. Tighten mounting bolts, making sure actuator is centered on the device drive shaft.
4. Utilize the handwheel to check for unobstructed manual operation from fully CCW to fully CW positions BEFORE applying power to the unit.
5. Make the electrical connections per wiring diagram on page 4.
   - Connect POWER to terminals marked 1 and 2 on the switch card.
   - Actuator accepts a modbus input signal.
   - Connect modbus connector to control card (430-10102).
   - Terminals 7-12 on the switch card (430-10100) are for the (adjustable) aux switches. They are dry type Form C rated 10A @ 250vac MAX.
6. Do NOT apply power at this time.

Installation Notes

- These actuators are designed to be used between a horizontal and upright position. Do NOT mount the assembly with the actuator top below a horizontal position.
- When installing conduit, use proper techniques for entry into the actuator. Use drip loops to prevent conduit condensate from entering the actuator.
- Mechanical travel stops are factory calibrated for 90 degree operation. These stops are NOT designed to adjust mechanical rotation by more than +/- 3 degrees, they are for positioning the handwheel only.
- Both NPT conduit ports MUST use proper equipment to protect the NEMA 4X integrity of the housing.
- The internal heater is to be used in ALL applications.
- Do NOT install the actuator outdoors or in humid environments unless it is powered up and the heater is functioning.
- Use proper wire size to prevent actuator failure (see chart on page 4 for proper wire sizing).
- All terminals accept 12-18AWG solid/stranded wire.

Wiring Diagram

Proportional Control



Wire Sizing Chart

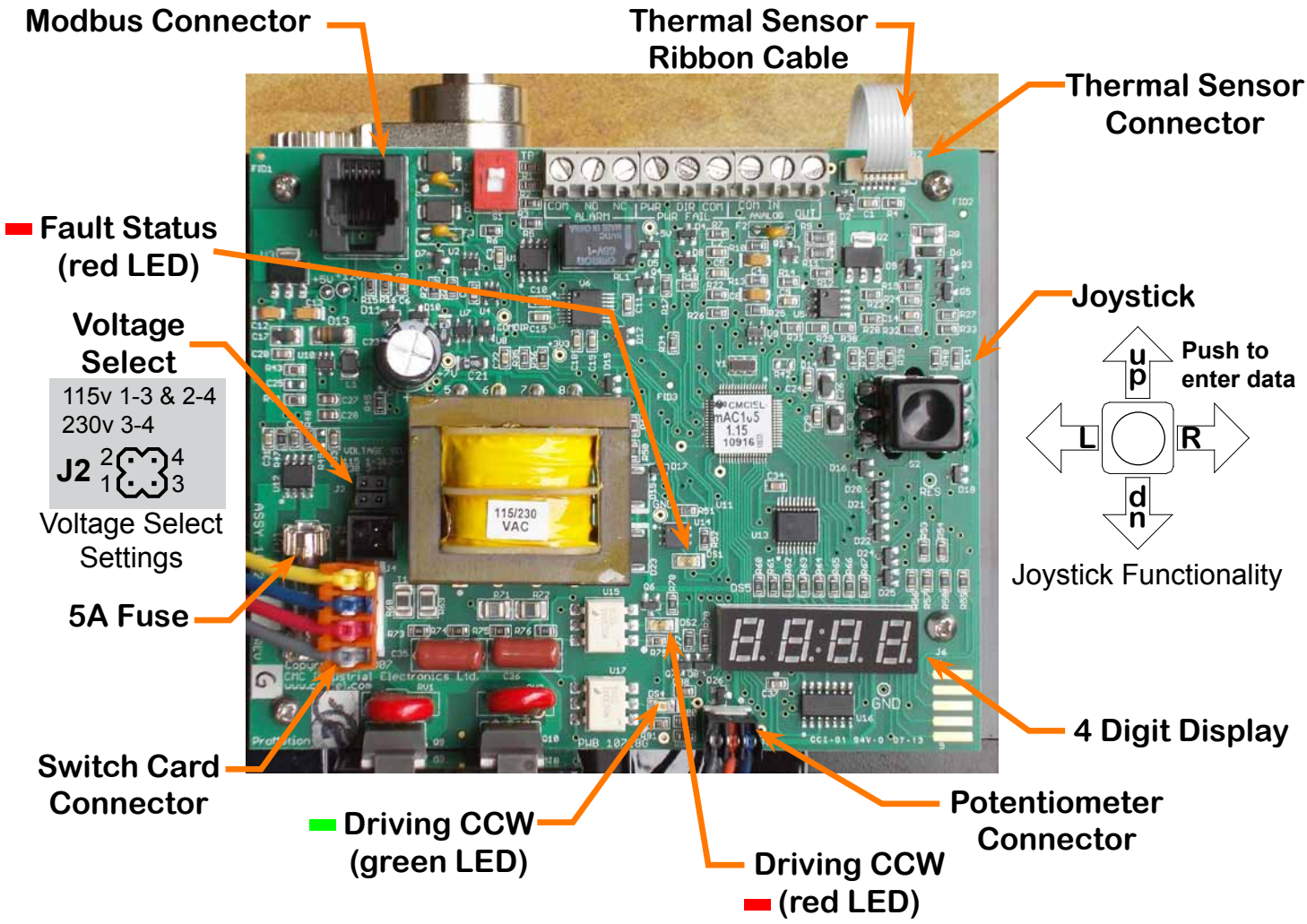
	MAX distance between Actuator and Supply (feet)			
Actuator/ Voltage	**P2 120VAC**	**P2 230VAC**	**P3 120VAC**	**P3 230VAC**
Amps / Wire Gage	**1.8A**	**0.8A**	**1.8A**	**1.2A**
18	459	1980	459	1320
16	722	3111	722	2074
14	1166	5026	1166	3351
12	1783	7687	1783	5125
10	3030	13068	3030	8712
8	4523	19505	4523	13003

Wire sizing data is provided in the table to assist in the selection of the proper wire size for ProMation actuators using various wire sizes over distance.

Please make sure to reference the correct voltage and do not exceed the indicated length of the wire run for each model.

Diagram of Controller

Proportional Control



The proportional control card has been calibrated and tested at the factory to operate between 0 degrees and 90 degrees operating range. There is normally no need for any adjustments at this point in the installation. Changes from the factory set cam settings and controller settings can be very difficult to reverse.

The default settings in the controller are as follows:

- Input/Output Signal: 4-20mA (unless otherwise specified at time of Factory order)
- Signal Response: Direct Acting (max signal = CCW)
- Loss of Signal: Fail in Position
- Controller version: 1.15

The **Fault Status** indicator will blink once per second under normal operating conditions. It will blink approximately three times per second if a fault has occurred. A fault status indication will not return to normal unless the fault has been cleared or the board has been powered down.

Under normal operation, the **4 digit display** will show percentage of CCW position...i.e. 25 = 25% CCW, or roughly 22 degrees CCW.

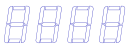
Controller: Initial Startup

These instructions illustrate the initial power up sequence for power up, initial data displays, and position display so the user has a baseline for proper startup sequencing.

(Assumes actuator is properly mounted and wired as directed elsewhere in this manual).

Power Up *(baseline of normal functionality)*:

1. Apply power to the actuator and wait 20 seconds for the controller to power up, self-test, and stabilize.
2. Immediately on power up the fault status light will begin blinking at a rate of once per second throughout operation
3. The 4 digit display will begin sequencing through the self-test messaging.
4. Because there are only 4 display characters the text will scroll or crawl across the display.
5. At this point the actuator is functioning properly.
6. **Note: Autocalibrating AFTER any controller modifications wipes out those modifications and the controller starts from it's new zero point.**

4 digit display reads:	How the display behaves	Notes
	(Blank display before power up)	Power off
	(Static display for about 1 second)	Initial power on display test of all led elements
	(Text 'crawls' left to right. Displays twice.)	Software version (in this example: Version 1.15)
 example display	(Text 'crawls' left to right. Displays twice.)	Actuator - Voltage (in this example: P2 Actuator - 120 volt)
	(Static display, stays on.)	Rotation display showing 0.0% CCW

Controller: Change INput/OUTput signal type

Follow these instructions to change the input/output signal range or type:

(Assumes actuator is powered up, running and is at the default display showing position).

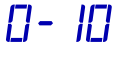
Press the joystick LEFT twice... Display reads: 

Press the joystick DOWN twice... Display reads: 

Press the joystick RIGHT once... Display reads: 

Press the joystick RIGHT again... Press the joystick UP or DOWN to toggle the display to available selections...

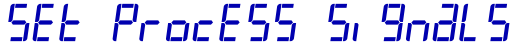
Display reads:  (mA) (default)

 (vdc)

 (vdc)

 (vdc)

When the correct INPUT signal is displayed, press the joystick IN... Display reads: 

Press the joystick LEFT twice... Display reads: 

Press the joystick UP twice... Display reads: 

Press the joystick RIGHT once... DOWN twice, then RIGHT once, the display will now show % of CCW position (0.0 = CLOSED)

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Controller: Adjusting the actuator CW position

Follow these instructions to adjust the CW position controlled by the 105 Proportional Controller (standard operation). Proceed to the next page to adjust the CW position controlled by the travel cam.

(Assumes actuator is powered up, running and is at the default display, showing position).

Press the joystick LEFT twice...	Display reads:	rEaLtiME
Press the joystick DOWN three times...	Display reads:	SEt trauEL
Press the joystick RIGHT once...	Display reads:	AUto SEt
Press the joystick DOWN once...	Display reads:	FULL CLoSEd
Press the joystick RIGHT once... (actual position in steps)	Display reads:	00 to 4096

Press joystick UP and HOLD to drive further CCW or press DOWN and HOLD to drive further CLOSED. The adjusted CLOSED position MUST be between 50 and 1000 steps.

When the correct CLOSED position is established, press the joystick IN...	Display reads:	donE
Press the joystick LEFT twice...	Display reads:	SEt trauEL
Press the joystick UP three times	Display reads:	rEaLtiME
Press the joystick RIGHT once... DOWN twice, then RIGHT once, the display will now show % of CCW position (0.0 = Fully CW)		00 to 100

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Notice! Performing an Auto Calibration after this procedure will ERASE this custom stop set point and will return to the factory default setting. For this reason, you CANNOT run an Auto Calibration procedure at any time after this setting has been changed.

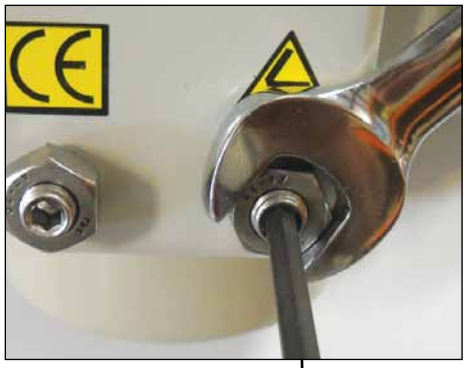
Cams: Adjusting the actuator CW position

Serious Damage to the actuator will result if the motor is allowed to drive the gear train into the mechanical stop!! Remove power from this device BEFORE making any travel adjustments.

This actuator has been factory calibrated to operate between 0 degrees and 90 degrees. Most quarter-turn products will not require recalibration of these settings. Proceed ONLY if adjustments are required.

CW Mechanical Stop

Cam 1



CW Mechanical Stop

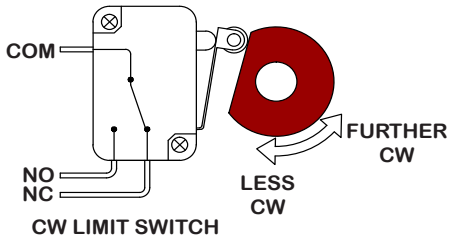
Loosen Mechanical Stop

1. BEFORE power is applied, use a 17mm wrench and a 5mm hex key to loosen the RIGHT SIDE mechanical stop. This is the CW stop limit adjustment. Turn the stop screw 5-6 turns CCW to allow electrical cam stop adjustment without running into the mechanical stop screw.

2. Use the manual hand wheel to position the actuator to your required CW position. This must be within +/- 3 degrees of the factory setting.

Adjust Cam 1

3. The lower cam is Cam 1, the CW end-of-travel adjustment. Once the actuator is at its required CW position, with POWER OFF, use a 2.5mm hex key to free up the cam set screw. Once it is free, rotate the hex key to the RIGHT 10-15 degrees to reset the switch roller arm. Then snug the set screw up against the camshaft (CW) until slight pressure is felt. Then SLOWLY rotate the hex key pushing the cam to the LEFT until you hear the “click” on the bottom switch indicating that correct adjustment has been achieved. Tighten the set screw.



4. Apply power to the actuator and drive CCW at least 15-20 degrees. Then drive the actuator CW until the cam stops the electrical travel. Check to be sure this is the correct CW position you require. Repeat step 3 if further adjustment is needed.

Tighten Mechanical Stop

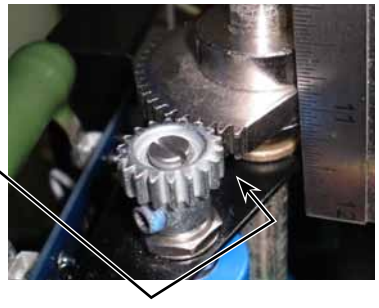
5. While holding the 17mm wrench on the RIGHT SIDE jam nut to prevent the jam nut from locking, turn the 5mm hex key CW until the end of the stop screw bottoms out against the internal stop boss. Then turn the hex key ONE FULL TURN CCW before locking that adjustment with the jam nut. This procedure assures that the actuator reaches its end of travel electrically before there is any interference from the mechanical stop.

6. This completes the CW position calibration.

Notice! After completing this step, you must initiate a recalibration routine (see AutoCalibration Procedures) in order for the changes to take effect in the controller.

Potentiometer Gear Engagement

During the setting of the CW stop position, make sure that the potentiometer pinion gear and the camshaft sector gear do not drive past the point of engagement. If the sector gear does not have at least 2 full teeth contacting the potentiometer pinion gear, contact your distributor for mechanical recalibration instructions.



The mechanical stop screw limits handwheel operation ONLY and is NOT to be used as an electrical travel limiting device.

Controller: Adjusting the actuator CCW position

Follow these instructions to adjust the CCW position controlled by the 105 Proportional Controller (standard operation). Proceed to the next page to adjust the CCW position controlled by the travel cam.

(Assumes actuator is powered up, running and is at the default display, showing position).

Press the joystick LEFT twice...	Display reads:	rEALtiME
Press the joystick DOWN three times...	Display reads:	SEt trAvEL
Press the joystick RIGHT once...	Display reads:	AUto SEt
Press the joystick DOWN twice...	Display reads:	FULL oPEn
Press the joystick RIGHT once... (actual position in steps)	Display reads:	00 to 4096

Press joystick UP and HOLD to drive further CCW or press DOWN and HOLD to drive further CW. The adjusted CCW position MUST be between 2500 and 4000 steps.

When the correct CCW position is established, press the joystick IN...	Display reads:	donE
Press the joystick LEFT twice...	Display reads:	SEt trAvEL
Press the joystick UP three times	Display reads:	rEALtiME
Press the joystick RIGHT once... DOWN twice, then RIGHT once, the display will now show % of CCW position (0.0 = Fully CW)		00 to 100

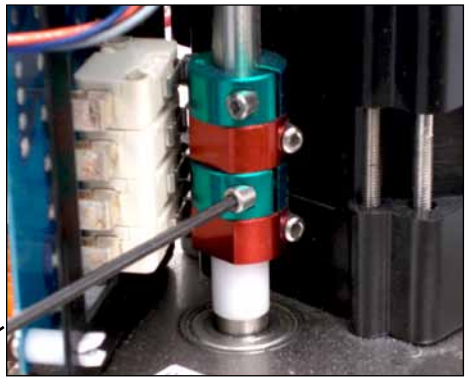
Notice! Performing an Auto Calibration after this procedure will ERASE this custom stop set point and will return to the factory default setting. For this reason, you CANNOT run an Auto Calibration procedure at any time after this setting has been changed.

Cams: Adjusting the actuator CCW position

Serious Damage to the actuator will result if the motor is allowed to drive the gear train into the mechanical stop!! Remove power from this device BEFORE making any travel adjustments.

This actuator has been factory calibrated to operate between 0 degrees and 90 degrees. Most quarter-turn products will not require recalibration of these settings. Proceed ONLY if adjustments are required.

CCW Mechanical Stop



Cam 2

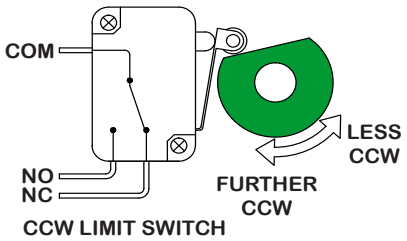
CCW Mechanical Stop

Loosen Mechanical Stop

1. BEFORE power is applied, use a 17mm wrench and a 5mm hex key to loosen the LEFT SIDE mechanical stop. This is the CCW stop limit adjustment. Turn the stop screw 5-6 turns CCW to allow electrical cam stop adjustment without running into the mechanical stop screw.
2. Use the manual hand wheel to position the actuator to your required CCW position. This must be within +/- 3 degrees of the factory setting.

Adjust Cam 2

3. The second cam is Cam 2, the CCW end-of-travel adjustment. Once the actuator is at its required CCW position, with POWER OFF, use a 2.5mm hex key to free up the cam set screw. Once it is free, rotate the hex key to the LEFT 10-15 degrees to reset the switch roller arm. Then snug the set screw up against the camshaft (CW) until slight pressure is felt. Then SLOWLY rotate the hex key pushing the cam to the RIGHT until you hear the “click” on the second switch indicating that correct adjustment has been achieved. Tighten the set screw.



4. Apply power to the actuator and drive CW at least 15-20 degrees. Then drive the actuator CCW until the cam stops the electrical travel. Check to be sure this is the correct CCW position you require. Repeat step 3 if further adjustment is needed.

Tighten Mechanical Stop

5. While holding the 17mm wrench on the LEFT SIDE jam nut to prevent the jam nut from locking, turn the 5mm hex key CW until the end of the stop screw bottoms out against the internal stop boss. Then turn the hex key ONE FULL TURN CCW before locking that adjustment with the jam nut. This procedure assures that the actuator reaches its end of travel electrically before there is any interference from the mechanical stop.
6. This completes the CCW position calibration.

Notice! After completing this step, you must initiate a recalibration routine (see Auto-Calibration Procedures) in order for the changes to take effect in the controller.

The mechanical stop screw limits handwheel operation ONLY and is NOT to be used as an electrical travel limiting device.

Controller: Change Loss of Signal Response Setting

(Assumes actuator is powered up, running and is at the default display, showing position).

Notice: Any changes, settings or new calibration points are lost if a factory "Reset" is performed on the controller. Contact the factory for details.

Press the joystick LEFT twice...	Display reads:	rEALtiME
Press the joystick DOWN twice...	Display reads:	SEt ProcESS
Press the joystick RIGHT once...	Display reads:	in and out
Press the joystick DOWN once...	Display reads:	InPUt FAULt
Press the Joystick RIGHT once...	Display reads:	FAULt LEvEL
Press the Joystick DOWN once...	Display reads:	FAULt PoSition
Press the Joystick RIGHT once...	Display reads:	-0.1
Press the joystick UP or DOWN to select	Display reads:	-0.1 to 100.0

{The display shows percentage of full CCW. i.e. 100.0 = full CCW. 50.0 = 50% CCW, 0.0 = Full CW. -0.1 = Fail in position (no move)}

After selection is displayed, press the joystick IN...

	Display reads:	donE
Press the joystick LEFT three times...	Display reads:	SEt ProcESS
Press the joystick UP twice...	Display reads:	rEALtiME
Press the joystick RIGHT once... DOWN twice, then RIGHT once, the display will now show % of CCW position (0.0 = Fully CW)		00 to 100

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Controller: Auto-Calibration Procedure

(Assumes actuator is powered up, running and is at the default display, showing position).

Notice: Any changes, settings or new calibration points are lost if a factory "Reset" is performed on the controller. Contact the factory for details.

Press the joystick LEFT twice...	Display reads:	
Press the joystick DOWN three times...	Display reads:	
Press the joystick RIGHT once...	Display reads:	
Press the joystick RIGHT once...	Display reads:	
Press the joystick IN. The display will show calibration routines AC1 through AC10, moving the actuator to different positions and recording data at each step. When the auto calibration routine is complete, the actuator will be in the fully CW position, and the display will read:		
Press the joystick LEFT twice...	Display reads:	
Press the joystick UP three times	Display reads:	
Press the joystick RIGHT once... DOWN twice, then RIGHT once, the display will now show % of CCW position (0.0 = Fully CW)		

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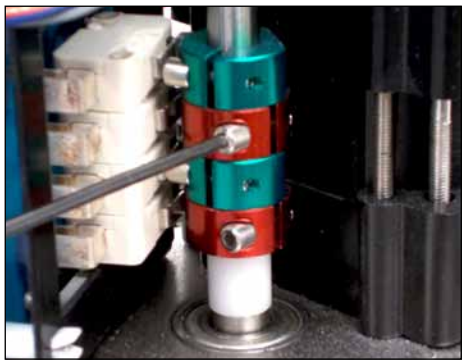
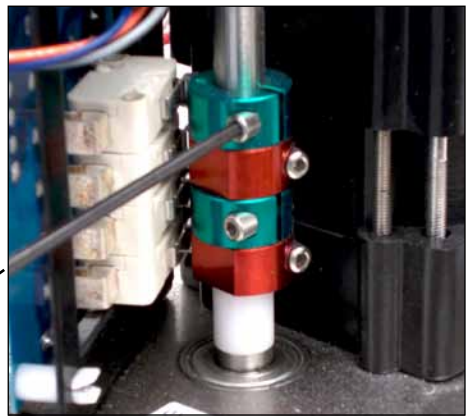
Cams: Adjusting the actuator Auxiliary Switches



Adjust Cam 3

1. The THIRD cam is Cam 3, the CW auxiliary switch adjustment. Drive the actuator to its CW position. Then use a 2.5mm hex key to free up the cam set screw. Once it is free, rotate the hex key to the RIGHT 10-15 degrees to reset the switch roller arm. Then snug the set screw up against the camshaft (CW) until slight pressure is felt. Then SLOWLY rotate the hex key and cam to the LEFT until you hear the “click” on the third switch. Continue to rotate the cam between 3 and 5 degrees to the LEFT to make sure the auxiliary cam switch changes state before the actuator reaches its end of travel electrically. Tighten the cam set screw.



Adjust Cam 4

1. The FOURTH cam is Cam 4, the CCW auxiliary switch adjustment. Drive the actuator to its CCW position. Then use a 2.5mm hex key to free up the cam set screw. Once it is free, rotate the hex key to the LEFT 10-15 degrees to reset the switch roller arm. Then snug the set screw up against the camshaft (CW) until slight pressure is felt. Then SLOWLY rotate the hex key to the RIGHT until you hear the “click” on the fourth switch. Continue to rotate the cam between 3 and 5 degrees to the RIGHT to make sure the auxiliary cam switch changes state before the actuator reaches its end of travel electrically. Tighten the cam set screw.

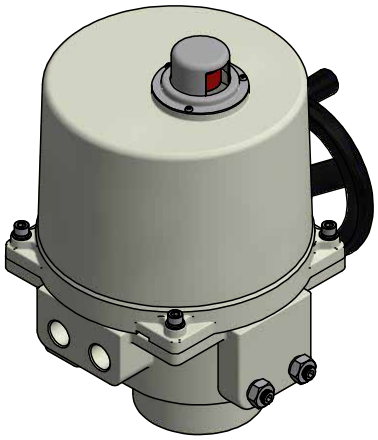
Commissioning

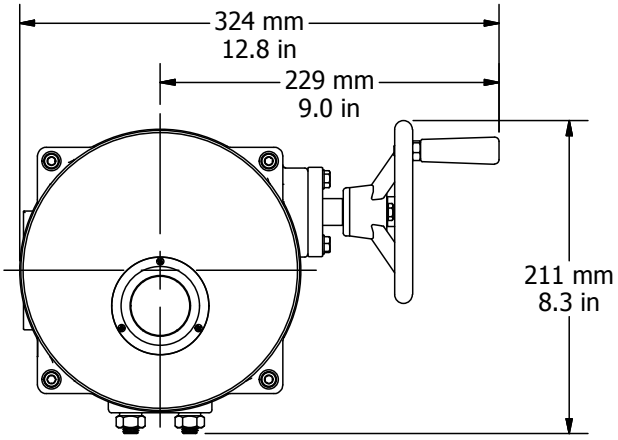
After completing all mounting and wiring procedures and main power is available, it is now possible to commission the actuator.

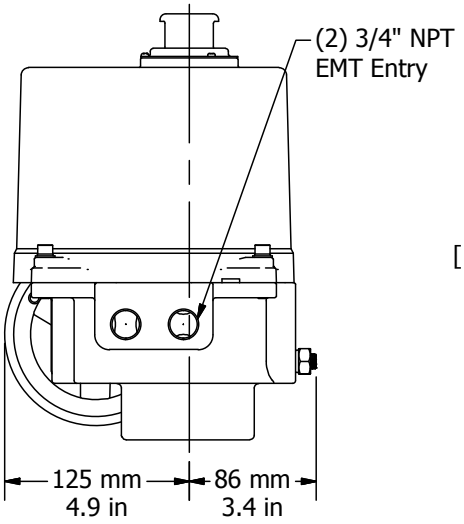
1. Utilize the handwheel to rotate the actuator and damper, valve or other connected device through its full travel from full CW to full CCW and back again to check for any possible interference. Do NOT utilize any mechanical advantage devices to rotate the handwheel (pipes, wrenches, extension bars, etc.).
2. Apply correct power to the unit.
3. Measure correct power on terminals 1 (Hot) and 2 (Neu) on the switch board.
4. Measure correct power on the two heater terminals on the switch board.
5. Command the field device to generate a CCW signal. The actuator rotates in a CCW direction (as viewed from above).
6. Measure terminals 2 (Neu) and 6 (Hot) for correct voltage (matching that measured in step 3).
7. Actuator will stop when it reaches it’s full CCW position.
8. Command the field device to generate a CW signal. The actuator rotates in a CW direction (as viewed from above).
9. Measure terminals 2 (Neu) and 4 (Hot) for correct voltage (matching that measured in step 3).
10. Actuator will stop when it reaches it’s full CW position.
11. Actuator is now commissioned and operational.

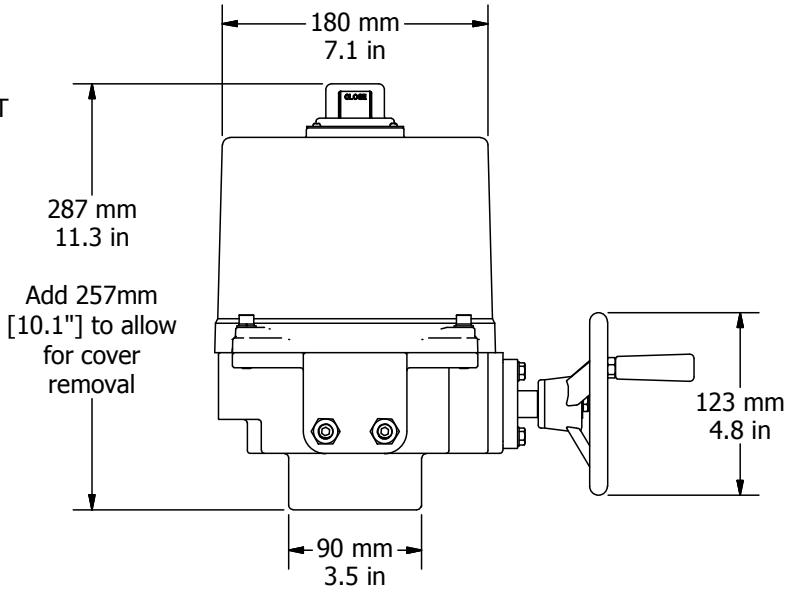
Mechanical Data

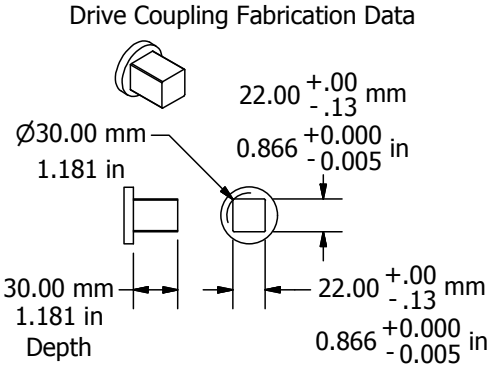
P2/3 Series Dimensional Data

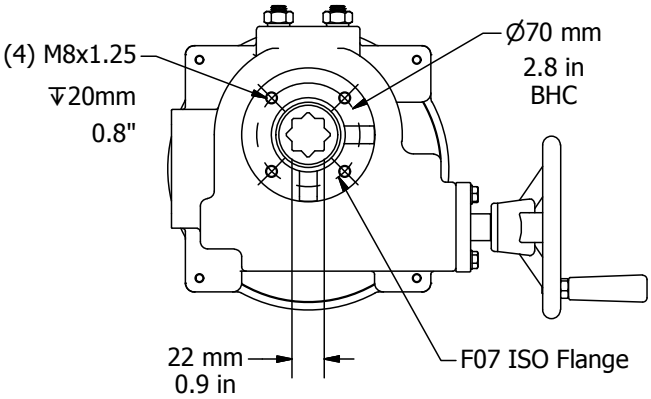










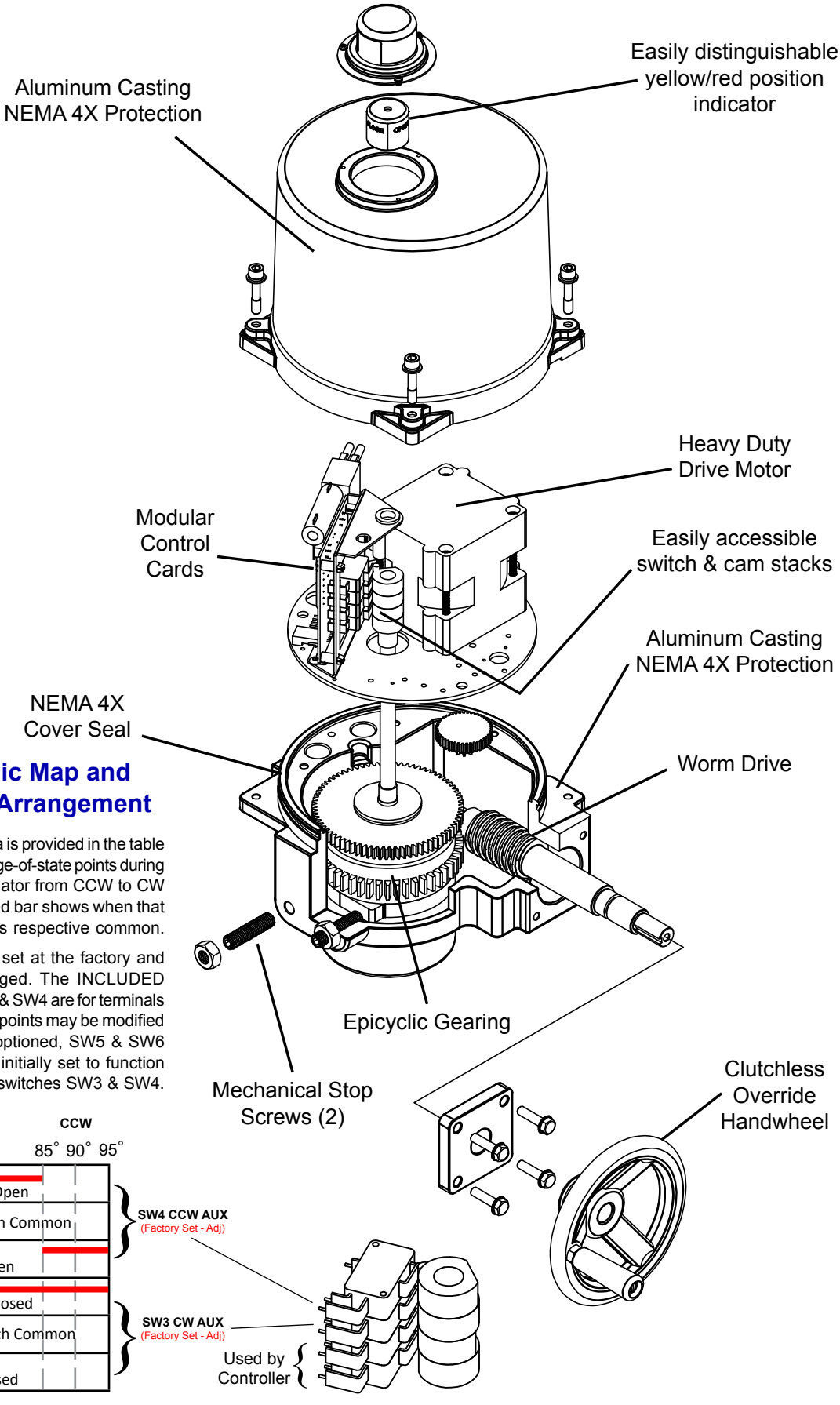


FM15_P23 HV MN4 Ver C 050516

Mechanical Data

P Series Exploded View

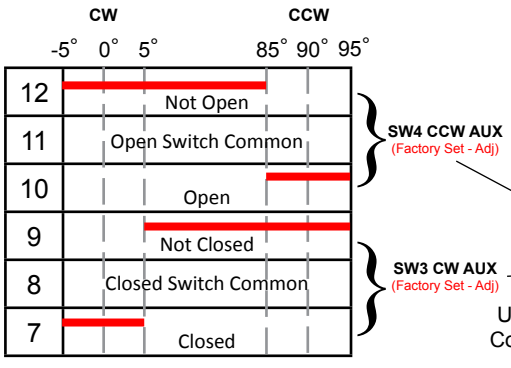
(P2/3-120N4 unit is shown)



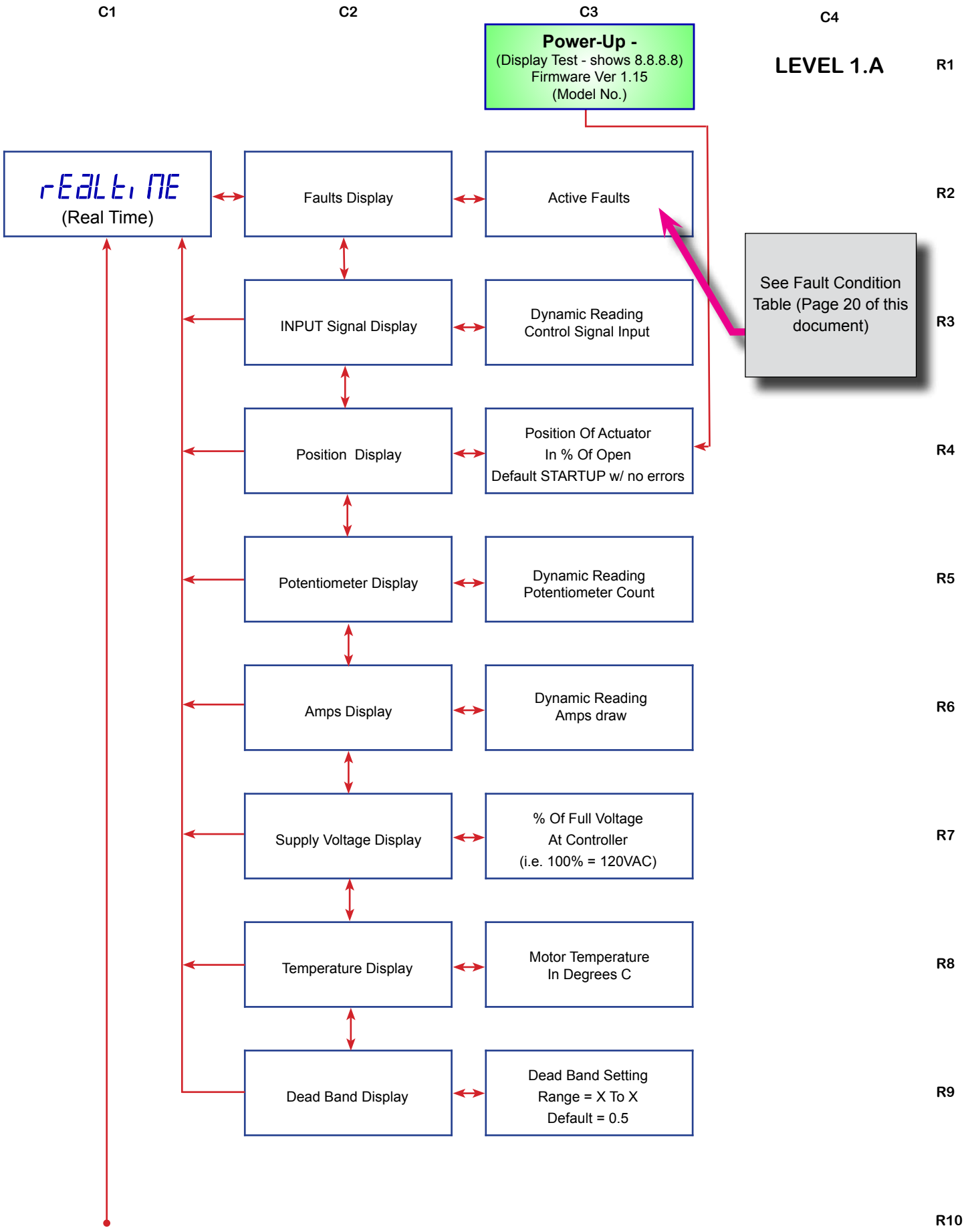
Switch Logic Map and Switch/Cam Arrangement

Switch sequencing data is provided in the table below to show the change-of-state points during the rotation of the actuator from CCW to CW and back again. The red bar shows when that terminal makes with its respective common.

Switches 1 and 2 are set at the factory and should NOT be changed. The INCLUDED auxiliary switches SW3 & SW4 are for terminals 7 thru 12 and those set points may be modified if need be. When so optioned, SW5 & SW6 auxiliary switches are initially set to function the same as auxiliary switches SW3 & SW4.



Controller Navigation Map, Level 1.A



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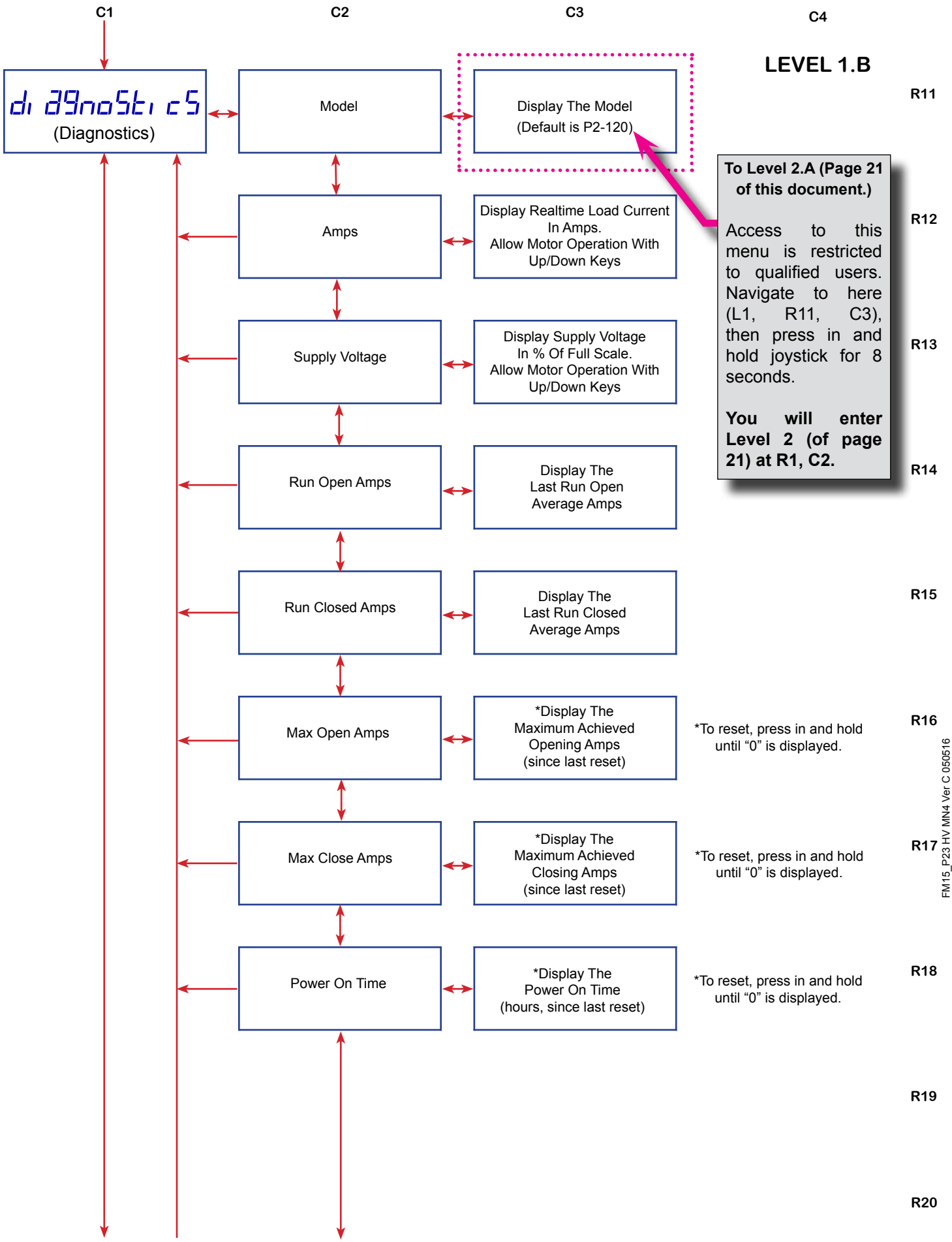
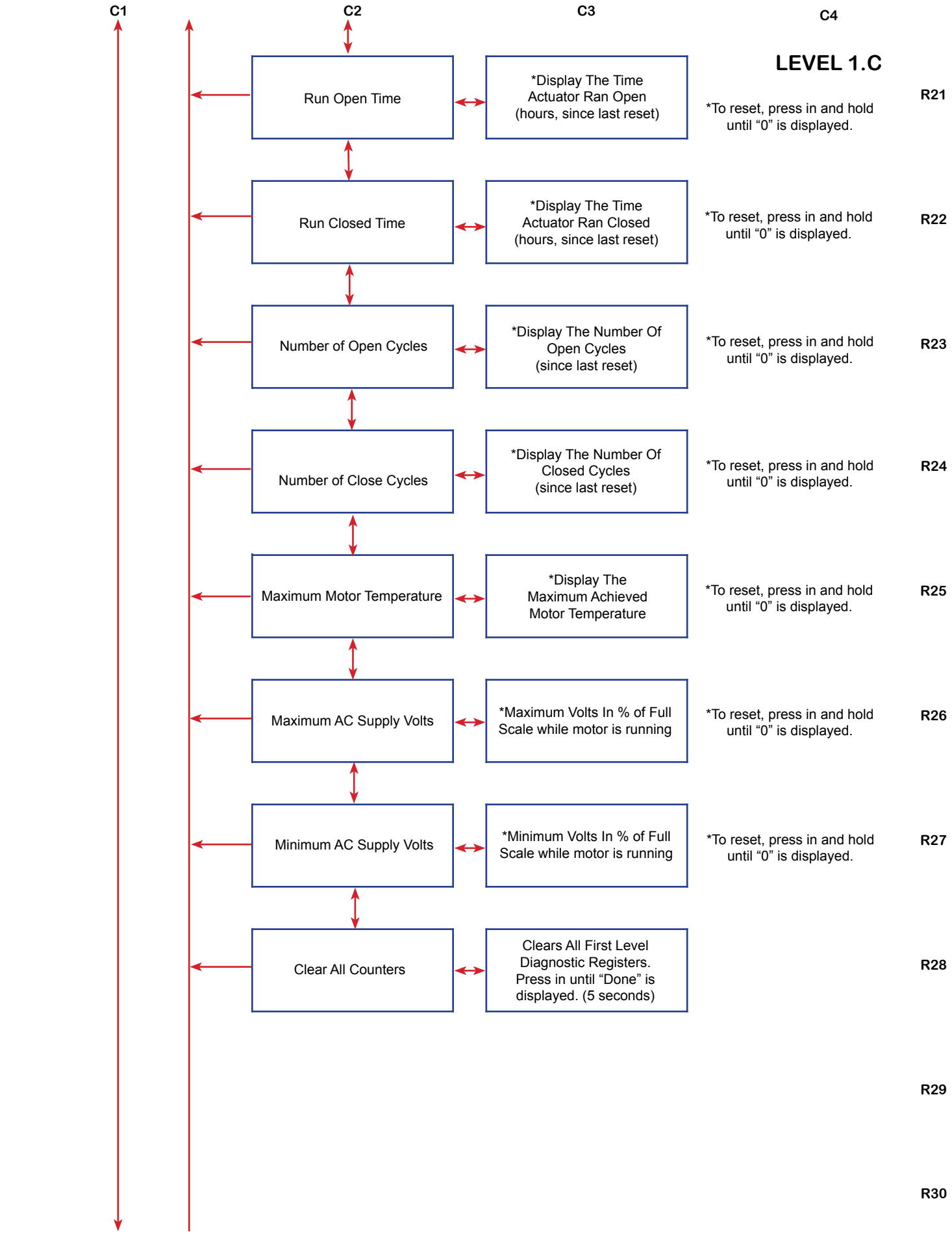
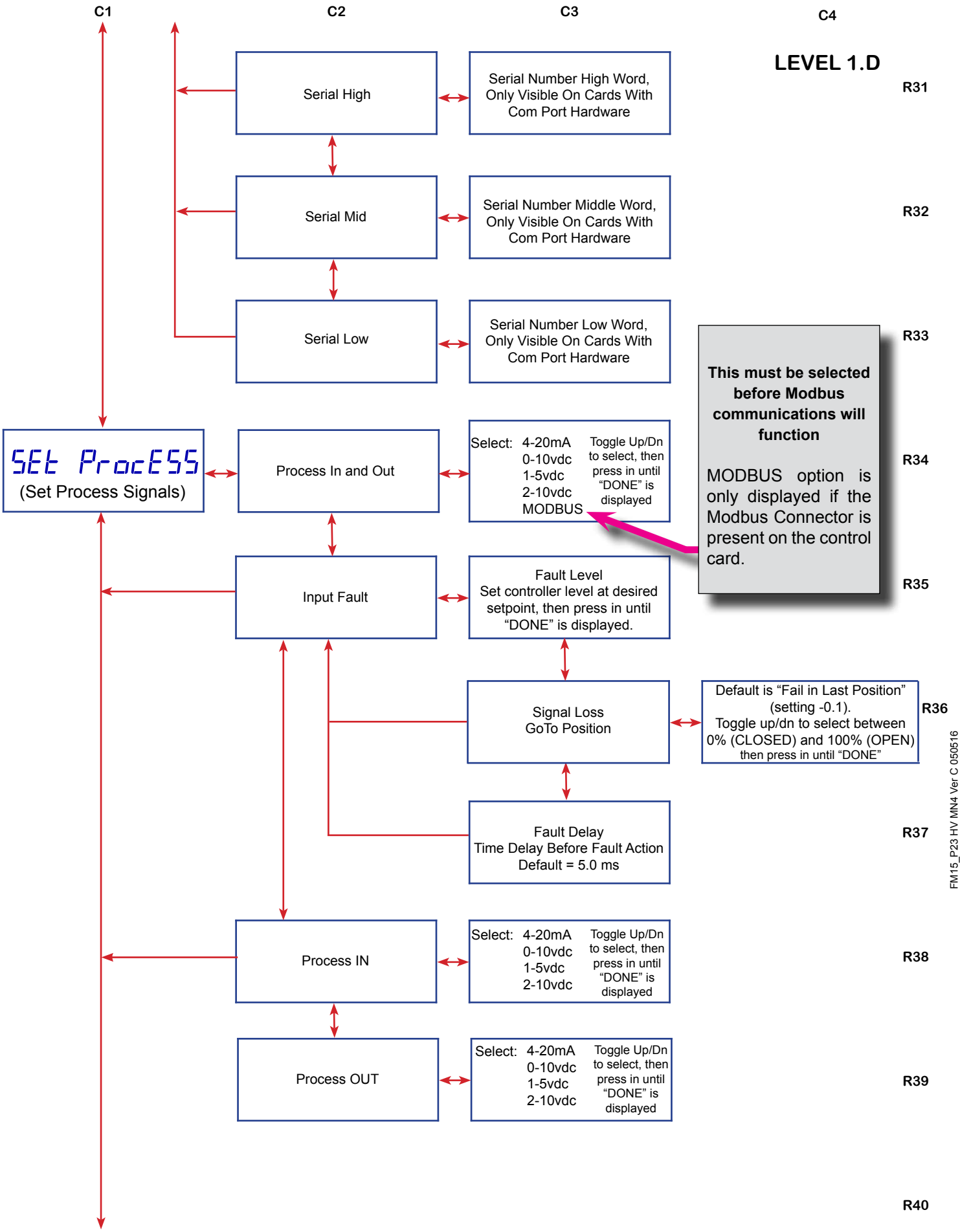
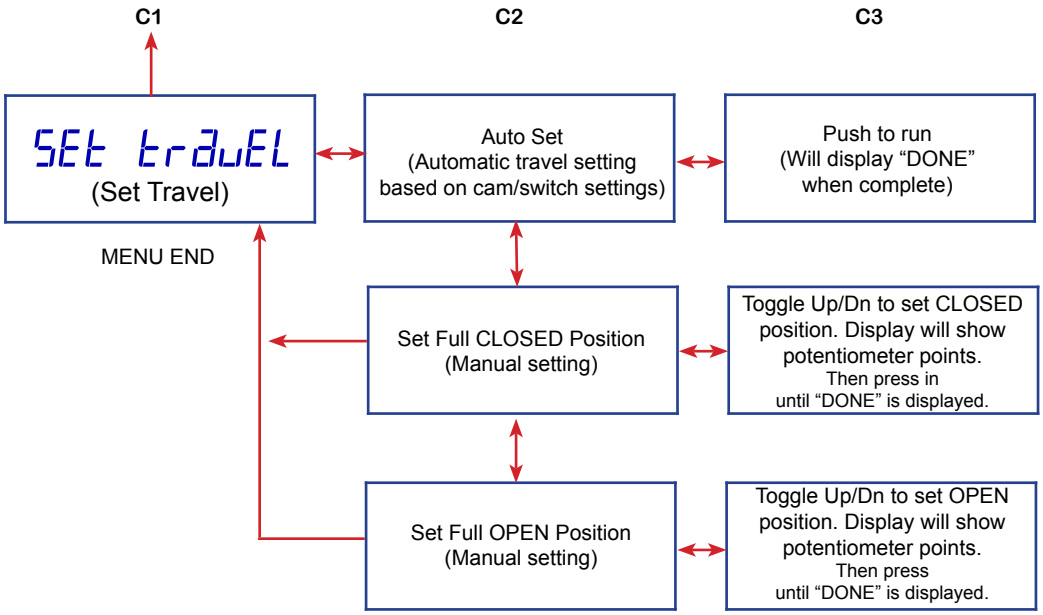

C1
C2
C3
C4
LEVEL 1.B
R11
R12
R13
R14
R15
R16
R17
R18
R19
R20
di 29noSti cS
(Diagnostics)
Model
Display The Model
(Default is P2-120)
Amps
Display Realtime Load Current
In Amps.
Allow Motor Operation With
Up/Down Keys
Supply Voltage
Display Supply Voltage
In % Of Full Scale.
Allow Motor Operation With
Up/Down Keys
Run Open Amps
Display The
Last Run Open
Average Amps
Run Closed Amps
Display The
Last Run Closed
Average Amps
Max Open Amps
*Display The
Maximum Achieved
Opening Amps
(since last reset)
*To reset, press in and hold
until “0” is displayed.
Max Close Amps
*Display The
Maximum Achieved
Closing Amps
(since last reset)
*To reset, press in and hold
until “0” is displayed.
Power On Time
*Display The
Power On Time
(hours, since last reset)
*To reset, press in and hold
until “0” is displayed.
To Level 2.A (Page 21 of this document.)
Access to this menu is restricted to qualified users. Navigate to here (L1, R11, C3), then press in and hold joystick for 8 seconds.
You will enter Level 2 (of page 21) at R1, C2.



FM15_P23 HV MN4 Ver C 050516



FM15_P23 HV MN4 Ver C 050516



R41 R42 R43

Fault Condition Table

Fault Condition	Default Motor Setting	Option	Indicator Status on Fault	Reset / Time
Motor Over Temp (thermal cable error)	Run	Run	Flash 4Hz	Reconnect cable
Over Current	Stop	Run	Flash 4Hz	Checks every 5 sec
Low Line Voltage	Stop	Run	Flash 4Hz	Checks every 5 sec
Max Service Cycles	Run	Run	Flash 4Hz	Reset cycle count
Motor Stalled	Stop	Run	Flash 4Hz	Power Reset
Motor Too Hot	Stop	Stop (no option)	Flash 4Hz	Cool Down

R44 R45 R46 R47

Motor Over Temp is set when the thermal cable connected to the top of the drive motor has been disconnected, cut, bent, shorted to ground through an incorrect screw size, or the PCB cable land is not seated into the receiver.

Over Current is set when the motor running current exceeds that of the pre-programmed lookup table that dictates when the drive motor is working beyond its intended limits. This is indicative of an improperly sized actuator. R48

Low Line Voltage is set when the incoming power is more than 10% below the design voltage. Low line voltage needs to be corrected before this fault will reset.

Max Service Cycles is set when the number of CLOSED cycles exceeds the user-programmed cycle count for use in servicing and maintenance routines. This is reset in the field after maintenance has been completed. R49

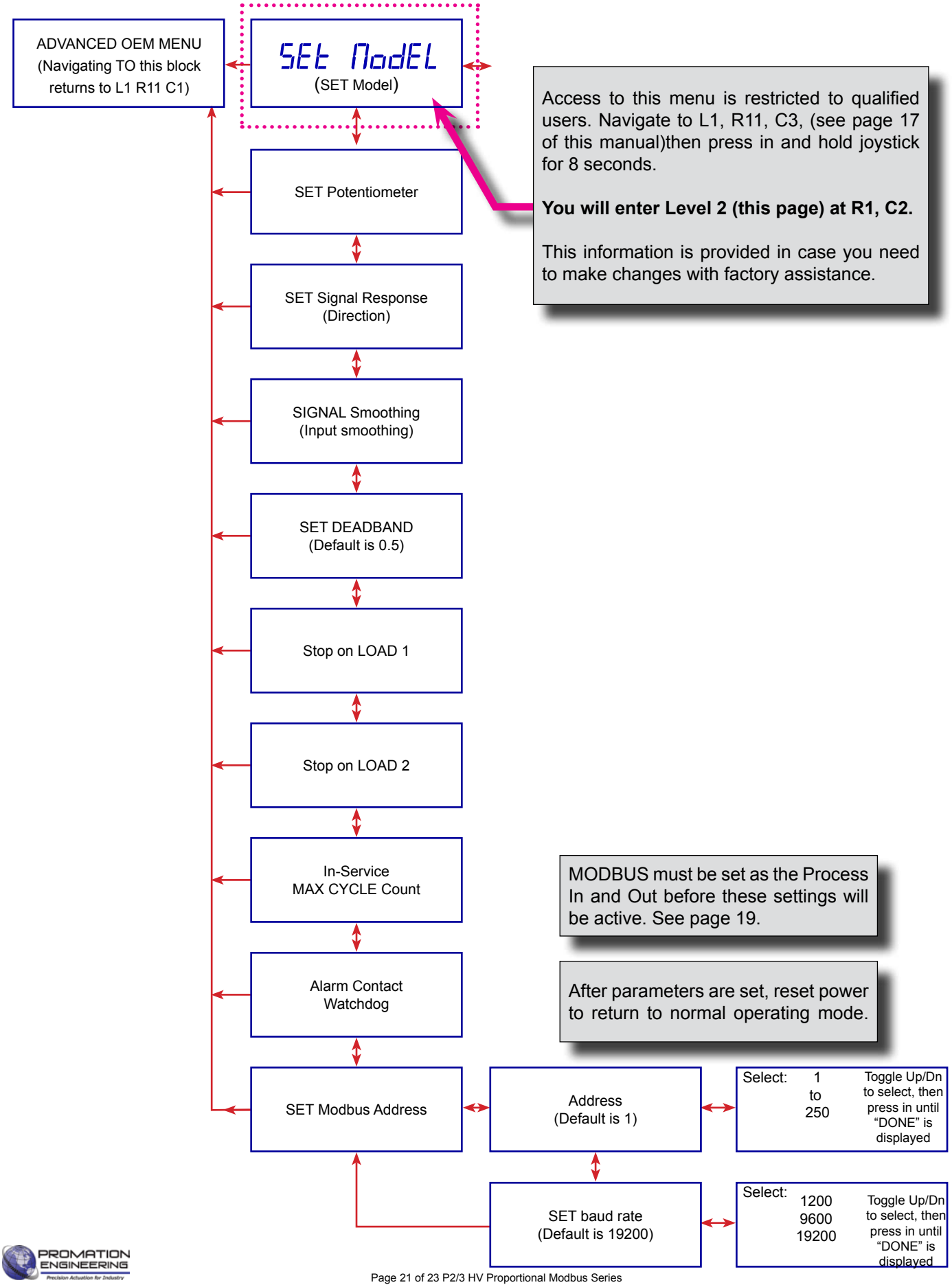
Motor Stalled is set when the controller commands a motor move and the feedback potentiometer does not record a move. Either a motor connection is loose, or theres something stuck in the pipeline.

Motor Too Hot is set when the motor termperature (as measured by the thermal sensor) exceeds the propro-grammed limits. The motor must be allowed to cool in order to reset the fault. R50

Accessing and Setting ModBus Parameters

LEVEL 2.A

C1 C2 C3 C4



R1

Access to this menu is restricted to qualified users. Navigate to L1, R11, C3, (see page 17 of this manual)then press in and hold joystick for 8 seconds.

You will enter Level 2 (this page) at R1, C2.

This information is provided in case you need to make changes with factory assistance.

R2

R3

R4

MODBUS must be set as the Process In and Out before these settings will be active. See page 19.

After parameters are set, reset power to return to normal operating mode.

R5

R6

R7

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Register Descriptions

Register		Label Description	Size	Type
40001	mbstatus	Controller status	16	R
40002	potinscaled	Potentiometer input scaled	16	R
40003	prcinscaled	Process input scaled	16	R
40004	mtrcrntscld	Motor current input scaled	16	R
40005	mtrtempscld	Motor temperature scaled	16	R
40006	mbcommand	Command	16	R/W
40007	mbsetpoint	Setpoint	16	R/W
40020	mtrcrntopen	Last run open motor current	16	R
40021	mtrcrntclsd	Last run clode motor current	16	R
40022	mtrcrntmxop	Maximum run open motor current	16	R
40023	mtrcrntmxcl	Maximum run close motor current	16	R
40024	powerontime	Total power on time	32	R
40026	runtimeopen	Total running time open	32	R
40028	runtimecls	Total running time closed	32	R
40030	opencycles	Total open cycles	32	R
40032	clscycles	Total closed cycles	32	R
40100	potspan	Potentiometer input span	16	S R/W
40101	potoffset	Potentiometer input offset	16	S R/W
40102	intype	Process input type	16	S R/W
40103	inspan	Process input span	16	S R/W
40104	inoffset	Process input offset	16	S R/W
40105	infailed	Process input failsafe active value	16	S R/W
40106	infailpsn	Process input go to position on failsafe	16	S R/W
40107	infailtime	Process input go to failsafe positon delay time	16	S R/W
40108	prcinavgset	Process in smoothing no of averages	16	S R/W
40109	prcinovride	Process in smoothing change for override	16	S R/W
40110	outtype	Process output type	16	S R/W
40111	outspan	Process output span	16	S R/W
40112	outoffset	Process output offset	16	S R/W
40113	mtempoffset	Motor temperature offset	16	S R/W
40114	mtempspan	Motor temperature span	16	S R/W
40115	mcrntoffset	Motor current offset	16	S R/W
40116	mcrntspan	Motor current span	16	S R/W
40117	mcrntdelay	Motor over current stop delay time	16	S R/W
40118	deadband	Seek deadband	16	S R/W
40119	stalldly	Stop on stall delay time	16	S R/W
40120	trnaround	Motor direction change delay timer	16	S R/W
40121	opendircn	Motor direction for open	16	S R/W
40122	mbprcspan	Modbus process signal span	16	S R/W
40123	mbstpntspan	Modbus process setpoint span	16	S R/W
40124	mbfailtime	Modbus communication fault delay time	16	S R/W
40125	mbfailpsn	Modbus communications fault go to position	16	S R/W
40126	mbcomaddr	Modbus slave address	16	S R/W
40127	mbbaudrate	Modbus com port baudrate	16	S R/W

Register Descriptions (continued)

Register		Label Description	Size	Type
40200	prcinmaspan	Process in 4-20mA span	16	S R/W
40201	prcinmaofst	Process in 4-20mA offset	16	S R/W
40202	prcinv1span	Process in 0-10V span	16	S R/W
40203	prcinv1ofst	Process in 0-10V offset	16	S R/W
40204	prcinv2span	Process in 1-5V span	16	S R/W
40205	prcinv2ofst	Process in 1-5V offset	16	S R/W
40206	prcinv3span	Process in 2-10V span	16	S R/W
40207	prcinv3ofst	Process in 2-10V offset	16	S R/W
40208	proutmaspan	Process out 4-20mA span	16	S R/W
40209	proutmaofst	Process out 4-20mA offset	16	S R/W
40210	proutv1span	Process out 0-10V span	16	S R/W
40211	proutv1ofst	Process out 0-10V offset	16	S R/W
40212	proutv2span	Process out 1-5V span	16	S R/W
40213	proutv2ofst	Process out 1-5V offset	16	S R/W
40214	proutv3span	Process out 2-10V span	16	S R/W
40215	proutv3ofst	Process out 2-10V offset	16	S R/W
40300	potinactl	Potentiometer input raw	16	R
40301	prcinactl	Process input raw	16	R
40302	mtrcrntactl	Motor current raw	16	R
40303	mtrtempactl	Motor temperature raw	16	R
40304	autodeadbd	Auto deadband value	16	R

Industrial Applications

ProMation Engineering actuators have been installed to operate process controls such as butterfly valves, ball valves, high performance valves, plug valves, gate valves and dampers, in a broad range of demanding industrial applications.

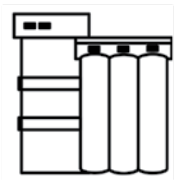
Power Generation

Water Processes

Mining

Oil and Gas

Agriculture



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