

PLC update 10304

Field service bulletin

810040
Revision 0

English
Original Instructions





April 2018

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Safety


	Refer to the instruction manual. Read and understand all of the safety guidelines in this manual.
 DANGER	Dangerous voltage To reduce the risk of serious injuries or death, wear approved protection and follow safety recommendations when working with electricity.
 WARNING	Personnel who maintain and repair this equipment can be injured or killed if hazardous energy is not properly controlled. Injuries can include burns, cuts, fractures, or electrocution.
 WARNING	Personnel who work on deenergized machinery can be seriously injured or killed if lock-out devices are removed and the machinery is reenergized without their knowledge. All workers must respect lock-out devices and that only the person(s) who applied these devices shall remove them.

Purpose


The operator interface, a PLC (programmable logic controller), is the standard controller for this pump. This software update adds an automatic startup procedure.

Improved startup routine

The updated and improved power-up sequence for HyPrecision S-series and HyPrecision D-series pumps occurs in stages.



 The default setpoints for all timers are user-programmable. Refer to **Power Up Delays** on page 19.

1. Touch the pump start symbol.

 The bleed-down valve is open.




Stage 1: Achieve inlet water pressure

2. The main motor starts.
3. The hydraulic pump operates at the minimum pressure.
 -  The factory differential default is 20.7 bar (300 psi).
 -  The intensifier does not stroke.
4. The inlet water–pressure switch closes when the inlet water pressure is 2.8 bar (40 psi).

If the inlet water pressure switch does not close after 20 seconds:


- ☐ The pump stops the startup sequence.
- ☐ An Inlet Water Pressure Low alarm shows on the screen.
- ☐ the yellow stack light flashes.
- ☐ the system stays in cooling mode.

Find the cause of the low inlet-water pressure and start the pump again.

5. The Stage 1 Inlet Water timer starts.
 -  The default setpoint for the Stage 1 Inlet Water timer is 5 seconds.
6. Inlet water causes the water pressure in the system to increase.
7. The Stage 1 Inlet Water timer expires.






Stage 2: Purge the system

8. The intensifier starts stroking.
9. The Stage 2 Bleed Valve timer starts.
 -  The default setpoint for the Stage 2 Bleed Valve timer is 5 seconds.
10. The intensifier pushes water through the system, and pushes any air in the system out through the bleed-down valve.
11. The Stage 2 Bleed Valve timer expires.




Stage 3: Charge the system


12. The bleed-down valve closes.
 -  The pump operates at the minimum pressure.
13. The Stage 3 Hydraulics timer starts.
 -  The default setpoint for the Stage 3 Hydraulics timer is 5 seconds.
14. The intensifier strokes, causing the water pressure in the system to increase.
 - If the time between intensifier strokes is longer than the Intensifier Stroke setpoint, the pressure in the system is sufficient. The intensifier stops stroking.
 -  The default setpoint for Intensifier Stroke is 1.5 seconds.
 - If the time between intensifier strokes is shorter than the Intensifier Stroke setpoint when the Stage 3 Hydraulics timer expires, pressure in the system is too low. Refer to **Troubleshooting** on page 7.
 - ☐ A Power Up Warning alarm shows on the screen.
 - ☐ The yellow stack light flashes.
 - ☐ The startup sequence continues.



Stage 4: Ramp to pierce pressure

 This stage can go very quickly.

15. The pump increases the hydraulic pressure, which is set with the low-pressure (pierce pressure) control knob.
16. The Stage 4 Pierce timer starts.

 The default setpoint for the Stage 4 Pierce timer is 5 seconds.

17. The intensifier strokes, causing the water pressure in the system to increase to pierce pressure.

If the time between intensifier strokes is longer than the Intensifier Stroke setpoint, the pressure in the system is sufficient. The intensifier stops stroking.

If the time between intensifier strokes is shorter than the Intensifier Stroke setpoint when the Stage 4 Pierce timer expires, pressure in the system is too low. Refer to **Troubleshooting** on page 7.


- ☐ A Power Up Warning alarm shows on the screen.
- ☐ The yellow stack light flashes.

18. If the pump is set to low pressure (pierce mode):
 - a. The PUMP READY output is on.
 - b. The startup sequence is complete.
19. If the pump is set to high pressure (cut mode), the startup sequence continues.



Stage 5: Ramp to cut pressure

20. The pump increases the hydraulic pressure, which is set with the high-pressure (cut pressure) control knob.
21. The Stage 5 Cut timer starts.

 The default setpoint for the Stage 5 Cut timer is 5 seconds.


22. The intensifier strokes, causing the water pressure in the system to increase to cut pressure.

If the time between intensifier strokes is longer than the Intensifier Stroke setpoint, the pressure in the system is sufficient. The intensifier stops stroking.

If the time between intensifier strokes is shorter than the Intensifier Stroke setpoint when the Stage 5 Cut timer expires, pressure in the system is too low. Refer to **Troubleshooting** on page 7.

- ☐ A Power Up Warning alarm shows on the screen.
- ☐ The yellow stack light flashes.

23. The PUMP READY output is on.

 The startup sequence is complete.

Troubleshooting

When pressure in the system is too low:

- A Power Up Warning alarm shows on the screen.
- The yellow stack light flashes.

If this occurs, find and resolve the source of the low pressure. Causes can include a leak in the high-pressure system or at the cutting head, the cutting head is open, or a stage timer setpoint is too short.

Record the PLC information in the table



Rebooting the PLC will erase some or all of the adjustments and setpoints.
Before rebooting the PLC, record the information in the table on page 22.

Most of the PLC images in this manual are typical for an S-series HyPrecision pump with redundant intensifiers and one pump. Your screen configuration can look different.

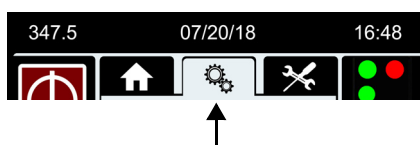
Total hours

The hour meter on the top left of the PLC screen shows the total hours the pump has been in operation. Write the total hours in the table on page 22.



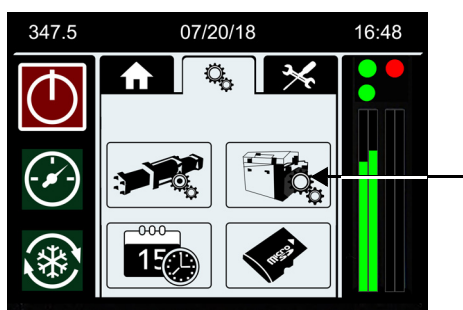
Model configuration

1. Touch the adjustments tab.



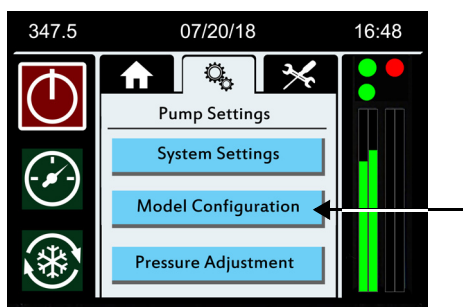
The adjustments screen opens.

2. Touch the pump symbol on the screen.




The pump adjustments screen opens.


3. Touch **Model Configuration**.






The model configuration screen opens.

- Record the information from this screen in the table on page 22.





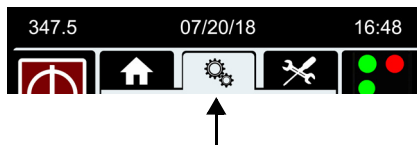


Model Number	75S
Voltage	460 VAC
Frequency	60 Hz
Intensifier Type	Redundant
Fan Cooled	
Prop Press	

- Green indicates that the feature is operating on this machine.
- Red indicates that the feature is not operating on this machine.

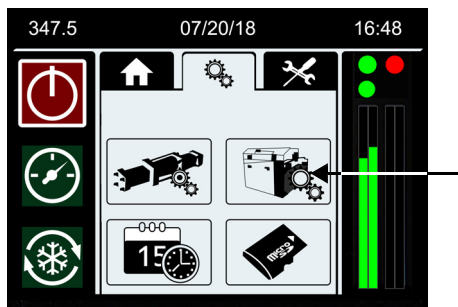
System adjustments

- Touch the adjustments tab.



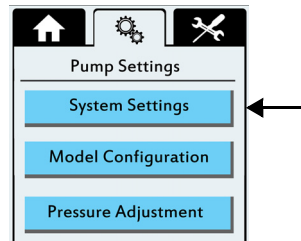
The adjustments screen opens.

- Touch the pump symbol on the screen.



The pump adjustments screen opens.


- On the pump adjustments screen, touch **System Settings**.

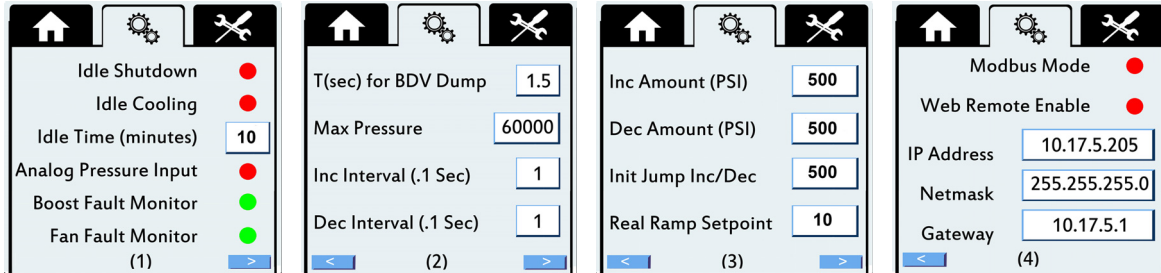


The system adjustments screen opens.

- Record the information from these screens in the table on page 22.

Touch the arrow on the bottom of the screen to move to other screens.

 Green indicates that the feature is operating on this machine.
Red indicates that the feature is not operating on this machine.

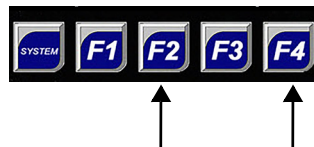


Proportional adjustments

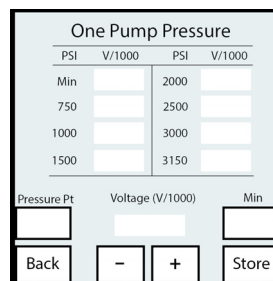
It is only necessary to record these adjustment in the table on page 22 if the pump has proportional controls.

HyPrecision S-series pump

- Touch the cooling mode symbol to turn ON the pump in cooling mode.
- Touch **F2** and then touch **F4**.



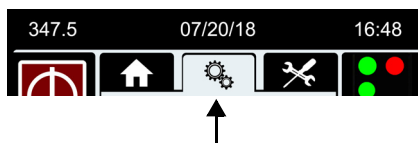
The proportional setup screen opens.



- Record the information from this screen in the table on page 22.

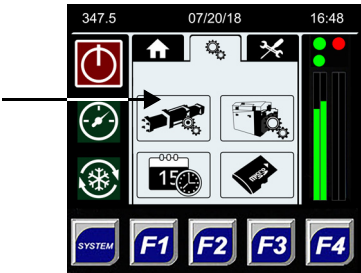
HyPrecision D-series pump

- Touch the adjustments tab.



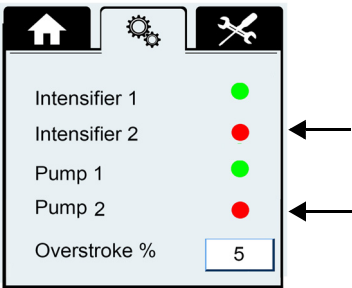
The adjustments screen opens.

2. Touch the intensifier symbol on the screen.



The intensifier adjustments screen opens.

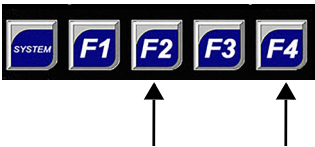
3. Touch the dots to turn ON intensifier 1 and pump 1. Touch the dots to turn OFF intensifier 2 and pump 2.



- Green indicates that the feature is operating.
- Red indicates that the feature is not operating.

4. Touch the cooling mode symbol to turn ON the pump in cooling mode.

5. Touch **F2** and then touch **F4**.



The proportional setup screen opens.

One Pump Pressure			
PSI	V/1000	PSI	V/1000
Min		2000	
750		2500	
1000		3000	
1500		3150	

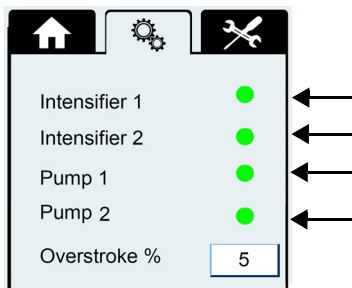
Pressure Pt	Voltage (V/1000)	Min

Back - + Store

6. Record the information from this screen in the table on page 22.

7. Do steps 1 and 2 again.

8. Touch the dots to turn ON the intensifiers and the pumps.



9. Do steps 4 and 5 again.

The proportional setup screen opens.

Dual Pump Pressure			
PSI	V/1000	PSI	V/1000
Min		2000	
750		2500	
1000		3000	
1500		3150	

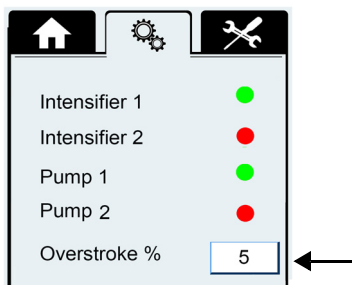
Pressure Pt	Voltage (V/1000)	Min

Back - + Store

10. Record the information from this screen in the table on page 22.

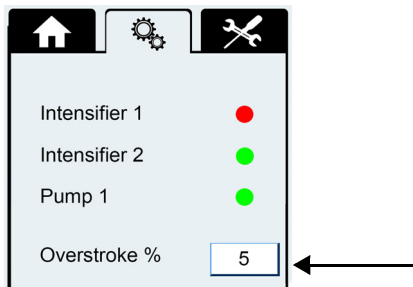
11. Touch **Back**.

The intensifier adjustments screen opens.



12. Record the Overstroke % information in the table on page 22.



The intensifier adjustments screen opens.



13. Record the Overstroke % field in the table on page 22.

Update the PLC firmware

Copy the firmware update to the PLC

 WARNING	Personnel who work on deenergized machinery can be seriously injured or killed if lock-out devices are removed and the machinery is reenergized without their knowledge. All workers must respect lock-out devices and that only the person(s) who applied these devices shall remove them.
 WARNING	Use a lock-out device according to the work site's policy to isolate and control energy.



Required parts, tools, and materials

Computer

Micro SD card reader or USB card adapter

Put the software on the micro SD card

1. Turn OFF the pump.
2. Turn OFF the primary breaker disconnect lever on the electrical enclosure door.
3. Open the electrical enclosure door. Remove the micro SD card from the top of the PLC.
4. Copy the files from the micro SD card onto a computer.
5. Copy the update file onto the micro SD card.
The file is supplied by a Hypertherm Technical Service Associate.
6. Unzip the files into the root directory on the micro SD card.
7. Install the micro SD card in the PLC.
8. Close the electrical enclosure door.
9. Turn ON the primary breaker disconnect lever on the electrical enclosure door.

Install the firmware



Rebooting the PLC will erase some or all of the adjustments and setpoints.
Before rebooting the PLC, record the information in the table on page 22.
Refer to **Record the PLC information in the table** section, which starts on page 8.

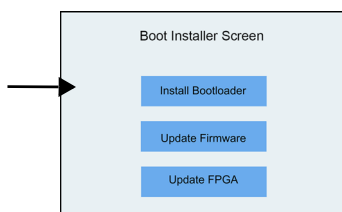
1. Touch and hold **SYSTEM** for approximately 5 seconds.

The boot installer screen opens.

2. Touch **Install Bootloader**.



Do not touch **Update Firmware**. This will corrupt the PLC and make it not operate.

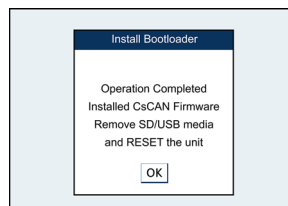
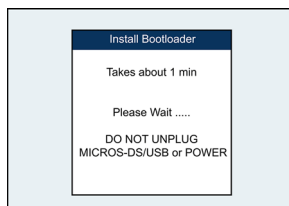


A bootloader is a program that loads an operating system when the computer turns on.

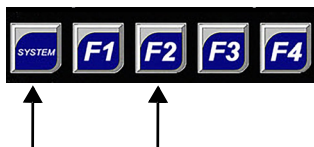
A confirmation screen opens.

3. Touch **Yes**.

The bootloader is installed. The new firmware is installed. The following messages show on the screen.






4. Touch **OK** when the bootloader operation is complete.
5. Touch and hold **SYSTEM** and **F2** at the same time for 2 seconds.



The PLC reboots. When the system check is complete, the PLC shows the boot installer screen.

Update the PLC software

 WARNING	Personnel who work on deenergized machinery can be seriously injured or killed if lock-out devices are removed and the machinery is reenergized without their knowledge. All workers must respect lock-out devices and that only the person(s) who applied these devices shall remove them.
 WARNING	Use a lock-out device according to the work site's policy to isolate and control energy.
	The PLC firmware must be current to install the software update correctly. Refer to Install the firmware on page 14 for instructions.

Contact a Hypertherm Technical Service Associate for information and support regarding the installation, operation, maintenance, and repair of this equipment.



Required parts, tools, and materials

Computer

Micro SD card reader or USB card adapter

Put the software on the micro SD card

1. Turn OFF the pump.
2. Turn OFF the primary breaker disconnect lever on the electrical enclosure door.
3. Open the electrical enclosure door.
4. Remove the micro SD card from the top of the PLC.
5. Copy the update file (10304.pgm) onto the micro SD card. The file is supplied by a Hypertherm Technical Service Associate.

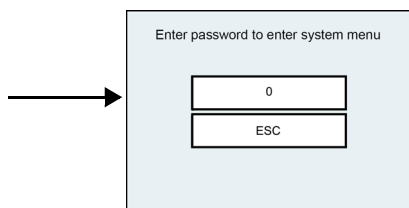
Install the software

1. Install the micro SD card in the PLC.
2. Close the electrical enclosure door.
3. Touch **SYSTEM**.



The password screen opens.

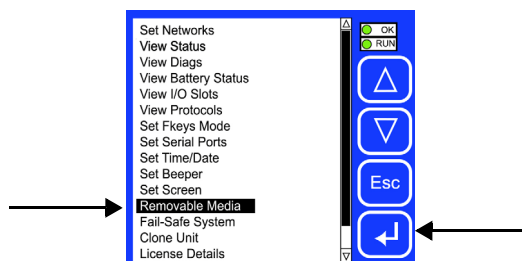
4. Touch the top box to open a numeric keypad.



5. Enter 4575. Touch **Enter**.

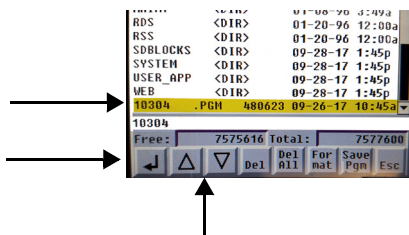
The System Menu opens.

6. Use the up and down arrows to highlight Removable Media. Touch the enter symbol.



The Media Directory opens.

7. Use the up and down arrows to highlight the update file (10304.pgm).



Touch the enter symbol.

8. Touch **OK** when prompted to confirm the selection.

9. After the program is installed, touch **OK**.

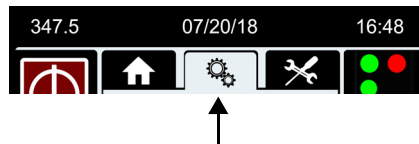
The PLC is in run mode.

Update the PLC adjustments

Use these instructions and the table on page 22 to enter your adjustments.

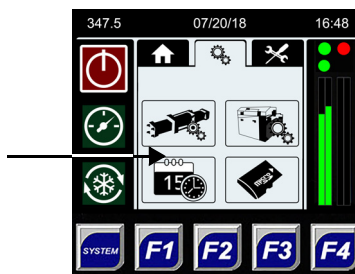
Date and time

1. Touch the adjustments tab.



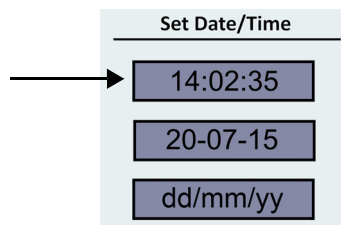
The adjustments screen opens.

2. Touch the date-and-time symbol on the screen.



The date-and-time adjustments screen opens.

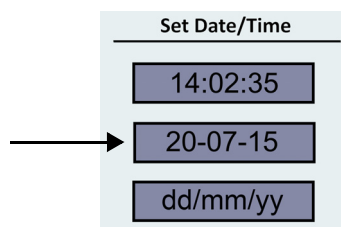
3. Touch the time field to open a numeric keypad.



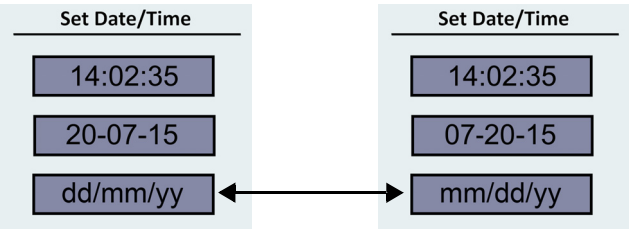
4. Use the left and right arrows to highlight the hours, minutes, or seconds. Use the up and down arrows to increase or decrease the number.

5. Touch **Enter** to accept the change.

6. Use the same procedure to set the date.

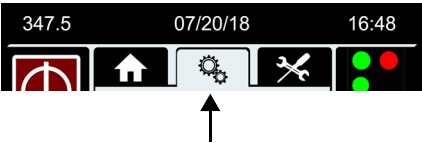


7. Touch the bottom field to change how the date is shown. Options are day/month/year or month/day/year.



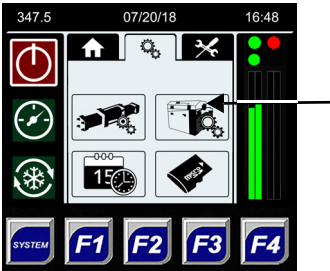
Total hours and model configuration

1. Touch the adjustments tab.



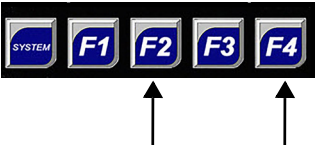
The adjustments screen opens.

2. Touch the pump symbol on the screen.



The pump adjustments screen opens.

3. Touch **F2** and then touch **F4**.



The model configuration setup screen opens.

4. Enter the information from the **Total hours** and the **Model configuration** sections of the table on page 22.

Model Configuration Setup

Model

PROP Voltage

Frequency

Intensifier Type

Fan Cooled

Proportional Press Control

Run Hours

Esc

in the table

Model Number
Voltage
Frequency
Intensifier Type
Fan Cooled
Prop Press
Total hours

5. If the system has proportional pressure control, touch **PROP**.

The proportional adjustments screen opens.

One Pump Pressure

PSI	V/1000	PSI	V/1000
Min		2000	
750		2500	
1000		3000	
1500		3150	

Dual Pump Pressure

PSI	V/1000	PSI	V/1000
Min		2000	
750		2500	
1000		3000	
1500		3150	

ESC

6. Enter the information from the proportional adjustments section of the table on page 22.

7. Touch **ESC** to return to the pump adjustments screen.

System adjustments

1. On the pump adjustments screen, touch **System Settings**.

The system adjustments screen opens.

2. Enter the information from the **System adjustments** section of the table on page 22.

Touch the arrow on the bottom of the screen to move to other screens.

Idle Shutdown ●

Idle Cooling ●

Idle Time (minutes)

Analog Pressure Input ●

Boost Fault Monitor ●

Fan Fault Monitor ●

(1) >

in the table

Idle Shutdown
Idle Cooling
Idle Time (minutes)
Analog Pressure Input
Boost Fault Monitor
Fan Fault Monitor

Power Up Delays

Intensifier Stroke S

Stage 1 Inlet Water S

Stage 2 Bleed Valve S

Stage 3 Hydraulics S

Stage 4 Pierce S

Stage 5 Cut S

< (2) >

Power Up Delays

- Intensifier Stroke
- Stage 1 Inlet Water
- Stage 2 Bleed Valve
- Stage 3 Hydraulics
- Stage 4 Pierce
- Stage 5 Cut

Use the values shown.

Max Pressure

60000

Inc Interval (.1 Sec)

5

Dec Interval (.1 Sec)

5

Bleed Valve

1.5

Cut to Pierce

<

(3)

>

in the table

Max Pressure
Inc Interval (.1 Sec)
Dec Interval (.1 Sec)
T(sec) for BDV Dump

Inc Amount (PSI)

500

Dec Amount (PSI)

500

Init Jump Inc/Dec

500

Real Ramp Setpoint

10

<

(4)

>

in the table

Inc Amount (PSI)
Dec Amount (PSI)
Init Jump Inc/Dec
Real Ramp Setpoint

Modbus Mode

Web Remote Enable

IP Address

10.17.5.205

Netmask

255.255.255.0

Gateway

10.17.5.1

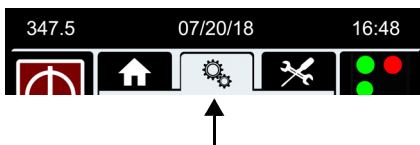
<

in the table

Modbus Mode
Web Remote Enable
IP Address
Netmask
Gateway

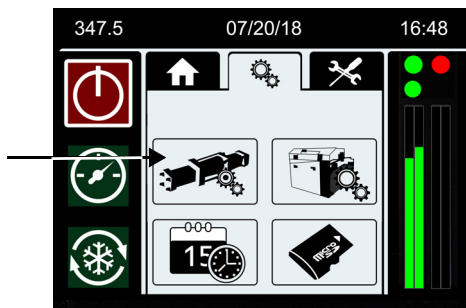
Overstroke percentage

1. Touch the adjustments tab.




The adjustments screen opens.

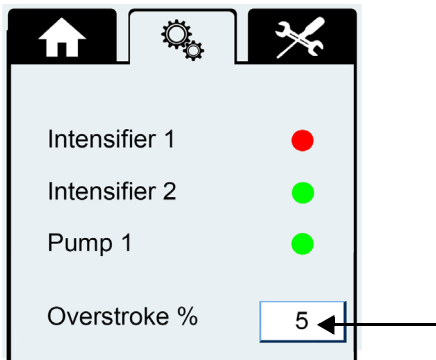
2. Touch the intensifier symbol on the screen.



The intensifier adjustments screen opens.

3. Touch the **Overstroke %** field to open a numeric keypad. Use the numeric keypad to change the overstroke percentage.





	Do not set the value higher than 20%. The factory default value is 5%.
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Adjustments and data

Total hours	
--------------------	--











Model configuration

Model Number		Intensifier Type	
Voltage		Fan Cooled	 
Frequency		Prop Press	 

System adjustments





(1)

(3)

Idle Shutdown	 	Inc Amount (PSI)	
Idle Cooling	 	Dec Amount (PSI)	
Idle Time (minutes)		Init Jump Inc/Dec	
Analog Pressure Input	 	Real Ramp Setpoint	
Boost Fault Monitor	 		
Fan Fault Monitor	 		

(2)

(4)

T (sec) for BDV Dump		Modbus Mode	 
Max Pressure		Web Remote Enable	 
Inc Interval (.1 Sec)		IP Address	
Dec Interval (.1 Sec)		Netmask	
		Gateway	

Proportional adjustments

One Pump Pressure

Dual Pump Pressure

Min		
750		
1000		
1500		
2000		
2500		
3000		
3150		

Overstroke %	
---------------------	--