ARMSTRONG

Design Envelope 6800 Booster

PLC and HMI software

Installation and operating instructions

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CONTENTS

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1.0   PURPOSE

The Purpose of this manual is to show how to update the software for PLCs and HMIs on a booster system.

2.0   HARDWARE REQUIRED

DESCRIPTION	QUANTITY
Smart key	1
Pigtail for USB flash drive	1
USB flash drive for HMI update	1

FIGURE 2.1: Smart Key

FIGURE 2.2: Pigtail for USB Flash Drive

FIGURE 2.3: USB Flash Drive

3.0   PROCEDURE: RECORD BOOSTER SETTINGS

All parameters and settings will be lost after updating PLC software. Therefore, it is recommended to note down all the parameter values from existing PLC program before updating HMI and PLC program.

Turn on the control panel with the motor breaker in position. Go to setup and to note down configuration parameters from the HMI.

Browse through various setup menus to capture all existing booster parameters. Take a video or pictures of all booster settings to keep a record of the booster settings. The Level 2 Booster Set Up menus can be seen below. **Taking a video of all Booster settings is highly recommended**.

FIGURE 3.1: Booster HMI Main Screen

FIGURE 3.2: Booster Level 2 Set Up Screen

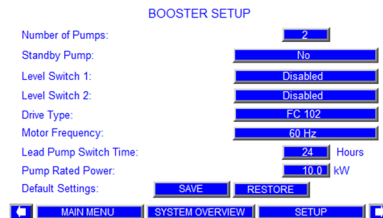

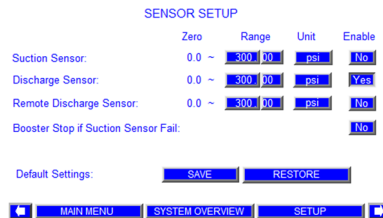**FIGURE 3.3:** Booster Set Up Screen

FIGURE 3.4: Sensor Set Up Screen

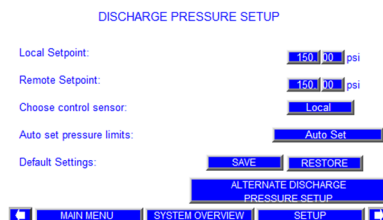**FIGURE 3.5:** Discharge Pressure Set Up Screen

FIGURE 3.6: Pressure Limit Set Up 1 Screen

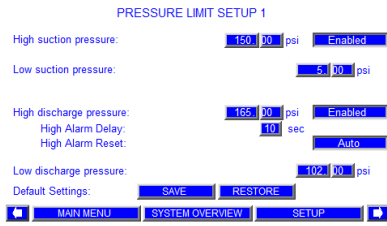PRESSURE LIMIT SETUP 1

High suction pressure:	150.00 psi	Enabled
Low suction pressure:	5.00 psi
High discharge pressure:	165.00 psi	Enabled
High Alarm Delay:	10 sec
High Alarm Reset:	Auto
Low discharge pressure:	102.00 psi
Default Settings:	SAVE RESTORE

MAIN MENU SYSTEM OVERVIEW SETUP

FIGURE 3.7: Pressure Limit Set Up 2 Screen

PRESSURE LIMIT SETUP 2

EMERGENCY POWER MODE Disabled
Number of running pumps in emergency: 1
Emergency Low Discharge: 30.00 psi

FACTORY SETUP
Factory high discharge: 200.00 psi
Default Settings: SAVE RESTORE

MAIN MENU SYSTEM OVERVIEW SETUP

FIGURE 3.8: Protection Set Up Screen

PROTECTION SETUP

END OF CURVE Disabled
EOC Head: 90.0 %
AQUASTAT SHUTDOWN Disabled
AIRLOCK PUMP SHUTDOWN
Disabled
Power setpoint: 15.0 %
Delay: 20 sec
Default Settings: SAVE RESTORE

MAIN MENU SYSTEM OVERVIEW SETUP
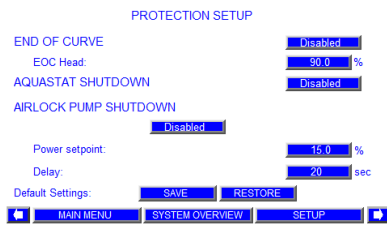
FIGURE 3.9: Pump Staging Set Up Screen

PUMP STAGING SETUP

Stage on speed: 97.0 %
Stage off by: Speed or Power
Stage off speed: 70.0 %
Stage off power: 90.0 %
Stage on delay: 5 sec
Stage off delay: 30 sec
Default Settings: SAVE RESTORE

MAIN MENU SYSTEM OVERVIEW SETUP
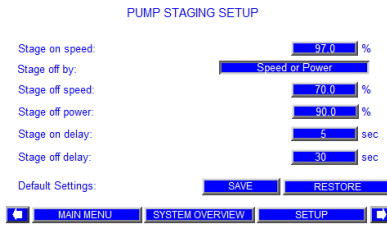
FIGURE 3.10: Soft Fill Set Up Screen

SOFT FILL SETUP

Enabled
Start setpoint: 50.0 %
Run setpoint: 65.0 %
Ramp: 60 sec
Default Settings: SAVE RESTORE

MAIN MENU SYSTEM OVERVIEW SETUP
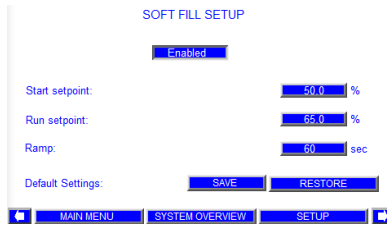
FIGURE 3.11: No Flow Shutdown Set Up Screen

NO FLOW SHUTDOWN SETUP
Enabled
Delay: 300 sec
Set Speed/Power: Power 70.0 %
Wait time: 30 sec
Boost pressure: 5.00 psi
Default Settings: SAVE RESTORE

MAIN MENU SYSTEM OVERVIEW SETUP
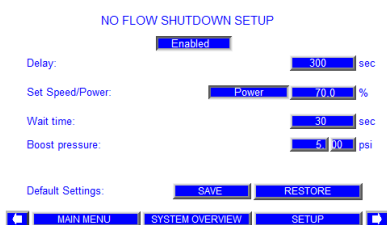
FIGURE 3.12: Speed Set Up Screen

SPEED SETUP

Minimum: 40.0 %
Maximum: 100.0 %
Start Speed: 60.0 %
Default speed: 70.0 %
Motor Rated RPM: 3600 RPM
Default Settings: SAVE RESTORE

MAIN MENU SYSTEM OVERVIEW SETUP
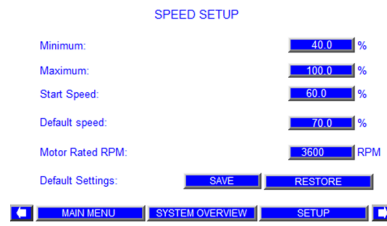
FIGURE 3.13: PID Set Up Screen

PID SETUP

Gain: 10 %/sec
Speed Up Limit: 1.0 %/sec
Speed Down Limit: 3.0 %/sec
POWER LIMIT SETUP Disabled
Motor Power Limit 103.0 %
Power Limit Speed Reduction 0.5 %/sec
PUMP ALARM AUTO RESET Disabled
iECM-Phase Loss Alarm-Only Disabled
Delay: 60 sec
Default Settings: SAVE RESTORE

MAIN MENU SYSTEM OVERVIEW SETUP
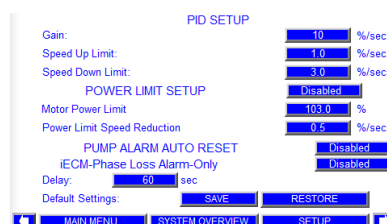
FIGURE 3.14: Pressure Setback Set Up Screen

PRESSURE SETBACK SETUP
Enabled
Setpoint: 85.0 %
Control mode: Quadratic
Default Settings: SAVE RESTORE

MAIN MENU SYSTEM OVERVIEW SETUP

FIGURE 3.15: BAS Set Up Screen

BAS SETUP

Protocol: Modbus
Address: 1
Baud Rate: 19200
Setup Modbus Baud Rate: 19200
Default Settings: SAVE RESTORE

MAIN MENU SYSTEM OVERVIEW SETUP

FIGURE 3.16: Fieldbus Set Up Screen

FIELDBUS SETUP

Source: Fbus2
Protocol: Modbus RTU
Baud Rate: 19200
Parity: No Parity
Stop Bit: 1
Pump Address: P1=1,P2=2,P3=3,P4=4,P5=5
Default Settings: SAVE RESTORE

MAIN MENU SYSTEM OVERVIEW SETUP

FIGURE 3.17: Flow Set Up Screen

FLOW SETUP

Model: VMS-1008B, VMS-1009B, VMS-1010B, VMS-1011B, VMS-1012B, VMS-1014B, VMS-1015B, VMS-1016B
Load Recipe
Pump Model: VMS-1010B
Design Flow: 100.00 US_GPM
Flow Unit: US_GPM
Flow Offset: 1.000

MAIN MENU SYSTEM OVERVIEW SETUP
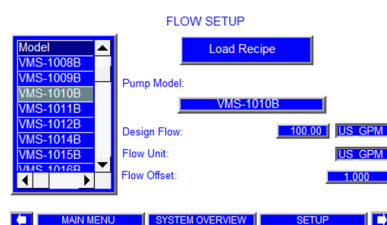
6

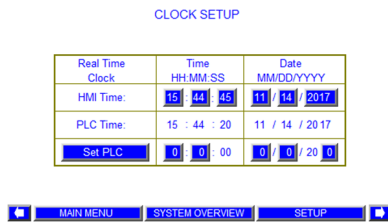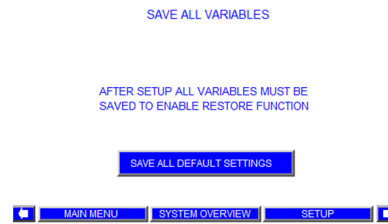FIGURE 3.18: Clock Set Up Screen

FIGURE 3.19: Save All Variables Screen

NOTE: Record value in the table below as per table before attempting to update

PLC SOFTWARE:

#	PARAMETER	SET TO	SETTING VALUE
	BOOSTER SET UP		
1	Number of pumps	As per order	
2	Standby pump	As per order	
3	Level switch 1	ENABLED/DISABLED	
4	Level switch 2	ENABLED/DISABLED	
5	Drive type	As per order	
6	Motor frequency	60Hz	
7	Lead pump switch time	24 Hours	
8	Motor rated power	As per order	
	SENSOR SETUP		
9	Pressure units	bar/psi	
10	Suction pressure sensor	ENABLED	—
11	Suction pressure range	See the transducer	
12	Discharge pressure sensor	ENABLED	—
13	Discharge pressure range	See the transducer	
14	Remote pressure sensor	ENABLED/DISABLED	
15	Remote pressure range	See the transducer	
	DISCHARGE PRESSURE SETUP		
16	Local setpoint	As per the order	
17	Remote setpoint	As per the order	
18	Choose control sensor	As per the order	
19	Choose control sensor	As per the order	
	PRESSURE LIMIT SETUP 1		
20	High suction pressure – status	DISABLED	
21	High suction pressure – value	As per the order	
22	Low suction pressure – value	0.1 bar/5 psi	
23	High discharge pressure – status	ENABLED	
24	High discharge pressure – value	3 bars above setpoint	
25	High discharge pressure – delay	5 sec	
26	High discharge pressure – reset	AUTO	
27	Low discharge pressure	—	
	PRESSURE LIMIT SETUP 2		
28	Emergency power mode	As per the order	
29	Factory high discharge	CVH+0.5	

| #	PARAMETER	SET TO	SETTING VALUE
	PROTECTION SETUP		
30	EOC	DISABLED	—
31	Aquastat pump shutdown	DISABLED	—
32	Aquastat pump shutdown	DISABLED	—
	PUMP STAGING SETUP		
33	Stage on speed	—	
34	Stage off by	Speed/power	
35	Stage off speed	—	
36	Stage off power	—	
37	Stage on delay	—	
38	Stage off delay	—	
	SOFT FILL SETUP		
39	Status	ENABLED	—
40	Start setpoint	30%	
41	RAMP	120 sec	
	NO FLOW SHUTDOWN		
42	Status	ENABLED	—
43	Delay	40 sec	
44	Set speed/power	Speed/power	
45	Speed	3% Above no flow speed	
46	Wait time	20 sec	-
47	Boost pressure	0.5 bar/5psi	
	SPEED SETUP		
48	Minimum	60%	
49	Maximum	100%	
50	RAMP (UP)	Same as drive ramp-up	
51	Default speed	70%	
52	Motor rated rpm	3600 rpm	
	PID SETUP		
53	Gain	30%/sec	
54	Speed up limit	1.5%/sec	
55	Speed down limit	3%/sec	
	PRESSURE SETBACK SETUP		
56	Status	DISABLED	—
	BAS SETUP		
57	Protocol	MODBUS	
58	Address	1	
	FIELDBUS SETUP		
59	Source	Fbus2	—
	FLOW SETUP		
60	Pump model	Do not load any pump	
61	Design flow	N/A	
62	Flow units	l/s	
63	Flow Offset	N/A	

4.0 PROCEDURE: UPDATING THE HMI SOFTWARE

1 To load a new HMI Revision onto an HMI screen for a DE booster, only one thing is needed, a flash drive with the need PLC/HMI Software Revision. Seen in **FIGURE 3.4**.

2 Power on the Booster if it is not already and allow the HMI to boot up.

3 Plug a flash drive into the USB port on the bottom of the HMI. The Flash Drive needs to have the required PLC software downloaded. If there is no room for the flash drive to plug into the HMI, use the pigtail adapter (**FIGURE 3.1**) to plug the flash drive into the HMI.

FIGURE 4.1: USB Plugged into HMI

4 A New window will appear on the HMI. Select Download

FIGURE 4.2: Download/Upload HMI Screen
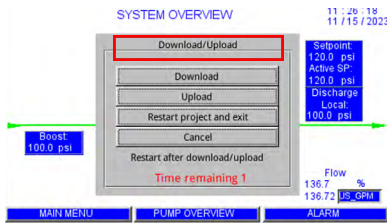
5 Enter Password **111111**.
FIGURE 4.3: Password HMI Screen
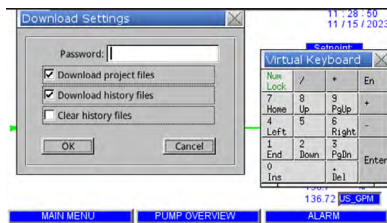
6 Pick a Directory, Click the **+** to the left of the **usbdisk**. Keep clicking the next **+** that appears until the **DE Booster** folder is seen.

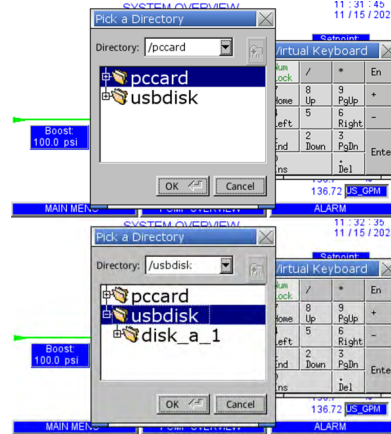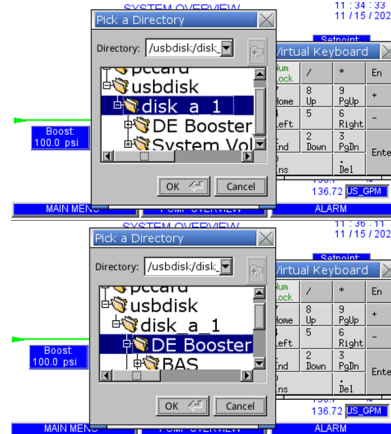**FIGURE 4.3:** Pick a Directory HMI Screen Part 1

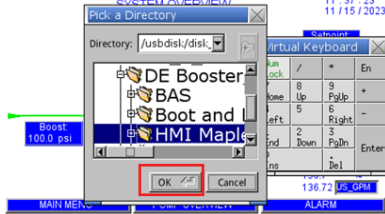

FIGURE 4.4: Pick a Directory HMI Screen Part 2

7 Click into the **DE Booster** folder. Click on the **HMI Maple** folder so that it is highlighted blue, do not click the **+** to open the folder.

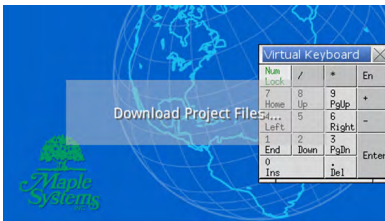**FIGURE 4.5:** Pick a Directory HMI Screen Part 3

8   Once the folder is selected, click **OK**.

FIGURE 4.5: Pick a Directory HMI Screen Part 4

9   The screen below will appear.

FIGURE 4.6: Downloading HMI Software Screen

10 Once complete, the Armstong booster home screen will be displayed. Select **Diagnose** to make sure the program was correctly uploaded.

FIGURE 4.7: Booster HMI Home Screen

5.0   PROCEDURE: UPDATING THE PLC SOFTWARE

IMPORTANT: Do not remove the key while data is being transferred to the key itself, as the file being transferred will be lost and the corresponding space will not be restored.

1   Switch off the PLC. To do this, disconnect the 24V fuse inside the panel. This Fuse will have a **24V** labelled wire coming out of the fuse block

FIGURE 5.1: 24V Fuse

2   Plug the Smart Key into the PLC into the telephone connector port.

FIGURE 5.2: Smart key - PLC Connection

3   Reconnect the PLC to power and it will turn on. All symbols on the Smart Key light up momentarily and the buzzer will beep.

4   Wait a few seconds and the key will become operational. During this period, the symbols ↑↓ will flash.

5   The controller then enters programming mode, and the start button and symbol ↑ light up steadily. Press the button to start the data transfer, the data transfer should take a couple of minutes to complete.

FIGURE 5.3: Smart Key - Start

6   Now, verify the PLC software has been updated. At the booster home screen. Select **Diagnose** to verify the correct version was installed properly.

↑ / ↓	Flashing: the key is connecting to pCO, during this phase, which may last a few seconds, the start button is disabled.
START	Flashing: the key has detected the pCO and is checking the access permission.
START + ↑	On steady: pressing the start button will start writing the software to the pCO.
START + ↓	On steady: pressing the start button will start reading the software from the pCO
START + 📄	On steady: pressing the start button will start reading the logos from the pCO.
MODE	On steady: in case of C or G keys, pressing the button for 1 second switches from read to write.

NOTE: All parameters and settings will be lost after updating PLC software.

6.0 PROCEDURE: UPDATE THE BOOSTER SETTINGS

1 Now that the HMI and PLC are updated with the new software compatible with the new drives, the booster settings to be updated.

FIGURE 6.1: Booster Home and Set Up Screen

2 For Level 2 Access to the Booster Settings, the password is **2323**.

3 Now the booster settings can be configured as they were before. Use the video recorded before of the booster settings to configure the booster the same way.

4 Go through all Booster setting screens as seen in **FIGURE 3.1**-**FIGURE 3.19** nd update booster settings as captured in the video taken before loading new software.

5 Save all default settings once complete.

FIGURE 6.2: Save All Variables Screen