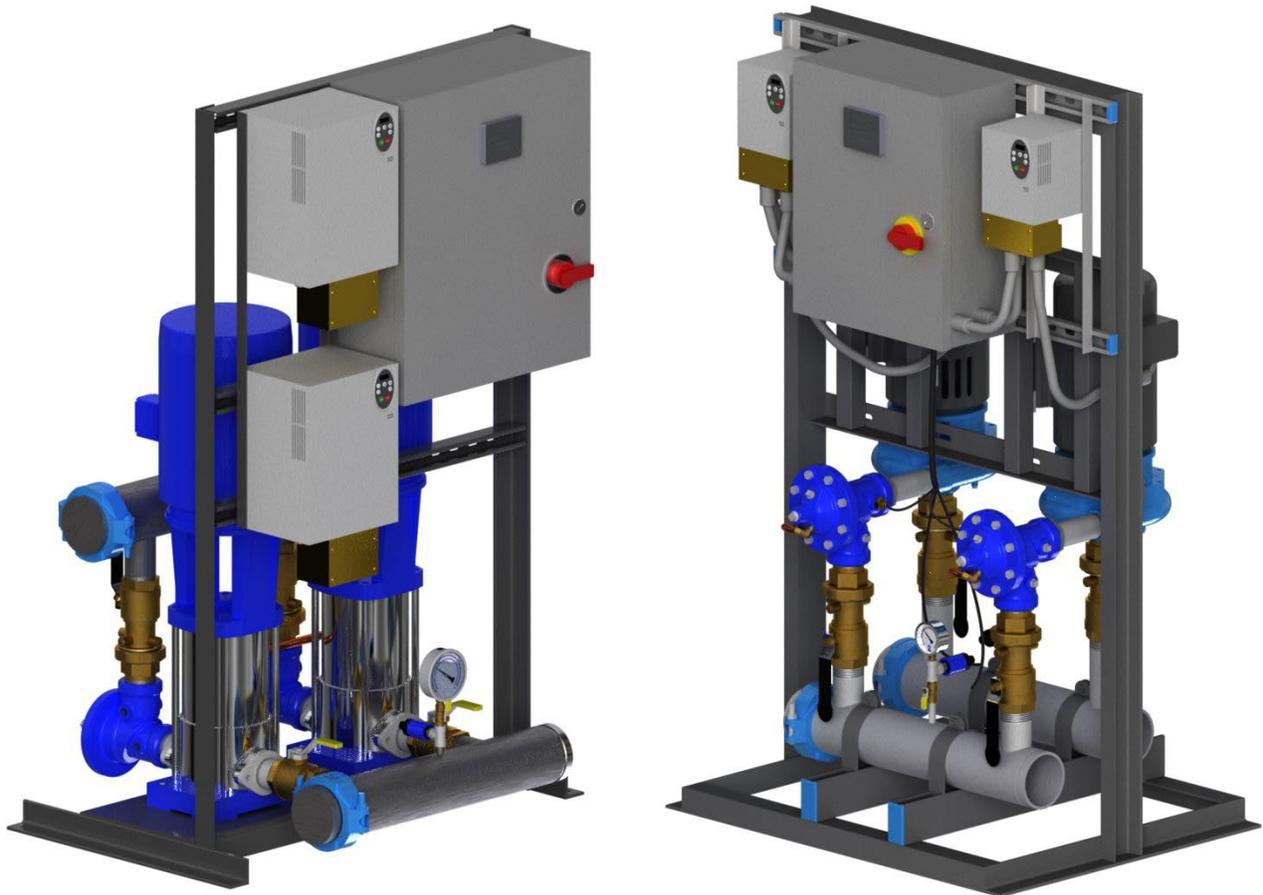


IOM Manual

Document: 687-468



eMVP/MVP

Installation, Operation & Maintenance Manual

**Modular Variable Speed Pressure Boosters
with M172 v6.xx Software**

Table of Contents

Contents	5
Description and Specifications	5
Nameplate	5
Engineering Data	5
HFP Pumps Safety Instructions	6
User Safety	7
Personal Safety	7
Safety Equipment.....	7
Workplace Safety.....	7
Washing the skin and eyes.....	7
Start-Up	8
System Components	9
Storage	10
Delivery Inspection.....	10
Package Inspection	10
Unit Inspection.....	10
Safety	10
Location and Treatment	10
Indoor Storage	10
Outdoor Storage.....	10
Installed But Not in Service.....	11
Equipment Protection	11
Preparation for Operation	11
Installation Guide	12
Installation Checklist	14
3.5” Color Touchscreen	15
Controller Menu Structure	16
Display Settings Menu Map	18
Booster Controller Features	19
Booster Controller Sequence of Control	20
Color Touchscreen Instructions	22
Booster Interior Controller	26
Booster Controller Navigation	27
Main Menu	27
Status	27
Alarms	28
Configuration.....	28
Pump Enable.....	29

- Operating Mode 30
- No Flow Standby 30
- Alarms/Shutdown 31
- Contact Inputs 32
- DemandSet 33
- Pump Run Timers 34
- Pressure & Flow Sensors 35
- Factory Settings 37
- PID Tuning 41
- Pump Staging 42
- Display Settings 42
- System 43
- Offline 43
- Diagnostics 43
- Building Automation System Integration 44**
- Port Locations 44**
- BAS Configuration Menu Structure 46**
- BAS Config 46
- Modbus TCP 46
- BACnet IP 47
- BACnet MSTP 47
- Modbus RTU 47
- Ethernet Configuration 47
- RS-485 Configuration 48
- BAS Point Export Table 49
- Schneider Electric Altivar 212 50**
- Modified Parameter List 50
- Allen Bradley PowerFlex 523 51**
- Modified Parameter List 51
- Schneider Magellis STU 655/855 52**
- Regular Cleaning 52**
- Cleaning the Display 52
- Cleaning the Gasket 52
- Inserting the Gasket 52
- Periodic Check Points 52
- Installation 53**
- Location 53
- Close-Coupled Units 53
- Piping 53**
- Piping Suction 53

Wiring & Grounding	53
Rotation	54
Operation	54
Maintenance	54
Seasonal Service	55
Monthly Maintenance	55
Troubleshooting Guide	56
Replacement Parts	58
MVP Drawing	58
Typical Goulds 3656-S Pump End	59
Typical Cla-Val Angle Check Valve	59
Standard MVP Parts Table	60
7-Series MVP Parts Table	61
eMVP Drawing, 5SV-22SV	62
Goulds e-SV Pump End, 5SV-22SV	63
EMVP Parts Table, 5SV-22SV	63
eMVP Drawing, 33SV-92SV	65
Goulds e-SV Pump End, 33SV-92SV	66
EMVP Parts Table, 33SV-92SV	67
Optional Booster Accessories	68
Frequently Asked Questions	69
Additional Components	70
Baldor Motors	70
Cla-Val Check Valve	70
Goulds Model 3656, e-SV Pumps	70
Magelis HMI	70
Modicon M172	70
Square D Altivar VFD	70
Allen Bradley PowerFlex 523 VFD	70
Therm-Omega Tech Econo/HAT-RA	70
Warranty	71

Contents

eMVP™/MVP™ Pressure Booster Systems are shipped with:

- eMVP™/MVP™ Installation Guide
- Startup Checklist
- Controller Instructions
- Schneider Altivar 212 / Allen Bradley PowerFlex 523 Modified Parameter Tables
- Typical 208 and 460 VAC Wiring Diagrams

These materials are sufficient for most startups. For more complete information on particular components, the following reference documents (as well as the ones shipped with the unit) are available at <http://www.hyfabco.com/index.cfm?sp=boosters>. If unable to view or print these documents, printed copies may be requested from the submittal department of the James M. Pleasants Company by calling 800-365-9010. Please specify requested document numbers when calling.

Description and Specifications

The MVP pumps are modified Goulds 3656 series single stage, end-suction, centrifugal pumps. The eMVP pumps are modified Goulds eSV series multistage pumps.

Pump impellers are fully enclosed, key driven and held in position by an impeller bolt and washer. Casings are full volute in design with replaceable wear rings.

Depending on the pump size, the pump suction and discharge connections will be threaded or flanged. Shafts are protected with stainless steel shaft sleeves.

Close-coupled units have NEMA Premium Efficient JM or JP motors with C-face mounting and key driven shaft extension.

Nameplate

Located on every pump station is a nameplate that details information about the pump station. The nameplate is located on the side of the controller cabinet. When contacting the manufacturer, please detail:

- Model Size
- Serial Number
- Item numbers for applicable parts

Engineering Data

Maximum Liquid Temperature:

250° F (120° C) – Standard Viton Seal

Maximum Working Pressure (Fluid Temperature Dependent):

- NPT connections, 200 PSI (1379 kPa)
- 125# ANSI flanged connections, 200 PSI (1379 kPa)

Maximum Suction Pressure: 100 PSI (689.5 kPa)

Starts per Hour: 20, evenly distributed

Pump Suction: 2" (Standard MVP), 3" NPT (MVP, 7-Series), 1.25" to 4", 125#, 250# Flange (eMVP)

Pump Discharge: 1.5" NPT (Standard MVP), 2.5" NPT (MVP, 7-Series), 1.25" to 4", 125#, 250# Flange (eMVP)

Pump Safety Instructions



Important: Read all safety information prior to installation of the eMVP/MVP.

TO AVOID SERIOUS OR FATAL PERSONAL INJURY OR MAJOR PROPERTY DAMAGE, READ AND FOLLOW ALL SAFETY INSTRUCTIONS IN THE MANUAL AND ON THE PUMP.



This is a **SAFETY ALERT SYMBOL**. When you see this symbol on the pump or in the manual, look for one of the following signal words and be alert to the potential for personal injury or property damage.



Warns of hazards that **WILL** cause serious personal injury, death or major property damage.



Warns of hazards that **CAN** cause serious personal injury, death or major property damage.



Warns of hazards that **CAN** cause personal injury or property damage.

NOTICE: INDICATES SPECIAL INSTRUCTIONS WHICH ARE VERY IMPORTANT AND MUST BE FOLLOWED.

THIS MANUAL IS INTENDED TO ASSIST IN THE INSTALLATION AND OPERATION OF THIS UNIT. THOROUGHLY REVIEW ALL INSTRUCTIONS AND WARNINGS PRIOR TO PERFORMING ANY WORK ON THIS PUMP.

MAINTAIN ALL SAFETY DECALS.



UNIT NOT DESIGNED FOR USE WITH HAZARDOUS LIQUIDS OR FLAMMABLE GASES.

NOTICE: INSPECT UNIT FOR DAMAGE AND REPORT ALL DAMAGE TO CARRIER IMMEDIATELY.

NOTICE: All operating instructions must be read, understood and followed by the operating personnel. HYFAB accepts no liability for damages or operating disorders which are the result of non-compliance with the operating instructions.

User Safety

Personal Safety

In any situation:

- Keep the work area clean and free from any potential hazards.
- Be mindful of the potential risks for injuries related to burns, electric shocks, toxic fluids, and hazardous pressure.
- Be mindful of hazardous voltage and avoid all electrical hazards.
- Be mindful of the risks associated with gas and vapors in the workplace.

Safety Equipment

Personal safety equipment must be worn and used to all applicable standards/regulations. The following safety equipment is recommended in the workplace:

- Fully stocked first-aid kits
- Protective goggles with side shields attached
- Hearing protection
- Sturdy protective gloves
- Sturdy steel-toed shoes
- Sturdy hard hat
- Safety devices
- Gas masks

Workplace Safety

When working on the eMVP/MVP, or nearby, be mindful of the following safety precautions:

- Always work with others nearby. Do not work alone.
- Be mindful of and stay away from suspended loads.
- If the eMVP/MVP is in automatic operation, be mindful of the potential risk of a sudden start.
- Use an appropriate lifting device when positioning the MVP/eMVP.
- Wear appropriate protective clothing.
- If pump disassembly is required, clean and sufficiently rinse the components with potable water prior to reassembly.
- Do not operate equipment unless all safety guards are in place
- While the system is pressurized and/or energized, do not open any vents or drains or remove any plugs. System must be isolated electrically and mechanically with all pressure relieved prior to any disassembly. Isolate the pump from the system and relieve the pressure before disassembling the pump, removing plugs, or disconnecting piping.
- Care should be taken to ensure that equipment is NOT operated at pressures above the pump or other system components' listed maximum operating pressure.

Washing the skin and eyes

If chemicals or hazardous fluids come into contact with the skin or eyes:

Chemicals/Hazardous fluids on skin

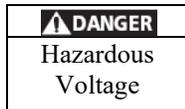
- Take off contaminated clothing.
- Wash skin with soap and water for at least one minute.
- If necessary, seek medical attention.
-

Chemicals/Hazardous fluids in eyes

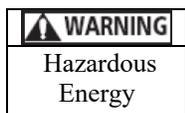
- Hold eyelids open with fingers.
- Rinse eyes with eyewash or running water for at least fifteen minutes.
- Seek medical attention.

Start-Up

1. This manual is intended to assist in the installation, operation and maintenance of the system and must be kept with the system or at a readily accessible location.
2. Installation and maintenance **MUST** be performed by properly trained and qualified personnel.
3. Review all instructions and warnings prior to performing any work on the system.



4. The system **MUST** be disconnected from the main power supply before attempting any operation or maintenance on the electrical or mechanical part of the system. Failure to disconnect electrical power before attempting any operation or maintenance can result in electrical shock, burns or death.



5. Anytime power is applied to unit, the motor and pump could start unexpectedly and cause serious injury.



6. Do not operate at pressure(s) above fixture/component pressure ratings.

7. Always follow local, state or provincial codes for plumbing and electrical safety.

System Components

Review the eMVP/MVP components and ensure that all parts are present and that the installer is familiar with their names. Inspect all components for shipping damage.

eMVP:

- Goulds eSV Series Multistage Pump (Including Dry Run Sensor [Optional])
- Suction Header (Including Electronic Suction Pressure Transmitter & Gauge)
- Discharge Header (Including Electronic Discharge Pressure Transmitter & Gauge)
- Frame
- Check Valve (Including Electronic Temperature Probe)
- 460V/208V Control Panel
- 460V/208V Variable Frequency Drives

MVP:

- Goulds 3656 series single stage pump
- Suction Header (Including Electronic Suction Pressure Transmitter & Gauge)
- Discharge Header (Including Electronic Discharge Pressure Transmitter & Gauge)
- Frame
- Check Valve (Including Electronic Temperature Probe)
- 460V/208V Control Panel
- 460V/208V Variable Frequency Drives

CAUTION

Any exposed metal in the system piping, including transducer case, must be grounded to the service entrance per NFPA 70: National Electrical Code, Article 250.

WARNING

DO NOT power the unit or run the pump until all electrical and plumbing connections, especially the pressure transmitter connection, are completed. Do not run the pump dry. All electrical work must be performed by a qualified technician. Always follow the National Electrical Code (NEC), or the Canadian Electrical Code (CEC) as well as all local, state and provincial codes. Code questions should be directed to the local electrical inspector. Failure to follow electrical codes and OSHA safety guidelines may result in personal injury or equipment damage. Failure to follow manufacturer's installation instructions may result in electrical shock, fire hazard, personal injury, death, damage to equipment, unsatisfactory performance and may void the manufacturer's warranty.

Storage

Delivery Inspection

Package Inspection

- Ensure that there are no missing or damaged items at delivery.
- If missing or damaged items are discovered, note on the receipt and freight bill.
- If there is a problem, file a claim with the shipping company.

Unit Inspection

- Remove and dispose of all packing materials in accordance with local regulations.
- Inspect for any missing or damaged parts.
- Unfasten the eMVP/MVP from its restraints by removing any screws, bolts, or straps present. Be careful when handling nails or straps.
- If anything is out of order, contact your sales representative.

NOTICE: Instructions and information supplied with the eMVP/MVP are only relevant to the eMVP/MVP. Equipment and other accessories not part of the eMVP/MVP that are offered separately by other manufacturers must be handled according to those manufacturer's recommendations and instructions for storage and usage. For the purposes of this manual, storage lasting thirty days or more is considered long term.

Safety

- Store in a hazard-free location that poses no potential dangers to workers or others that may enter the area.
- Handle safely upon arrival and during subsequent transportation.
- Store the MVP/eMVP on a level and stable surface that can bear the equipment weight. Do not stack or store in a manner that could lead to the equipment tipping or falling.

Location and Treatment

Indoor Storage

- Store in an environment with stable temperatures between 35°F and 104°F.
- Keep out of direct sunlight.
- Protect from dirt and dust.
- Ensure that there is no moisture build-up:
 - Properly ventilate
 - Tightly seal with desiccant
- In humid or dusty conditions, care for the eMVP/MVP as if it were stored outdoors.
- If storing in a condensing environment, coat steel or cast-iron surfaces with rust-inhibiting oil.
- Isolate stored equipment from other equipment and minimize exposure to vibration.
- All equipment piping openings should be covered during storage.

Outdoor Storage

- Protect from the elements and direct sunlight by securely covering.
- Ensure that coverings are safely secured from potential high winds.
- Cover securely such that moisture is unable to build up underneath the cover.
 - Properly ventilate
 - Tightly seal with desiccant
- All water should be drained from equipment prior to outdoor storage to prevent damage to equipment.
- Inspect the storage area weekly.
- Inspect the storage area after strong weather, inspecting covers for any damage.
- Inspect suction and discharge manifold flange covers.

Installed, But Not in Service

- Tightly close suction and discharge valves.
- Remove water from all pumps and piping. Completely dry the interior of all pumps and piping.
- Examine external steel or cast-iron surfaces for moisture build-up every thirty days and maintain corrosion inhibitors during inspection.

Equipment Protection

- Pumps
 - Rotate the pump and motor shaft by hand at least ten times every thirty days to prevent the potential for binding and bearing damage. Rest the shaft in different positions.
 - If tools are required to rotate pump and motor, do so carefully to ensure that shaft is not damaged.
 - If the coupling guard is removed during hand-rotation of the pump or motor shafts, make sure that it is reinstalled before removing any safety tagging, lockouts, or starting the equipment.
- Control Panel, VFDs, and other electronics
 - If any electronic materials are stored for more than ninety days, insert moisture absorbing packets within the enclosed space. Replace the packets when necessary. Remove packets before starting up any equipment.
- Package Enclosures
 - Seal any housing vents and/or openings with plastic wrap and waterproof tape.
 - Protect against condensation.

Preparation for Operation

- Remove rust inhibitors from all machine surfaces.
- Remove all corrosion protective materials.
- Remove flange covers, tape, and any unnecessary piping plugs.

eMVP/MVP Installation Guide

Purpose

This manual is provided to present some of the standard ways to install, operate and maintain this equipment. Read this manual before start-up, or performing maintenance on the unit. Also, refer to this guide for basic troubleshooting procedures and factory support information.

Operating Conditions

Standard units are designed for indoor installation in spaces with temperatures between 35°F and 104°F and humidity levels below 95%, non-condensing. Installation in conditions outside this range may result in unsatisfactory equipment performance and loss of warranty coverage.

Location

Unit installation location should allow for ease of inspection, maintenance and service to all equipment components.

Leveling

Unit must be leveled and anchored to structure, A base 2.5 times the weight of the booster unit is recommended. Consult submittal data for unit weight. In noise-sensitive areas, consult a sound specialist for the base and anchor design.

WARNING: UNIT PIPING CONNECTIONS SHOULD BE COMPLETED BY A COMPETENT AND LICENSED PLUMBER IN COMPLIANCE WITH LOCAL CODES. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN SERIOUS PERSONAL INJURY, DEATH AND/OR PROPERTY DAMAGE.

Piping

Inlet and outlet connection may be made on either end of the inlet and discharge header. Standard connections are 4" grooved and require grooved couplings not supplied by HYFAB. Other sizes and connectors such as copper adapters, flange adapters and flexible connectors are available from HYFAB as options. Piping must be supported such that the weight of connected piping is not transferred to the booster package.

- Connect inlet piping. Consult grooved coupling instructions for connection details. If an inlet reduction is required, an eccentric reducer must be installed flat on top to prevent air trapping.
- Connect discharge piping. Consult grooved coupling instructions for connection details. If an outlet reduction is required, an eccentric reducer must be installed flat on top to prevent air trapping.
- Thermal relief valve discharge piping (1/2" O.D. copper) should be routed to a safe location. This piping may discharge hot water in event of a temperature build-up.

Lubrication

All pumps and motors should be lubricated before running equipment.

Wiring

WARNING: UNIT ELECTRICAL CONNECTIONS MUST BE COMPLETED BY A COMPETENT AND LICENSED ELECTRICIAN IN COMPLIANCE WITH NEC AND LOCAL CODE REQUIREMENTS. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN SERIOUS PERSONAL INJURY, DEATH AND/OR PROPERTY DAMAGE.

Verify that supply voltage and ampacity available are consistent with package requirements.

Connect power and ground unit per wiring diagram supplied with unit.

eMVP/MVP Installation Checklist

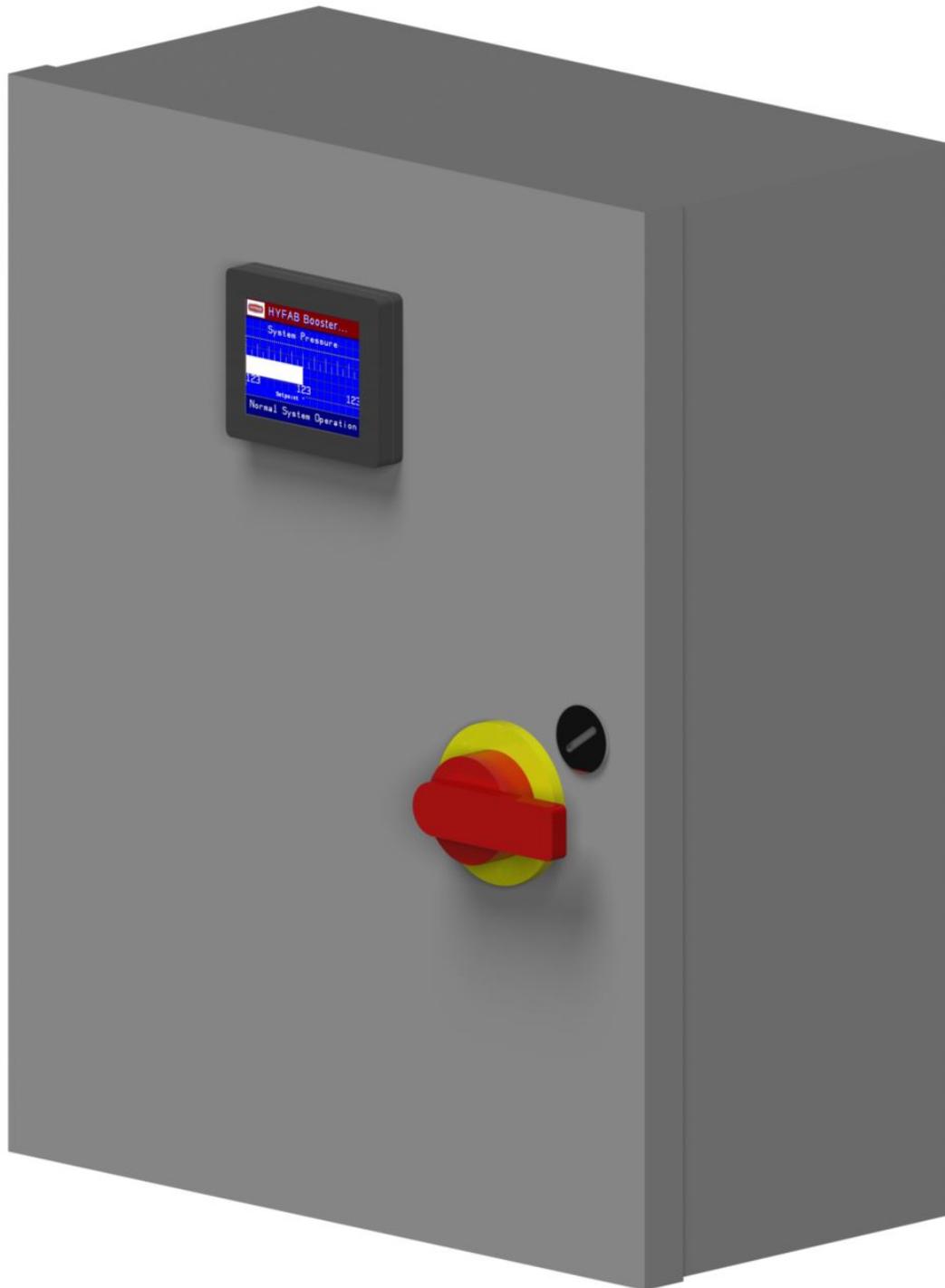
	Y	N	N/A	
1	_____	_____	_____	Standard units are designed for indoor installation in spaces with temperatures between 35°F and 104°F and humidity levels below 95%, non-condensing. Installation in conditions outside this range may result in unsatisfactory operation and loss of warranty coverage.
2	_____	_____	_____	Unit location should provide reasonable access for inspection, maintenance and service of all components.
3	_____	_____	_____	Unit must be leveled and anchored to structure. A base 2.5 times the weight of the booster unit is recommended. Consult submittal for unit weight. In noise sensitive areas, consult a sound specialist for the base and anchor design.
4	_____	_____	_____	WARNING: UNIT PIPING CONNECTIONS SHOULD BE COMPLETED BY A COMPETENT AND LICENSED PLUMBER IN COMPLIANCE WITH LOCAL CODES. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN SERIOUS PERSONAL INJURY, DEATH AND/OR PROPERTY DAMAGE.
5	_____	_____	_____	Inlet and outlet connection can be made on either end of the inlet and discharge header. Standard connections are 4" grooved and require grooved couplings not supplied by HYFAB. Other sizes and connectors such as copper adapters, flange adapters and flexible connectors are available from HYFAB as options. Piping must be supported such that the weight of connected piping is not transferred to the booster unit.
6	_____	_____	_____	Connect inlet piping. Consult grooved coupling instructions for connection details. If an inlet reduction is required, an eccentric reducer must be installed flat on top to prevent air trapping.
7	_____	_____	_____	Connect discharge piping. Consult grooved coupling instructions for connection details. If an outlet reduction is required, an eccentric reducer must be installed flat on top to prevent air trapping.
8	_____	_____	_____	Route thermal relief valve discharge piping (1/2" O.D. copper) to a safe location. This piping may discharge hot water in event of a temperature build-up.
9	_____	_____	_____	If used, pressurize the hydropneumatic tank with air to 90% of desired operating setpoint. Consult hydropneumatic installation instructions for details. HYFAB offers a discharge header cap option for a tank connection which includes a combination shutoff/drain valve. Do not open the shutoff valve to admit water into the tank before it is pressurized with air.
10	_____	_____	_____	WARNING: UNIT ELECTRICAL CONNECTIONS MUST BE COMPLETED BY A COMPETENT AND LICENSED ELECTRICIAN IN COMPLIANCE WITH NEC AND LOCAL CODE REQUIREMENTS. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN SERIOUS PERSONAL INJURY, DEATH AND/OR PROPERTY DAMAGE.
11	_____	_____	_____	Verify that available supply voltage and ampacity are consistent with package requirements.
12	_____	_____	_____	Connect power and ground unit per wiring diagram supplied with unit.

Sign when completed

Name

Date

3.5" Color Touchscreen



Controller Menu Structure

Main Menu
Status...
Alarms...
Configuration...
Reserved...*1

*1) "Temp Control..."
(When in HVAC mode
with temperature
controller configured)

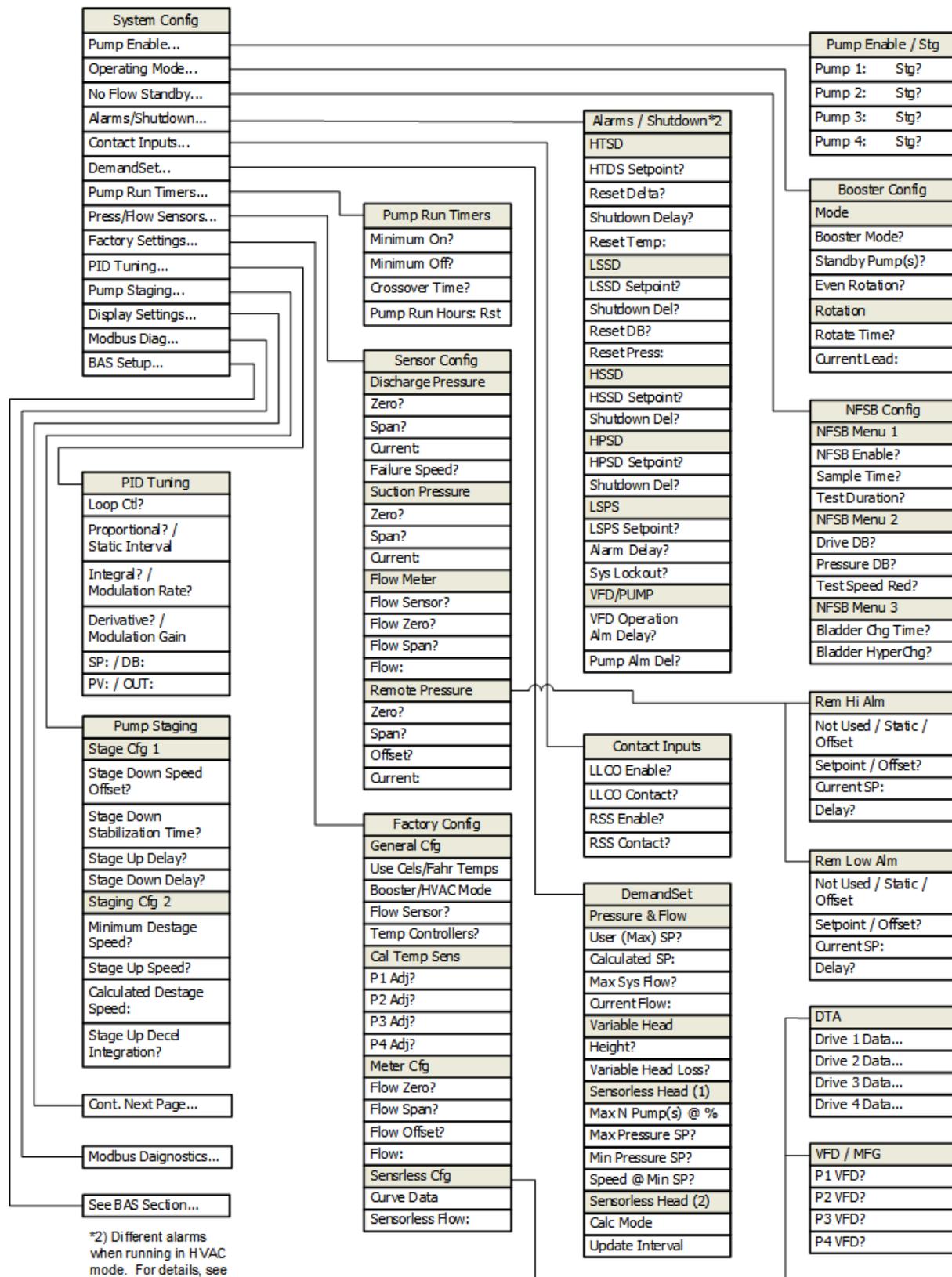
System Status
Discharge Pr:
Suction Pr:
Discharge Temp: / Remote Pr:
Meas / Calc Flow:
Sys Setpoint?
Restart %?
System Start:
Stage: / Pumps:
Pump 1:
Pump 2:
Pump 3:
Pump 4:
P1 Hours:
P2 Hours:
P3 Hours:
P4 Hours:
P1 Temperature:
P2 Temperature:
P3 Temperature:
P4 Temperature:

Alarm Menu
Alarm Summary...
Alarm History...
Alarm Reset

System Config
Pump Enable...
Operating Mode...
No Flow Standby...
Alarms/Shutdown...
Contact Inputs...
DemandSet...
Pump Run Timers...
Press/Flow Sensors...
Factory Settings...
PID Tuning...
Pump Staging...
Display Settings...
Modbus Diag...
BAS Setup...

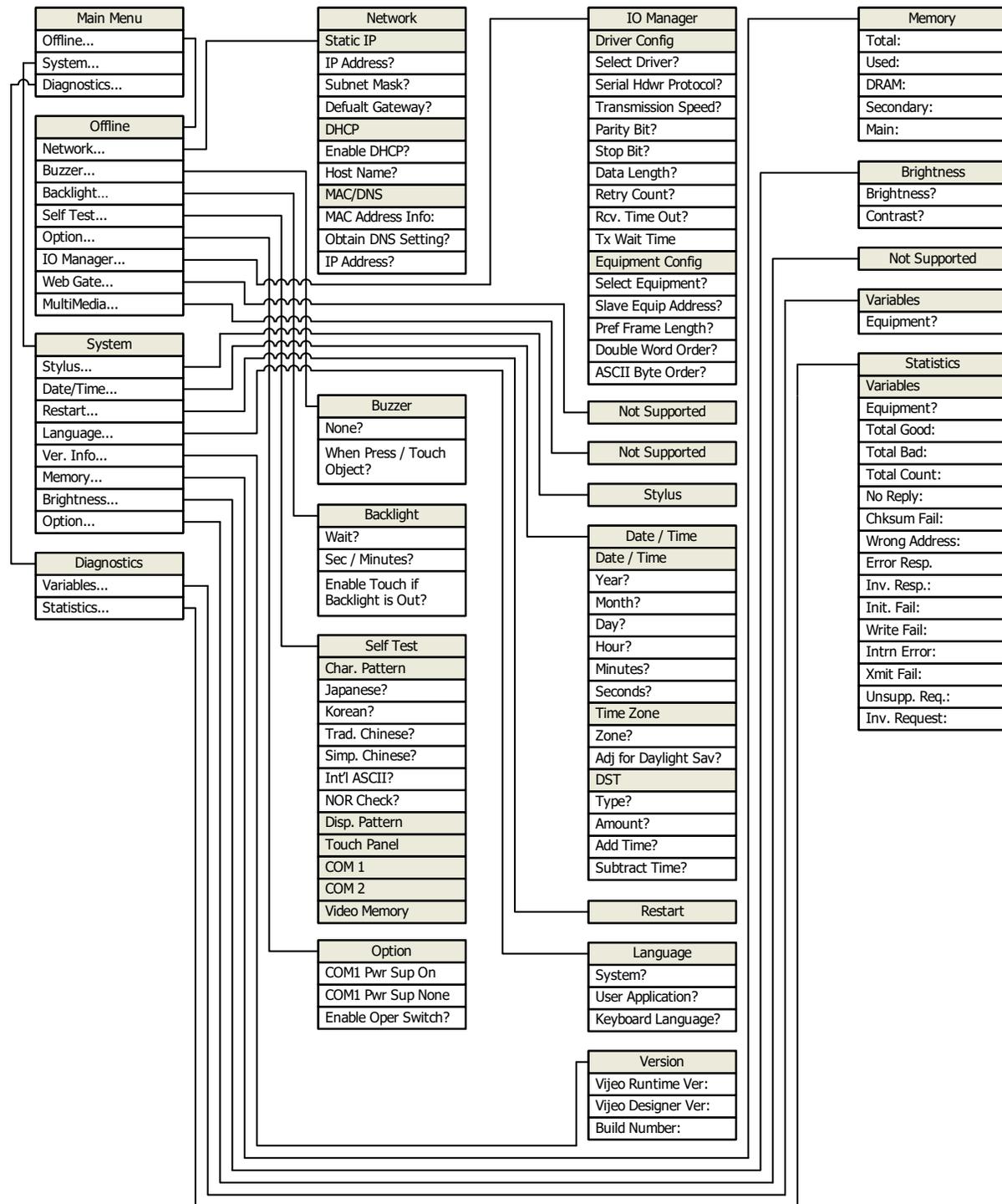
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Controller Menu Structure



*2) Different alarms when running in HVAC mode. For details, see HVAC controller IOM

Display Settings Menu Structure



Standard Variable Speed Control Panel Features

- U/L 508A Listed Industrial Control Panel
- Digital programmable logic pump controller (PLC) with door mounted 3.5” Touchscreen Interface with all parameters displayed in English
- Internally protected DC power supply for controls
- Flo-Check no demand shut down control logic
- Digital input for remote enable/disable
- Full color back-lit touchscreen with all parameters and pumping terminology in English
- Temperature sensor for each pump
- Door operated main power disconnect
- Automatic lead/lag pump alternation (equal size pumps required)
- Variable frequency drive (VFD) for each pump (mounted externally)
- Digital output for general alarm monitoring
- Motor circuit protector for each pump/VFD
- NEMA 1 enclosure
- Pump protection logic
- Single point power connection
- DemandSet Control

Standard Alarms

- Pump/VFD fault
- Low system pressure
- High and low suction pressure shutdown/alarm
- High and low discharge pressure shutdown/alarm
- High temperature shutdown/alarm
- Low water level shutdown/alarm (opt. sensor required)

Screen Indication Features

- Power on
- Pump out of service
- General Fault
- Pump/VFD Status
- System pressure
- Suction pressure
- Discharge temperature
- Pump elapsed run time
- Pump failure detection

Optional Features

- Audio Alarm with silencing button
- Low water level shutdown sensor
- NEMA 4 enclosure
- 5.7” full color touchscreen
- BACnet® MS/TP communication
- BACnet® /IP communication
- Modbus RTU / TCP communication

Sequence of Control

Pump(s) Start

The pump runs when the system pressure is less than the start pressure setpoint (adjustable % of setpoint) and no standby conditions exist. After the pump starts, it runs until a No Flow Standby (NFSB) condition is initiated.

Staging Control

The lead pump speed varies to maintain the system pressure setpoint via Proportionate Integral Derivative (PID) control of drive speed. If pressure cannot be maintained by the lead pump, the lag pump is started.

De-staging Control

When system demand can be met by a single pump and the lag pump minimum run timer is satisfied, the lag pump is stopped.

No Flow Standby (NFSB)

When the pump logic controller senses a no-flow condition for 120 seconds (adjustable) it will initiate a flow-check test. If the test confirms a no-flow condition, the lead pump will shut down and remain off until a start condition exists.

High Temperature Shutdown (HTSD)

The pump(s) will shut down if their respective discharge temperature exceeds 120°F (adjustable) for 60 seconds (adjustable). Reset will occur when the temperature falls 10°F (adjustable) below the shutdown setpoint. HTSD will occur regardless of the minimum run timer condition. A HTSD will activate the remote alarm relay. Setting the HTSD setpoint to zero will eliminate all references to pump temperature, including the display of temperature and HTSD alarming. A HTSD alarm condition activates the remote alarm contact.

Low Suction Pressure Shutdown (LSSD)

When suction pressure falls below the LSSD setpoint 10 psi (adjustable) for 15 seconds (adjustable) the pump(s) will shutdown. Reset will occur and pump(s) will restart when the pressure exceeds the LSSD setpoint by 5 PSI (adjustable). This function is independent of the minimum run timer condition. Setting the suction pressure transmitter span to 0 will disable this function and remove all references to suction pressure from the booster system control sequence. A LSSD will activate the remote alarm delay. This alarm will reset automatically when suction pressure rises above the LSSD setpoint for the selected timer duration. A LSSD alarm condition activates the remote alarm contact.

High Suction Pressure Shutdown (HSSD)

If the suction pressure remains above the HSSD setpoint 0 psi (adjustable) for 60 seconds (adjustable) the booster system will be shutdown and a HSSD alarm will be generated. Once the suction pressure falls below the HSSD setpoint, the HSSD alarm will be cleared and the booster system will be permitted to restart. A HSSD setpoint of 0 (default) locks out the HSSD feature. A HSSD alarm condition activates the remote alarm contact.

High Discharge Pressure Shutdown (HPSD)

If the discharge pressure remains above the HPSD setpoint 110 psi (adjustable) for 60 seconds (adjustable) the booster system will be shutdown and a HPSD alarm will be generated. The booster system will remain locked out until the HPSD alarm is manually reset via the booster operator interface. A HPSD alarm condition activates the remote alarm contact.

Low Supply Pressure Shutdown (LSPS)

If the discharge pressure remains below the LSPS setpoint 0 psi (adjustable) for 30 seconds (adjustable), a LSPS alarm will be generated. If the LSPS alarm is activated and the LSPS system lockout is enabled, the booster system will be shutdown. If a LSPS shutdown is activated, booster system will remain locked out until the LSPS alarm is manually reset via the booster operator interface. A LSPS setpoint of 0 (default) locks out the LSPS feature. A LSPS alarm condition activates the remote alarm contact.

Pump Failure Alarm (VFD/PUMP)

If a pump is commanded to start and fails to start within the pump alarm delay 10 sec (adjustable) time window as sensed by its VFD run contact, a pump alarm will be generated. If the lead pump fails to start, a lag pump will be started. A pump failure alarm condition activates the remote alarm contact. If a pump is NOT commanded to start and is sensed running for the VFD operation alarm delay 30 seconds (adjustable), a VFD in manual alarm will be generated. The VFD in manual alarm condition activates the remote alarm contact.

DemandSet Control

There are two options when configuring DemandSet

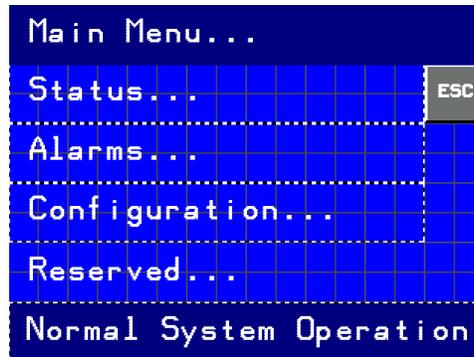
Option 1 – Sensorless Head (Available when no flow meter is configured) When no flow indication is present Sensorless Head DemandSet is configured by setting the maximum flow operating conditions at (Max (n) Pump(s) @ %). (n) = the number of pumps required and % = output speed. The maximum and minimum operating pressures and the minimum speed that the system achieves minimum pressure at no flow must be entered.

Option 2 – Variable Head (Available when a flow meter has been configured). For Variable Head DemandSet to be operational, flow indication via hardwired flow meter, or calculated flow must be present. Once flow indication has been established, Variable Head DemandSet can be configured. Variable Head DemandSet requires two user configured values: (1) Maximum system flow (2) variable system head via building height, or variable head loss.

Once DemandSet has been configured, the system pressure setpoint will be reset based on booster system demand. Booster will continuously monitor system flow (Option 2) or approximate flow based on speed (Option 1) and decrease the system pressure setpoint based on the calculated variable head loss between booster discharge and critical fixture.

Color Touchscreen Instructions

These instructions refer to the operation of the booster controller from the color touchscreen operator interface located on the outside front of the control cabinet.



A system status display band runs along the bottom of the screen. Various messages are displayed along this band including:

- Normal System Operation
- *** Remote Enable Off ***
- *** ALERT ***, Timed Rotation Now In Progress.
- *** ALERT ***, Bladder Tank Charging.
- Current System Alarm

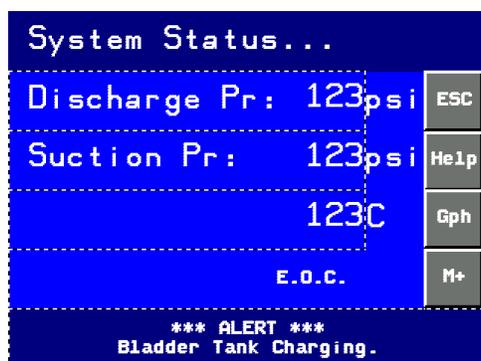
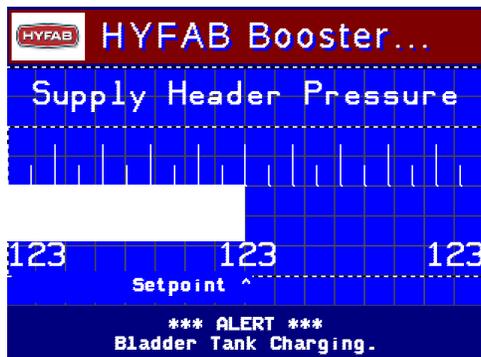
Current System Alarm

Current System Alarm is the only alert which requires attention. A blinking red message indicates that an alarm condition exists. If an alarm condition exists:

- The blinking Current System Alarm message functions as a menu button.
- Touch the alarm message to go directly to the alarm summary screen. All active system alarms are displayed here.
- Once the current alarms have been evaluated, press Esc to return to the alarm menu.
- From the alarm menu:
 - Alarms may be reset
 - The Alarm History can be accessed.

Default Screen

After 5 minutes of inactivity, the touchscreen will display a default screen containing a pressure meter with the system setpoint in the center and a range of -10 PSI to +10 PSI. Touch the default screen to return to the system status screen series.



System Status Screen

Esc Button

On the right side of the System Status screens are buttons used for navigating the graphic menu system. In the upper right corner is the Esc button. The Esc button opens the Main Menu or previously displayed screen.

Help Button

Directly below the Esc button is the Help button. Pressing the Help button displays the System Assistance screen. The System Assistance screen contains a scannable QR code that, when scanned, leads the user to support documentation including the relative IOM manual, wiring diagram, and various hardware support documentation. Also included is editable service contact information. The contact information may be edited via the password protected edit data button on the bottom of the screen. Current versions of the Touchscreen, Controller, Firmware and Time/Date settings are available via the Version Information button located at the bottom of the screen. The Help button is available on the common user screens.

Gph Button

Directly below the Esc button is the Gph button. Pressing the Gph button displays the default pressure meter screen. It is only visible on the System Status screens.

M+/M- Buttons**M+ Button**

In the lower right corner of the display is the M+ button. When visible, The M+ button indicates that another screen is available. Pressing the M+ button advances the display to the next screen.

M- Button

When visible, the M- button indicates the ability to return to the previous screen. Pressing the M- button returns the display to the previously viewed screen.

On the first System Status screen, touching the following headings will display their associated graph:

- Discharge Pressure
- Suction Pressure (if used)
- Discharge Temperature or Remote Pressure (if used)
- System Flow (if available)

The time range of the graph is displayed on the bottom line. Touching the time range toggles it between 2, 10 and 30 minutes.

System Variables

Most system variables for the application are set prior to the unit's shipment. Typically, the only variables that need to be adjusted are the setpoint and possibly the loop tuning parameters.

Setpoint

NOTICE: The system Setpoint is only available via the System Status screens.

1. If the default screen is displayed, touch the display to clear the default screen and display the System Status screen.
2. Once the System Status screen is displayed, press the M+ button once to display the Sys Setpoint: ###psi screen.
3. Touch the number ### to adjust the setpoint.
4. A numeric entry keypad will open on the display. Using the keypad, type in the new setpoint and press the enter button in the lower right corner.
5. After adjusting the setpoint and pressing the enter button, the user will be returned to the previous display and the new setpoint will be displayed.
6. The system start pressure will change accordingly.
 - Adjusting the restart % changes the system start pressure.
 - Press the M+ or M- keys to navigate through the status screen series.
 - If additional parameters in the attached table must be changed, press the Esc button.
 - The Esc button will display the controller's Main Menu where additional adjustments can be made.
 - The Main Menu matrix illustrates the menu system of the touchscreen. All system adjustments can be made from this menu.

Password

Most of the Configuration menu items require a password to change.

- When prompted for a password, the user name is 1 and the password is 1.
- Once the user name and password are entered, press the unlock button in the lower right corner of the password screen.
- Press the return button in the lower center of the password screen to return to the Configuration screens.

NOTICE: After 10 minutes of inactivity, the operator credentials time out and must be re-entered to make changes to the controller's configuration.

Menu Navigation

Using the Esc, M+, and M- buttons, the entire touchscreen menu system can be navigated.

Booster Starting & Running

The booster starts when the system pressure is less than the system start pressure and no shutdown conditions exist. After the booster starts, it runs for a minimum of 5 minutes. The pump will run longer if water usage is occurring in the system. Once water usage has stopped, the unit will run until the No Flow Stand By (NFSB) condition is achieved. As soon as water usage begins, the system will restart automatically.

Booster Interior Controller



NOTICE: These instructions are pertinent to the most recent model of the controller, Schneider Electric M172 Controller and Magelis STU HMI 655. Previous models include the Carel PCO XS Controller and the Schneider Electric M168 controllers displayed above. There may be discrepancies between the displays of the most recent model and older versions. Utilize these instructions accordingly. For information on the installation and operation of the Carel PCO XS Controller, or the Schneider M168 Controller, please contact HYFAB.

Schneider M172 Controller



The date and time must be set via the color operator interface on the front of the control panel. To set the date and time, navigate to the Display Settings menu via the System Config menu. The Date/Time are set via the display's System menu. The controller periodically polls the display and synchronizes its time to the display time. During power outages, the controller maintains the correct time and date via an onboard real-time clock with battery backup. During powerup, the display's clock is updated with the correct time from the controller's real-time clock.

NOTICE: To ensure accurate event time recordings, set the date and time on the controller as soon as possible after installation.

Booster Controller Navigation

Main Menu				
Menu Item	Variable	Default	Range	Field Value
Status:	<ul style="list-style-type: none"> Opens the System Status screen series 			
Alarms:	<ul style="list-style-type: none"> Opens the Alarm menu Displays current Alarms Summary and Alarm History Resets current alarms 			
Configuration:	<ul style="list-style-type: none"> Opens the system Configuration menu Password required to access all system parameters 			
Reserved.../ Temp Control...	<ul style="list-style-type: none"> When operating in Booster Mode, Reserved... is displayed. 			

System Status				
Menu Item	Variable	Default	Range	Field Value
Discharge Pr:	<ul style="list-style-type: none"> Displays current system Discharge Pressure Touching text activates the graph function 		0 to 999	
Suction Pr:	<ul style="list-style-type: none"> Displays current system Suction Pressure, if configured Touching text activates the graph function 		0 to 999	
Discharge Temp:/ Remote Pr:	<ul style="list-style-type: none"> Displays highest temperature reading of installed temperature sensors, or remote system pressure, if used 			
Meas/Calc Flow:	<ul style="list-style-type: none"> Total flow Will read 'Meas Flow' if hardwired flow meter used Will read 'Calc Flow' if sensorless flow is being used 		0 to 9999	
Sys Setpoint:	<ul style="list-style-type: none"> System Discharge Pressure Setpoint 	50	0 to 999	
Restart %:	<ul style="list-style-type: none"> Minimum percentage of system pressure setpoint required for system restart 	90	0 to 99	
System Start:	<ul style="list-style-type: none"> Displays Calculated System Start Pressure Based on System Setpoint and Restart % 		0 to 999	
Stage: Pumps:	<ul style="list-style-type: none"> Displays the number of stages called for and the number of pumps running 			
Pump 1:	<ul style="list-style-type: none"> Displays pump status and % of full speed 			
Pump 2:	<ul style="list-style-type: none"> Visible only in Dplx, Tplx, or Qplx modes Displays pump status and % of full speed 			
Pump 3:	<ul style="list-style-type: none"> Visible only in Tplx or Qplx modes Displays pump status and % of full speed 			
Pump 4:	<ul style="list-style-type: none"> Visible only in Qplx mode Displays pump status and % of full speed 			
P1 Hours:	<ul style="list-style-type: none"> Total pump run hours 			
P2 Hours:	<ul style="list-style-type: none"> Visible only in Dplx, Tplx, or Qplx modes Total pump run hours 			
P3 Hours:	<ul style="list-style-type: none"> Visible only in Tplx or Qplx modes Total pump run hours 			

System Status Continued				
Menu Item	Variable	Default	Range	Field Value
P4 Hours:	<ul style="list-style-type: none"> Visible only in Qplx mode Total pump run hours 			
P1 Temperature:	<ul style="list-style-type: none"> Pump discharge temperature 			
P2 Temperature:	<ul style="list-style-type: none"> Visible only in Dplx, Tplx, or Qplx modes Pump discharge temperature 			
P3 Temperature:	<ul style="list-style-type: none"> Visible only in Tplx or Qplx modes Pump discharge temperature 			
P4 Temperature:	<ul style="list-style-type: none"> Visible only in Qplx mode Pump discharge temperature 			

Alarms				
Menu Item	Variable	Default	Range	Field Value
Alarm Summary:	<ul style="list-style-type: none"> Opens the Alarm Summary screen Contains a summary of all active alarms 			
Alarm History:	<ul style="list-style-type: none"> Opens the Alarm History screen Contains the last 100 alarm events 			
Alarm Reset:	<ul style="list-style-type: none"> Resets current alarms Press and hold one second then release 			

Configuration				
Menu Item	Variable	Default	Range	Field Value
Pump Enable:	<ul style="list-style-type: none"> Opens the Pump Enable/Stg configuration screen Enables or disables individual pumps Sets the fixed rotation sequence number of the pumps, if fixed rotation has been selected 			
Operating Mode:	<ul style="list-style-type: none"> Opens the Booster Config screen series Selects the number of booster pumps (1-4) by setting to Splx, Dplx, Tplx, or Qplx Defines the standby and rotation sequences 			
No Flow Standby: (NFSB)	<ul style="list-style-type: none"> Opens the NFSB Config screen series NFSB Puts the booster in standby mode when there is no system demand 			
Alarms/Shutdown:	<ul style="list-style-type: none"> Opens the Alarms/System Shutdown screens Configures HTSD, LSSD, HSSD, HPSD, LSPS, VFD/PUMP shutdown/alarms 			
Contact Inputs:	<ul style="list-style-type: none"> Opens the Contact Inputs screen Enables and configures LLCO and RSS inputs 			
DemandSet:	<ul style="list-style-type: none"> Opens the DemandSet Configuration screens Adjusts the booster supply setpoint based on measured or calculated flow 			

Configuration Continued				
Menu Item	Variable	Default	Range	Field Value
Pump Run Timers:	<ul style="list-style-type: none"> Opens the Pump Run Timers screen Sets the minimum on, minimum off and crossover times Resets the pump run hours 			
Pressure/Flow Sensors:	<ul style="list-style-type: none"> Opens the Sensor Config screen series Configures the Discharge Pressure, Suction Pressure, Flow Meter, & Remote Pressure sensors 			
Factory Settings:	<ul style="list-style-type: none"> Opens the Factory Config screen series Sets the temperature sensor calibration and units Selects flow devices & factory parameters 			
PID Tuning:	<ul style="list-style-type: none"> Opens the PID Tuning screen Sets the pump speed response to system pressure 			
Pump Staging:	<ul style="list-style-type: none"> Opens the Pump Staging screen series Sets the system parameters that control when the system starts and stops additional pumps <p>NOTICE: These parameters can be viewed, but require a high-level password to modify.</p>			
Display Settings:	<ul style="list-style-type: none"> TIME AND DATE are SET HERE Opens the Controller Display screens Offline/System/Diagnostics menus 			
Modbus Diagnostics	<ul style="list-style-type: none"> Provides communication diagnostics for the VFD communication bus The VFD communication bus is only used when sensorless flow data is required 			
BAS Setup (Only visible if BMS communication module installed)	<ul style="list-style-type: none"> Opens BAS setup screens. The BAS Setup menu option will only be available if BAS connectivity was purchased. If BAS connectivity is required and this menu option is not visible, contact your booster provider. BAS modules can be purchased and added to the controller in the field. For more details see the BAS Setup section. 			

Pump Enable				
Menu Item	Variable	Default	Range	Field Value
Pump 1: Stg:	<ul style="list-style-type: none"> Enabled / Disabled – Stg # 	Ena - 1	Ena/Dis – 1-4	
Pump 2: Stg:	<ul style="list-style-type: none"> Visible only in Dplx, Tplx, or Qplx modes Enabled / Disabled – Stg # 	Ena - 2	Ena/Dis – 1-4	
Pump 3: Stg:	<ul style="list-style-type: none"> Visible only in Tplx or Qplx modes Enabled / Disabled – Stg # 	Ena - 3	Ena/Dis – 1-4	
Pump 4: Stg:	<ul style="list-style-type: none"> Visible only in Qplx mode Enabled / Disabled – Stg # 	Ena - 4	Ena/Dis – 1-4	

Operating Mode				
Menu Item	Variable	Default	Range	Field Value
Booster Mode:	<ul style="list-style-type: none"> • The mode for the package: <ul style="list-style-type: none"> ○ Splx=1 pump (Simplex) ○ Dplx=2 pumps (Duplex) ○ Tplx=3 pumps (Triplex) ○ Qplx=4 pumps (Quadplex) 	Splx	Splx to Qplx	
Standby Pump(s):	<ul style="list-style-type: none"> • Not visible/applicable in Simplex mode • Assigns standby pump(s) in multiple pump systems 	0	0 – No. of System Pumps	
Even Rotation:	<ul style="list-style-type: none"> • Not visible/applicable in Simplex mode • Enables the rotation of pump(s) based on run hours • Enabled prior to shipping 	No	No/Yes	
Rotate Time:	<ul style="list-style-type: none"> • Not visible/applicable if Even Rotation set to No. • Details the amount of time in hours the system will run before a pump rotation can be made automatically 	60	1 to 999	
Current Lead:	<ul style="list-style-type: none"> • Indicates which pump is currently selected for the lead by the controller • Changes with each unit cycle, if rotation is enabled above 		1 to 4	

(NFSB) No Flow Standby				
Menu Item	Variable	Default	Range	Field Value
NFSB Enable? (NFSB Menu 1)	<ul style="list-style-type: none"> • Enables or Disables No Flow Standby • None of the following No Flow Standby variables are visible if NFSB is disabled 	Yes	Yes/No	
Sample Time? (NFSB Menu 1)	<ul style="list-style-type: none"> • The amount of time in seconds the drive speed will be steady prior to the unit entering a NFSB sequence 	120	1 to 999	
Test Duration? (NFSB Menu 1)	<ul style="list-style-type: none"> • The amount of time in seconds the controller tests the NFSB sequence variables for verification 	5	2 to 30	
Drive DB? (NFSB Menu 2)	<ul style="list-style-type: none"> • Dead Band speed range the drive must operate within to initiate a No Flow Shutdown Test 	0.5	00.0 to 99.9	
Pressure DB? (NFSB Menu 2)	<ul style="list-style-type: none"> • Dead Band pressure range the system must operate within during No Flow Shutdown test to enter No Flow Shutdown Mode 	3	1 to 20	
Test Speed Reduction? (NFSB Menu 2)	<ul style="list-style-type: none"> • Amount the pump speed is reduced during the No Flow Shutdown test 	5.0	-99.9 to 99.9	
Bladder Tank Charge Time? (NFSB Menu 3)	<ul style="list-style-type: none"> • The amount of time that the booster runs (in seconds) with the HyperCharge setpoint prior to shutting down under No Flow StandBy 	10	0 to 999	
Bladder Tank HyperCharge? (NFSB Menu 3)	<ul style="list-style-type: none"> • The pressure setpoint adder that the booster operates at prior to shutting down under No Flow StandBy 	0	0 to 20	

Alarms/Shutdown				
Menu Item	Variable	Default	Range	Field Value
Setpoint? (HTSD)	<ul style="list-style-type: none"> High Temperature Shutdown Temperature The maximum discharge temperature that the system may reach prior to shutdown System will start again once this value falls below the HTSD setting by the amount of the High Temp Shutdown Reset Delta 	120° F	0 to 200° F	
Reset Delta? (HTSD)	<ul style="list-style-type: none"> High temperature reset delta The amount of discharge temperature decrease the controller must realize prior to restarting the unit 	10° F	5 to 100° F	
Shutdown Del? (HTSD)	<ul style="list-style-type: none"> Number of seconds the high temperature setpoint must be realized before the unit shuts down 	15	2 to 30	
Reset Temp: (HTSD)	<ul style="list-style-type: none"> Calculated temperature the system will reach prior to restart 			
LSSD Setpoint? (LSSD)	<ul style="list-style-type: none"> Low Suction Shutdown Pressure limit Suction pressure below this setting will cause the unit to shut down 	10	-15 to 999	
Shutdown Del? (LSSD)	<ul style="list-style-type: none"> The time in seconds that low suction pressure is allowed before alarm occurs 	15	0 to 60	
Reset DB? (LSSD)	<ul style="list-style-type: none"> The Low Suction Pressure Reset Pressure differential in PSI LSSD setpoint must be exceeded by this amount for the unit to restart 	5	1 to 99	
Reset Pressure: (LSSD)	<ul style="list-style-type: none"> The calculated suction pressure required for system to restart 			
HSSD Setpoint? (HSSD)	<ul style="list-style-type: none"> High Suction Shutdown Setpoint Suction pressure above this setting will cause to unit to shut down. A HSSD setpoint of zero disables this feature 	0	0 to 999	
Shutdown Del? (HSSD)	<ul style="list-style-type: none"> The time in seconds that high suction pressure is allowed before alarm occurs 	60	0 to 999	
HPSD Setpoint? (HPSD)	<ul style="list-style-type: none"> High System Shutdown Pressure Sets the maximum discharge pressure the system may reach prior to shutdown System requires a manual reset for this condition 	110	0 to 999	
Shutdown Del? (HPSD)	<ul style="list-style-type: none"> Time delay in seconds that the high system shutdown pressure is realized and sustained until the system shuts down 	60	0 to 999	

Alarms/Shutdown Continued				
Menu Item	Variable	Default	Range	Field Value
LSPS Setpoint? (LSPS)	<ul style="list-style-type: none"> Low Supply Pressure Shutdown Sets the minimum discharge pressure the system may discharge prior to triggering an alarm event A LSPS setpoint of zero disables this feature 	0	0 to 999	
Delay? (LSPS)	<ul style="list-style-type: none"> The time in seconds that low supply pressure is allowed before alarm occurs 	30	0 to 999	
Sys Lockout? (LSPS)	<ul style="list-style-type: none"> If Enabled, this will stop the booster on a LSPS event and prevent the booster from restarting until the LSPS alarm is manually reset 	Disabled	Disabled / Enabled	
VFD Operation Alm Delay? (VFD/PUMP)	<ul style="list-style-type: none"> Time in seconds that a VFD can run while not commanded to before a VFD in Manual Operation Alarm is generated 	30	0 to 999	
Pump Alm Del? (VFD/PUMP)	<ul style="list-style-type: none"> Time in seconds that a VFD can be commanded to operate and not return an ON status before a Pump Failure Alarm is generated 	5	0 to 999	

Contact Inputs				
Menu Item	Variable	Default	Range	Field Value
LLCO Enable?	<ul style="list-style-type: none"> Enables the Low Level Cutout function if enabled. Utilized for low water cutoff when pumping water from a vessel 	No	No/Yes	
LLCO Contact?	<ul style="list-style-type: none"> Low Level Cutout Operation 	N.O.	N.O./N.C.	
RSS Enable?	<ul style="list-style-type: none"> Enables Remote Start/Stop Function if enabled 	No	No/Yes	
RSS Contact?	<ul style="list-style-type: none"> Remote Enable Operation 	N.O.	N.O./N.C.	

DemandSet				
Menu Item	Variable	Default	Range	Field Value
User SP: (Pressure & Flow)	<ul style="list-style-type: none"> The User Setpoint Here for reference purposes only, but can be adjusted The user setpoint can be adjusted via the Status menu 	50	0 to 999	
Calculated SP: (Pressure & Flow)	<ul style="list-style-type: none"> The DemandSet Setpoint Displays the working setpoint of the booster The DemandSet setpoint is calculated using Max Sys Flow and Variable Head Cfg When actual system flow is at or above Max Sys Flow, the DemandSet SP will equal the User SP As actual system flow falls below Max Sys Flow, the system variable head is used to calculate a lower DemandSet SP 		0 to 999	
Max Sys Flow? (Pressure & Flow)	<ul style="list-style-type: none"> Only available when system flow is available via hardwired flow meter or sensorless calculation The highest anticipated flow the system is expected to deliver (usually design flow) 	0	0 to 9999	
Current Flow: (Pressure & Flow)	<ul style="list-style-type: none"> Only available when system flow is available via hardwired flow meter or sensorless calculation Current system flow from hardwired flow meter or sensorless flow calculation 		0 to 9999	
Height? (Variable Head)	<ul style="list-style-type: none"> Only available when system flow is available via hardwired flow meter or sensorless calculation Height of building in feet, or longest pipe run 	0	0 to 9999	
Variable Head Loss? (Variable Head)	<ul style="list-style-type: none"> Only available when system flow is available via hardwired flow meter or sensorless calculation Actual System Variable Head Loss If this variable is set to a value other than zero, it will be used to calculate the DemandSet SP regardless of the Height setting 	0	0 to 999	
Max N Pump(s) @ % (Sensorless Head (1))	<ul style="list-style-type: none"> Only available when system flow is NOT available Set max number of pumps and system speed required to meet design conditions 	1 & 80%	1 to 4 & 20% to 100%	
Max Pressure SP? (Sensorless Head (1))	<ul style="list-style-type: none"> Only available when system flow is NOT available Set maximum pressure required to meet design flow 	50	0 to 999	
Min Pressure SP? (Sensorless Head (1))	<ul style="list-style-type: none"> Only available when system flow is NOT available Set minimum pressure required – control head at zero flow 	0	0 to 999	

DemandSet Continued				
Menu Item	Variable	Default	Range	Field Value
Calc Mode (Sensorless Head (2))	<ul style="list-style-type: none"> Set control curve from 100% Quadratic to 100% Linear in 20% increments 	100% Linear	0% to 100%	
Update Interval (Sensorless Head (2))	<ul style="list-style-type: none"> Set the setpoint update interval 	2.0	0.1 – 999.9	

Pump Run Timers				
Menu Item	Variable	Default	Range	Field Value
Minimum On?	<ul style="list-style-type: none"> Establishes pump minimum on time in seconds 	5	0 to 999	
Minimum Off?	<ul style="list-style-type: none"> Establishes pump minimum off time in seconds 	5	0 to 999	
Crossover Time?	<ul style="list-style-type: none"> Establishes the length of time in seconds that a pump selected to shut down stays on line so other pump(s) can stabilize For example, during lead swap 	10	0 to 999	
Reset Pump Run Hours	<ul style="list-style-type: none"> Resets pump hours to zero 			

Pressure/Flow Sensors				
Menu Item	Variable	Default	Range	Field Value
Zero? (Discharge Pressure)	<ul style="list-style-type: none"> System Pressure Sensor Zero Sets the minimum pressure of the discharge pressure transducer in PSIG 	0	-30 to 30	
Span? (Discharge Pressure)	<ul style="list-style-type: none"> System Pressure Sensor Span The span of the discharge pressure transducer in PSIG 	300	0 to 999	
Current: (Discharge Pressure)	<ul style="list-style-type: none"> Displays the current discharge pressure reading 			
Failure Speed? (Discharge Pressure)	<ul style="list-style-type: none"> Speed the system will operate the pumps in the event of a discharge pressure transducer failure 	50	20 to 100	
Zero? (Suction Pressure)	<ul style="list-style-type: none"> Suction Pressure Sensor Zero Sets the minimum pressure of the suction pressure transducer in PSIG 	0	-30 to 30	
Span? (Suction Pressure)	<ul style="list-style-type: none"> Suction Pressure Sensor Span The span of the suction pressure transducer in PSIG Setting span to zero removes suction pressure from alarm routines and display 	300	0 to 999	
Current: (Suction Pressure)	<ul style="list-style-type: none"> Displays the current suction pressure reading 			
Flow Sensor? (Flow Meter)	<ul style="list-style-type: none"> Enables booster flow feature Selection of Meter enables hardwired meter interaction with booster system Once the Meter selection has been made the 4-20mA input hardware alarm is enabled for the flow meter input If Meter has been selected, Absence of flowmeter will cause a hardware failure alarm. Selection of Sensorless enables sensorless flow calculation interaction with booster system – This option only available on standard MVP boosters and typically enabled during factory setup Selection of Meter will override sensorless calculations 	No	No / Meter / Sensorless	
Flow Zero? (Flow Meter)	<ul style="list-style-type: none"> Hardwired flow meter zero 	0	0 to 999	
Flow Span? (Flow Meter)	<ul style="list-style-type: none"> Hardwired flow meter span 	0	0 to 9999	
Flow: (Flow Meter)	<ul style="list-style-type: none"> Displays the current hardwired flow meter reading 			

Pressure/Flow Sensors Continued				
Menu Item	Variable	Default	Range	Field Value
Zero? (Remote Pressure)	<ul style="list-style-type: none"> Remote pressure transmitter zero 	0	-30 to 30	
Span? (Remote Pressure)	<ul style="list-style-type: none"> Remote pressure transmitter span Setting span to anything other than zero enables the remote pressure transmitter feature Once the remote pressure transmitter feature has been enabled, the 4-20mA input hardware alarm is enabled for the remote pressure transmitter input Absence of a remote pressure transmitter will cause a hardware failure alarm and automatically return the booster system to local header pressure control When the remote pressure feature is active, the HPSD and LSPS alarms continue to monitor the booster's local header pressure 	0	0 to 999	
Offset +/-? (Remote Pressure)	<ul style="list-style-type: none"> Added to, or subtracted from, final remote pressure reading 	0	-99 to 99	
Current: (Remote Pressure)	<ul style="list-style-type: none"> Displays the current remote pressure reading 			
Alarm Type (Remote Pressure) (Rem Hi Alm)	<ul style="list-style-type: none"> Sets remote pressure high alarm type Only available if remote pressure sensor has been configured Not Used – Remote pressure high alarm not functional Static SP – Results in a fixed high pressure alarm setpoint Offset SP – Results in a dynamic high pressure alarm setpoint that is the result of adding the offset setpoint to the working setpoint 	Not Used	Not Used / Static SP / Offset SP	
Setpoint/Offset? (Remote Pressure) (Rem Hi Alm)	<ul style="list-style-type: none"> Value to be used as either the Static SP, or the Offset SP to be added to the working setpoint 	0	0 to 999	
Current SP: (Remote Pressure) (Rem Hi Alm)	<ul style="list-style-type: none"> Displays the current high pressure alarm setpoint 			
Delay? (Remote Pressure) (Rem Hi Alm)	<ul style="list-style-type: none"> Time delay in seconds that the high remote system pressure is realized and sustained until the high alarm is generated 	0	0 to 999	

Pressure/Flow Sensors Continued				
Menu Item	Variable	Default	Range	Field Value
Alarm Type (Remote Pressure) (Rem Low Alm)	<ul style="list-style-type: none"> Sets remote pressure low alarm type Only available if remote pressure sensor has been configured Not Used – Remote pressure low alarm not functional Static SP – Results in a fixed low pressure alarm setpoint Offset SP – Results in a dynamic low pressure alarm setpoint that is the result of subtracting the offset setpoint from the working setpoint 	Not Used	Not Used / Static SP / Offset SP	
Setpoint/Offset? (Remote Pressure) (Rem Low Alm)	<ul style="list-style-type: none"> Value to be used as either the Static SP, or the Offset SP to be subtracted from the working setpoint 	0	0 to 999	
Current SP: (Remote Pressure) (Rem Low Alm)	<ul style="list-style-type: none"> Displays the current low pressure alarm setpoint 			
Delay? (Remote Pressure) (Rem Low Alm)	<ul style="list-style-type: none"> Time delay in seconds that the low remote system pressure is realized and sustained until the low alarm is generated 	0	0 to 999	

Factory Config				
Menu Item	Variable	Default	Range	Field Value
Use Celsius Temps/Use Fahrenheit Temps (General Cfg)	<ul style="list-style-type: none"> Selects whether the temperatures are displayed as Fahrenheit, or Celsius 	F	F/C	
Booster/HVAC Mode	<ul style="list-style-type: none"> Used to set operating mode of controller HVAC Mode covered in detail by HVAC Mode addendum to this manual 	Booster	Booster – HVAC Mode	
Flow Sensor? (General Cfg)	<ul style="list-style-type: none"> Enables the flow sensor functions of Meter, Sensorless, or No 	No	No/Meter/ Sensorless	
P1 VFD? (VFD/MFG)	<ul style="list-style-type: none"> Available only if sensorless flow has been selected Sets model of VFD for Modbus communications 	Altivar 212	Altivar 212 / AB PF 523 / ABB ACH550 / Danfs FC102 / Future VFD3 / Future VFD4 / Future VFD5 / Future VFD6 / Future VFD7 / Future VFD8 /	
P2 VFD? (VFD/MFG)	<ul style="list-style-type: none"> Available only if sensorless flow has been selected Sets model of VFD for Modbus communications Visible only in Dplx, Tplx, or Qplx modes 	Altivar 212	Altivar 212 / AB PF 523 / ABB ACH550 / Danfs FC102 / Future VFD3 / Future VFD4 / Future VFD5 / Future VFD6 / Future VFD7 / Future VFD8 /	

Factory Config Continued				
Menu Item	Variable	Default	Range	Field Value
P3 VFD? (VFD/MFG)	<ul style="list-style-type: none"> Available only if sensorless flow has been selected Sets model of VFD for Modbus communications Visible only in Tplx, or Qplx modes 	Altivar 212	Altivar 212 / AB PF 523 / ABB ACH550 / Danfs FC102 / Future VFD3 / Future VFD4 / Future VFD5 / Future VFD6 / Future VFD7 / Future VFD8 /	
P4 VFD? (VFD/MFG)	<ul style="list-style-type: none"> Available only if sensorless flow has been selected Sets model of VFD for Modbus communications Visible only in Qplx mode 	Altivar 212	Altivar 212 / AB PF 523 / ABB ACH550 / Danfs FC102 / Future VFD3 / Future VFD4 / Future VFD5 / Future VFD6 / Future VFD7 / Future VFD8 /	
RPM (VFD/MFG) (DTA) Drive 1 Data...	<ul style="list-style-type: none"> Displays current RPM of pump 1 read from VFD via Modbus communications Available only if sensorless flow has been selected 			
KW (VFD/MFG) (DTA) Drive 1 Data...	<ul style="list-style-type: none"> Displays current kW of pump 1 read from VFD via Modbus communications Available only if sensorless flow has been selected 			
Delay KW (VFD/MFG) (DTA) Drive 1 Data...	<ul style="list-style-type: none"> Displays average rolling average of the last 10 readings of kW of pump 1 read from VFD via Modbus communications Available only if sensorless flow has been selected 			
RPM (VFD/MFG) (DTA) Drive 2 Data...	<ul style="list-style-type: none"> Displays current RPM of pump 2 read from VFD via Modbus communications Available only if sensorless flow has been selected Visible only in Dplx, Tplx, or Qplx modes 			
KW (VFD/MFG) (DTA) Drive 2 Data...	<ul style="list-style-type: none"> Displays current kW of pump 2 read from VFD via Modbus communications Available only if sensorless flow has been selected Visible only in Dplx, Tplx, or Qplx modes 			
Delay KW (VFD/MFG) (DTA) Drive 2 Data...	<ul style="list-style-type: none"> Displays average rolling average of the last 10 readings of kW of pump 2 read from VFD via Modbus communications Available only if sensorless flow has been selected Visible only in Dplx, Tplx, or Qplx modes 			

Factory Config Continued				
Menu Item	Variable	Default	Range	Field Value
RPM (VFD/MFG) (DTA) Drive 3 Data...	<ul style="list-style-type: none"> Displays current RPM of pump 3 read from VFD via Modbus communications Available only if sensorless flow has been selected Visible only in Tplx, or Qplx modes 			
KW (VFD/MFG) (DTA) Drive 3 Data...	<ul style="list-style-type: none"> Displays current kW of pump 3 read from VFD via Modbus communications Available only if sensorless flow has been selected Visible only in Tplx, or Qplx modes 			
Delay KW (VFD/MFG) (DTA) Drive 3 Data...	<ul style="list-style-type: none"> Displays average rolling average of the last 10 readings of kW of pump 3 read from VFD via Modbus communications Available only if sensorless flow has been selected Visible only in Tplx, or Qplx modes 			
RPM (VFD/MFG) (DTA) Drive 4 Data...	<ul style="list-style-type: none"> Displays current RPM of pump 4 read from VFD via Modbus communications Available only if sensorless flow has been selected Visible only in Qplx mode 			
KW (VFD/MFG) (DTA) Drive 4 Data...	<ul style="list-style-type: none"> Displays current kW of pump 4 read from VFD via Modbus communications Available only if sensorless flow has been selected Visible only in Qplx mode 			
Delay KW (VFD/MFG) (DTA) Drive 4 Data...	<ul style="list-style-type: none"> Displays average rolling average of the last 10 readings of kW of pump 4 read from VFD via Modbus communications Available only if sensorless flow has been selected Visible only in Qplx mode 			

Factory Config Continued				
Menu Item	Variable	Default	Range	Field Value
P1 Adj? (Cal Temp Sens)	<ul style="list-style-type: none"> Used to calibrate Pump 1 Temperature Calibrated temperature displayed to right of calibration value 	0	-99.9 to 99.9	
P2 Adj? (Cal Temp Sens)	<ul style="list-style-type: none"> Used to calibrate Pump 2 Temperature Calibrated temperature displayed to right of calibration value Visible only in Dplx, Tplx, or Qplx modes 	0	-99.9 to 99.9	
P3 Adj? (Cal Temp Sens)	<ul style="list-style-type: none"> Used to calibrate Pump 3 Temperature Calibrated temperature displayed to right of calibration value Visible only in Tplx, or Qplx modes 	0	-99.9 to 99.9	
P4 Adj? (Cal Temp Sens)	<ul style="list-style-type: none"> Used to calibrate Pump 4 Temperature Calibrated temperature displayed to right of calibration value Visible only in Qplx mode 	0	-99.9 to 99.9	
Flow Zero? (Meter Cfg)	<ul style="list-style-type: none"> Hardwired flow meter zero Not visible if Flow Sensor is set to No 	0	0 to 999	
Flow Span? (Meter Cfg)	<ul style="list-style-type: none"> Hardwired flow meter span Not visible if Flow Sensor is set to No 	0	0 to 9999	
Flow Offset? (Meter Cfg)	<ul style="list-style-type: none"> Sets Flow Sensor offset for calibration purposes Not visible if Flow Sensor is set to No 	0	-999 to 999	
Flow: (Meter Cfg)	<ul style="list-style-type: none"> Displays Current Calculated Flow 			
Curve Data (Sensorless Cfg)	<ul style="list-style-type: none"> Selects pump performance data by MVP model for sensorless flow calculation 	MVP 630 208	MVP-630-208 / MVP-630-460 / MVP-850-208 / MVP-850-460 / MVP-875-208 / MVP-875-460 / MVP-8100-208 / MVP-8100-460 / MVP-8150-208 / MVP-8150-460 / Custom 1 / Custom 2 / Custom 3 / Custom 4 / Custom 5 /	
Sensorless Flow (Sensorless Cfg)	<ul style="list-style-type: none"> Displays current sensorless flow calculation 			

PID Tuning				
Menu Item	Variable	Default	Range	Field Value
Loop Ctl:	<ul style="list-style-type: none"> Sets type of control P = Proportional only PI = Proportional with Integral PID = Proportional with Integral and Derivative DC = Demand Control – This option is NOT applicable to booster systems and should NOT be selected 	PI	P, PI, PID, DC	
Proportional:	<ul style="list-style-type: none"> Controls the initial reaction of the PID loop The larger the number the greater the initial response. Visible only on P, PI, PID menus. 	00.85	00.00 to 30.00	
Integral:	<ul style="list-style-type: none"> Controls the amount that is continuously added or subtracted to the output based on the process variable in relation to the setpoint Trims the initial control response up, or down. The larger the number the slower integral is added to the output signal Visible only on PI & PID menus. 	8	0 to 6000	
Derivative:	<ul style="list-style-type: none"> Takes the rate of process variable change into account and varies the control output accordingly. Visible only on PID menu. 	0	0 to 6000	
Static Interval?	<ul style="list-style-type: none"> Used only in DC configuration Time in seconds no change between DC cycles 	30	0 to 999	
Modulation Rate?	<ul style="list-style-type: none"> Used only in DC configuration Time between Gain adjustments during DC modulation 	5	0 to 99	
Modulation Gain?	<ul style="list-style-type: none"> Used only in DC configuration Amount of control output change in counts made each time the Modulation Gain is applied 	5	0 to 99	
SP:	<ul style="list-style-type: none"> Visible only in P, PI & PID configuration Current process setpoint 			
PV:	<ul style="list-style-type: none"> Current process Variable 			
DB:	<ul style="list-style-type: none"> Used only in DC configuration 	10	0 to 99	
OUT:	<ul style="list-style-type: none"> Used only in DC configuration Current control output 			

Pump Staging				
Menu Item	Variable	Default	Range	Field Value
Stage Down Speed Offset? (Stage Cfg 1)	<ul style="list-style-type: none"> Sets the percentage speed offset for the system destage point When the system stages up, once the Stage Dn Stab Time has elapsed, the system stores the pump speed minus the Stage Dn Speed Offset Example: Stabilized speed of 78 – offset speed of 25= destage speed of 53 	25	0 to 99	
Stage Down Stabilization Time? (Stage Cfg 1)	<ul style="list-style-type: none"> Sets the amount of time in seconds the system waits after staging up to record the stabilized speed 	10	0 to 999	
Stage Up Delay? (Stage Cfg 1)	<ul style="list-style-type: none"> The amount of time in seconds that the system has to operate above the Stage Up Speed for a stage to be added 	15	0 to 999	
Stage Down Delay? (Stage Cfg 1)	<ul style="list-style-type: none"> The amount of time in seconds that the system has to operate below whichever is greater to shed a stage: <ul style="list-style-type: none"> Calc Destage Speed Min Destage Speed 	15	0 to 999	
Minimum Destage Speed? (Stage Cfg 2)	<ul style="list-style-type: none"> The Minimum Destage Speed Takes precedent over calculated destage speed 	30	0 to 99	
Stage Up Speed? (Stage Cfg 2)	<ul style="list-style-type: none"> Speed the system achieves before staging up 	95	0 to 100	
Calculated Destage Speed: (Stage Cfg 2)	<ul style="list-style-type: none"> Displays the calculated destage speed 			
Stage Up Decel Integration?	<ul style="list-style-type: none"> Used to mitigate pressure overshoot during stage up by forcing the VFD speed reference output low as added stage reaches operating speed For this feature to work correctly, VFD ramp time must be 10 seconds (set at VFD) A value of 20% will cause the VFDs to match speeds at 90% output where the drive(s) already running slow to 90% as the drive coming online increase to 90% The effects of this feature happen very quickly and are time based. A 20% setting will cause an output decrease of 2 seconds A setting of 0% will result in no change to output speed 	20%	0% to 80%	

Display Settings				
Menu Item	Variable	Default	Range	Field Value
System:	<ul style="list-style-type: none"> Adjusts System Settings of the controller 			
Offline:	<ul style="list-style-type: none"> Adjusts Offline Settings 			
Diagnostics:	<ul style="list-style-type: none"> Displays Diagnostic Settings for the system 			

System				
Menu Item	Variable	Default	Range	Field Value
Stylus:	<ul style="list-style-type: none"> Configures the touchscreen (Moves cursor +) 			
Ver. Info:	<ul style="list-style-type: none"> Detailed system's version information 			
Date/Time:	<ul style="list-style-type: none"> Adjusts the system time and date 			
Memory:	<ul style="list-style-type: none"> Displays the total and used memory 			
Restart:	<ul style="list-style-type: none"> Restarts the controller 			
Brightness:	<ul style="list-style-type: none"> Adjusts brightness and contrast settings 			
Language:	<ul style="list-style-type: none"> Adjusts the system language 			
Option:	<ul style="list-style-type: none"> This item is reserved for use at a later date 			

Offline				
Menu Item	Variable	Default	Range	Field Value
Network:	<ul style="list-style-type: none"> Displays the system's network information 			
Option:	<ul style="list-style-type: none"> Displays system options 			
Buzzer:	<ul style="list-style-type: none"> Adjusts the controller's buzzer 			
IO Manager:	<ul style="list-style-type: none"> Adjusts the system input/output information 			
Backlight:	<ul style="list-style-type: none"> Controls the length of the backlight during periods of inactivity 			
Web Gate	<ul style="list-style-type: none"> This item is reserved for use at a later date 			
Self Test:	<ul style="list-style-type: none"> Performs testing on the system 			
Multimedia:	<ul style="list-style-type: none"> This item is reserved for use at a later date 			

Diagnostics				
Menu Item	Variable	Default	Range	Field Value
Variables	<ul style="list-style-type: none"> Tests the system's variables 			
Statistics	<ul style="list-style-type: none"> Displays system statistics 			

Building Automation System Integration

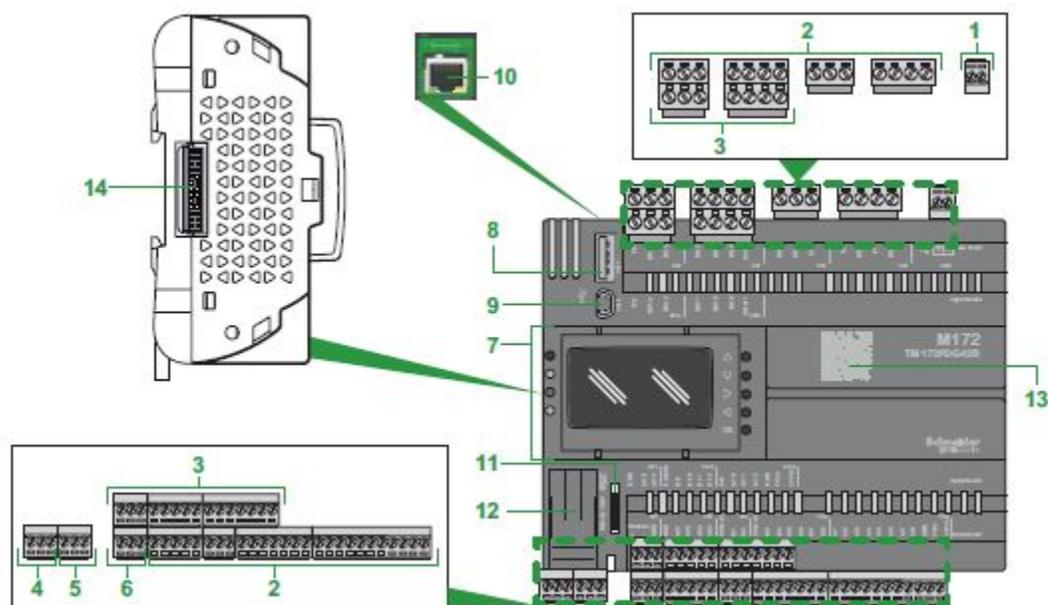
MVP/eMVP Boosters using the Schneider M172 controller can be integrated to building automation systems via the following communication protocols.

- Modbus RTU
- Modbus TCP
- BACnet MS/TP
- BACnet I/P

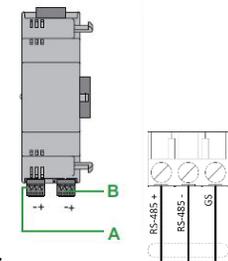
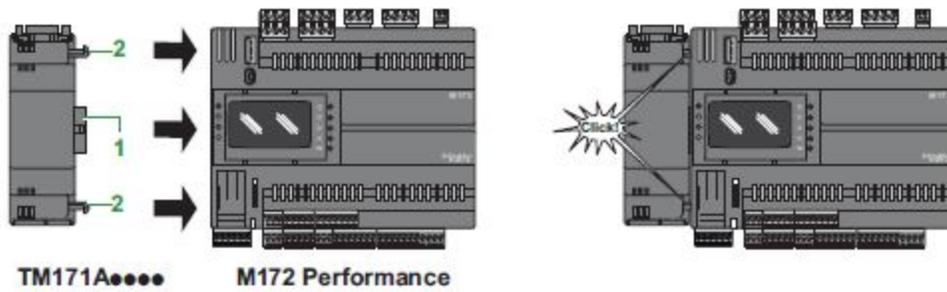
For the booster to communicate, an RS-485 (Schneider TM171ARS485) communication module must be installed. If your booster was purchased with a communication protocol, then the appropriate module will have been installed at the factory. If a communication module has not been installed, one may be purchased and added in the field.

Port Locations

The M172 controller has a built-in RJ-45 Ethernet port on top. See item 10 below...

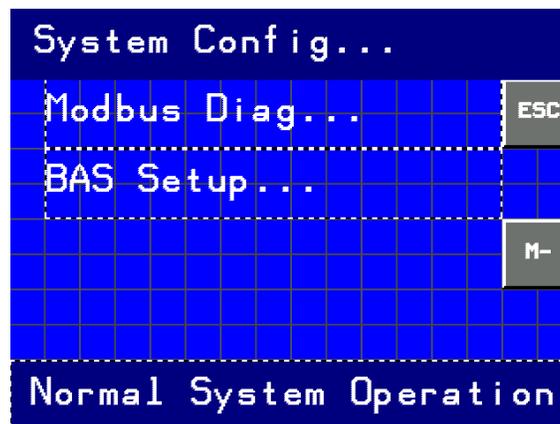


The RJ-45 port will be used when integrating to Ethernet based networks (BACnet IP, Modbus TCP). The controller above is shown without a communication module installed. Even though the RJ-45 port is located on the base controller, a communication module must be installed for the system to be able to communicate via the RJ-45 port. If a RS-485 module is installed, the system can communicate via BACnet IP, Modbus TCP, BACnet MSTP, or Modbus RTU. In the image below a communication module is being installed...



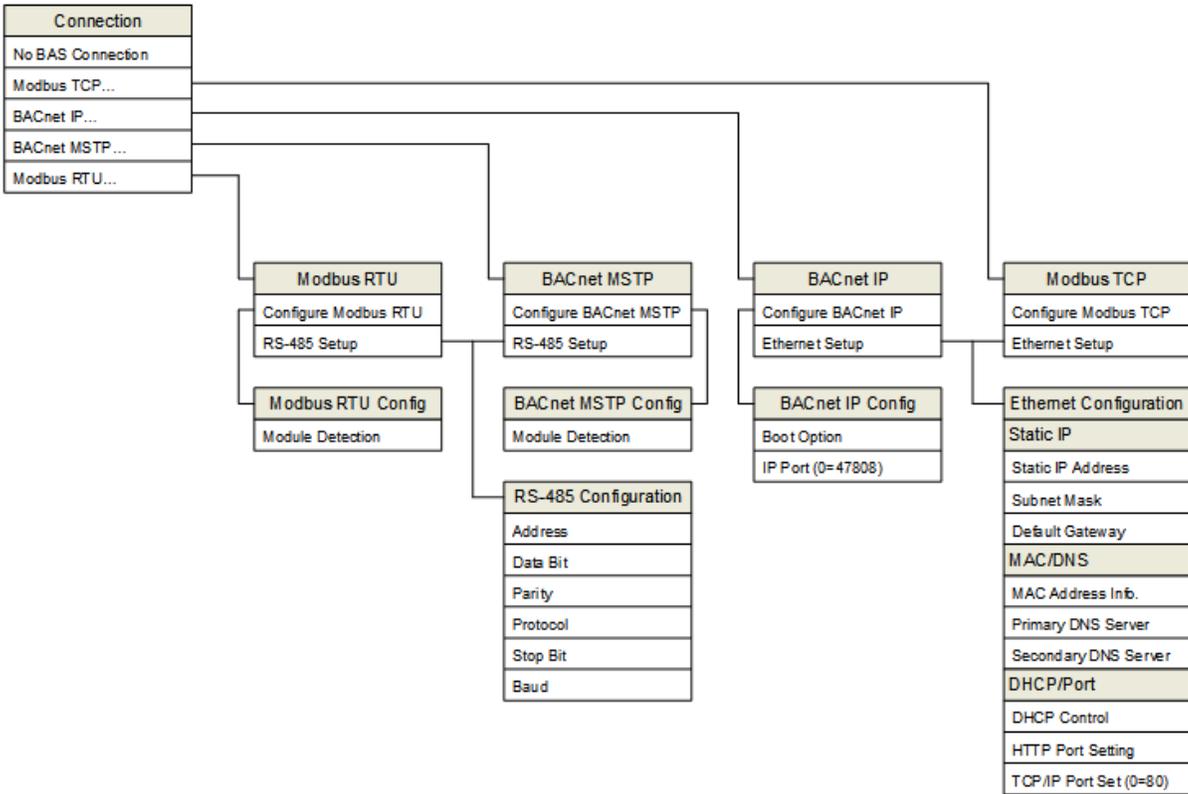
RS-485 Module details...

The communication ports are located on the bottom of the RS-485 module. Two ports are provided on the RS-485 module for convenience. The two ports on the RS-485 module are connected internally. Either port can be used to connect to the controller, or both if the controller is installed in the middle of a trunk (one for IN and one for OUT. It doesn't matter which is which). Once the communication module has been installed and the communication trunk has been connected properly, the port can be configured via the HMI (touchscreen). The BAS setup screens are accessed via the last menu item on the configuration menu (see below) ...



*** Important *** The BAS Setup menu option is not available (visible), if a communication module is NOT installed and then detected by the main controller. If you are installing a communication module, be sure to power the panel down completely prior to installing the communication hardware. On powerup, the controller will detect the newly installed communication module. Once a communication module has been detected, the following menu structure becomes available...

BAS Configuration Menu Structure



BAS Config				
Menu Item	Variable	Default	Range	Field Value
Connection	<ul style="list-style-type: none"> No BAS Connection Modbus TCP... BACnet IP... BACnet MSTP... Modbus RTU... 	No BAS Connection	No BAS Connection To Modbus RTU	
Modbus TCP				
Configure Modbus TCP	<ul style="list-style-type: none"> Opens the Modbus TCP configuration There is nothing special to configure for Modbus TCP The only information that requires configuration is the Ethernet port 			
Ethernet Setup	<ul style="list-style-type: none"> Opens the Ethernet Configuration Menu 			

BACnet IP				
Configure BACnet IP	<ul style="list-style-type: none"> BACnet IP Configuration 			
Boot Option (Configure BACnet IP)	<ul style="list-style-type: none"> No Action Load BACnet E2 Defaults (loaded at next system boot) 	No Action		
IP Port (Configure BACnet IP)	<ul style="list-style-type: none"> Allows setting of specific BACnet IP port A setting of 0 = 47808 A setting of 65535 = BACnet stack running only on PLC side 	0	0 to 65535	
Ethernet Setup	<ul style="list-style-type: none"> Opens the Ethernet Configuration Menu 			
BACnet MSTP				
Configure BACnet MSTP	<ul style="list-style-type: none"> RS-485 module detection screen Correct installation of the RS-485 communication module can be verified here 			
RS-485 Configuration	<ul style="list-style-type: none"> Opens the RS-485 Configuration Menu 			
Modbus RTU				
Configure Modbus RTU	<ul style="list-style-type: none"> RS-485 module detection screen Correct installation of the RS-485 communication module can be verified here 			
RS-485 Configuration	<ul style="list-style-type: none"> Opens the RS-485 Configuration Menu 			

Ethernet Configuration				
Menu Item	Variable	Default	Range	Field Value
Static IP Address (Static IP)	<ul style="list-style-type: none"> Static IP address set here 	10.0.0.100	0.0.0.0 To 255.255.255.255	
Subnet Mask (Static IP)	<ul style="list-style-type: none"> Subnet Mask address set here 	255.255. 255.0	0.0.0.0 To 255.255.255.255	
Default Gateway (Static IP)	<ul style="list-style-type: none"> Default Gateway address set here 	10.0.0.1	0.0.0.0 To 255.255.255.255	
MAC Address Info (MAC/DNS)	<ul style="list-style-type: none"> Controller MAC address viewed here 	Varies	00:00:00:00:00:00 To FF:FF:FF:FF:FF:FF	
Primary DNS Server (MAC/DNS)	<ul style="list-style-type: none"> Primary DNS Server address set here 	8.8.8.8	0.0.0.0 To 255.255.255.255	
Secondary DNS Server (MAC/DNS)	<ul style="list-style-type: none"> Secondary DNS Server address set here 	8.8.4.4	0.0.0.0 To 255.255.255.255	
DHCP Control (DHCP/Port)	<ul style="list-style-type: none"> DHCP addressing control enabled here 	DHCP Disabled	DHCP Disabled To DHCP Enabled	
HTTP Port Setting (DHCP/Port)	<ul style="list-style-type: none"> HTTP Port set here Setting of 0 = default port 80 	0	0 to 65535	
TCP/IP Port Setting (DHCP/Port)	<ul style="list-style-type: none"> TCP/IP Port set here 	502	0 to 65535	

RS-485 Configuration				
Menu Item	Variable	Default	Range	Field Value
Address	<ul style="list-style-type: none"> • RS-485 address set here 	1	0 To 255	
Data Bit	<ul style="list-style-type: none"> • Data Bit displayed here 	8	8 to 8	
Parity	<ul style="list-style-type: none"> • RS-485 Parity set here 	Even	None Odd Even	
Protocol	<ul style="list-style-type: none"> • RS-485 communication protocol set here • If BACnet IP is the desired communication protocol, this setting CANNOT be BACnet MSTP – The controller will only serve BACnet through one hardware port at a time 	Modbus RTU	uNET Modbus RTU BACnet MSTP	
Stop Bit	<ul style="list-style-type: none"> • RS-485 Stop Bit set here 	1	1 to 2	
Baud	<ul style="list-style-type: none"> • RS-485 Baud rate set here 	38,400	9,600 19,200 38,400 57,600 76,800 115,200	

BAS Point Export Table

Point Description	Read / Write	Point Type	-----BACnet Point Data-----		-Modbus Point Data-		Controller Mode	
			Units / Inactive	Active	Type	Decimal Address	Points Used	HVAC
Supply Header Pressure	R	AV	PSI		16-bit Int	9164	Yes	Yes
Suction Header Pressure	R	AV	PSI		16-bit Int	9165	Yes	Yes
Flow Rate	R	AV	GPM		16-bit Int	9166	Yes	Yes
Remote system Pressure	R	AV	PSI		16-bit Int	9167	Yes	Yes
Pump 1 Speed	R	AV	%		16-bit Int	9168	Yes	Yes
Pump 2 Speed	R	AV	%		16-bit Int	9169	Yes	Yes
Pump 3 Speed	R	AV	%		16-bit Int	9170	Yes	Yes
Pump 4 Speed	R	AV	%		16-bit Int	9171	Yes	Yes
Current Lead Pump	R	AV			16-bit Int	9172	Yes	Yes
High System Shutdown Pressure	R	AV	PSI		16-bit Int	9173	No	Yes
System Setpoint	R/W	AV	PSI		16-bit Int	8996	Yes	Yes
Pump 1 / System Supply Temperature	R	AV	DegF		16-bit Int	9175	Yes	Yes
Pump 2 / System Return Temperature	R	AV	DegF		16-bit Int	9176	Yes	Yes
Pump 3 / Process 1 Temperature	R	AV	DegF		16-bit Int	9177	Yes	Yes
Pump 4 / Process 2 Temperature	R	AV	DegF		16-bit Int	9178	Yes	Yes
Pump 1 Run Hours	R	AV	Hours		32-bit Uint	9179	Yes	Yes
Pump 2 Run Hours	R	AV	Hours		32-bit Uint	9181	Yes	Yes
Pump 3 Run Hours	R	AV	Hours		32-bit Uint	9183	Yes	Yes
Pump 4 Run Hours	R	AV	Hours		32-bit Uint	9185	Yes	Yes
Process 1 Setpoint	R/W	AV	DegF		16-bit Uint	8997	Yes	No
Process 2 Setpoint	R/W	AV	DegF		16-bit Uint	8998	Yes	No
Process 1 Output	R	AV	%		16-bit Uint	8995	Yes	No
Process 2 Output	R	AV	%		16-bit Uint	9003	Yes	No
Pump 1 Status	R	BV	Off	Running	16-bit Int	9187	Yes	Yes
Pump 2 Status	R	BV	Off	Running	16-bit Int	9188	Yes	Yes
Pump 3 Status	R	BV	Off	Running	16-bit Int	9189	Yes	Yes
Pump 4 Status	R	BV	Off	Running	16-bit Int	9190	Yes	Yes
No Flow Standby Status	R	BV	Running	Standby	16-bit Int	9191	No	Yes
Low Level Cutout Enable	R	BV	Disabled	Enabled	16-bit Int	9192	No	Yes
Low Level Cutout Alarm	R	BV	Normal	Alarm	16-bit Int	9193	No	Yes
System Enable Status	R	BV	Disabled	Enabled	16-bit Int	9194	Yes	Yes
Pump 1 Alarm	R	BV	Normal	Alarm	16-bit Int	9195	Yes	Yes
Pump 2 Alarm	R	BV	Normal	Alarm	16-bit Int	9196	Yes	Yes
Pump 3 Alarm	R	BV	Normal	Alarm	16-bit Int	9197	Yes	Yes
Pump 4 Alarm	R	BV	Normal	Alarm	16-bit Int	9198	Yes	Yes
High System Pressure Alarm	R	BV	Normal	Alarm	16-bit Int	9199	No	Yes
Low Suction Shutdown Alarm	R	BV	Normal	Alarm	16-bit Int	9200	Yes	Yes
Pump 1 High Temperature Shutdown Alarm	R	BV	Normal	Alarm	16-bit Int	9201	No	Yes
Pump 2 High Temperature Shutdown Alarm	R	BV	Normal	Alarm	16-bit Int	9202	No	Yes
Pump 3 High Temperature Shutdown Alarm	R	BV	Normal	Alarm	16-bit Int	9203	No	Yes
Pump 4 High Temperature Shutdown Alarm	R	BV	Normal	Alarm	16-bit Int	9204	No	Yes
Low System Pressure Alarm	R	BV	Normal	Alarm	16-bit Int	9205	No	Yes
Low System Pressure Shutdown Alarm	R	BV	Normal	Alarm	16-bit Int	9206	No	Yes
Remote High Pressure Alarm	R	BV	Normal	Alarm	16-bit Int	9207	No	Yes
Remote Low Pressure Alarm	R	BV	Normal	Alarm	16-bit Int	9208	No	Yes
Supply Pressure Transmitter Failure	R	BV	Normal	Alarm	16-bit Int	9209	Yes	Yes
Suction Pressure Transmitter Failure	R	BV	Normal	Alarm	16-bit Int	9210	Yes	Yes
Pump 1 Temperature Sensor Failure	R	BV	Normal	Alarm	16-bit Int	9211	No	Yes
Pump 2 Temperature Sensor Failure	R	BV	Normal	Alarm	16-bit Int	9212	No	Yes
Pump 3 Temperature Sensor Failure	R	BV	Normal	Alarm	16-bit Int	9213	No	Yes
Pump 4 Temperature Sensor Failure	R	BV	Normal	Alarm	16-bit Int	9214	No	Yes
Remote Pressure Transmitter Failure	R	BV	Normal	Alarm	16-bit Int	9215	Yes	Yes
Flow Transmitter Failure	R	BV	Normal	Alarm	16-bit Int	9216	Yes	Yes
VFD In Manual Alarm	R	BV	Normal	Alarm	16-bit Int	9217	Yes	Yes
High Suction Shutdown Alarm	R	BV	Normal	Alarm	16-bit Int	9218	No	Yes
System Enable (Must be Configured Locally)	R/W	BV	Disabled	Enabled	16-bit Int	8994	Yes	Yes
Process 1 Blocking/Enable	R/W	BV	Open/Enable	Close/Disable	16-bit Int	9002	Yes	No
Process 2 Blocking/Enable	R/W	BV	Open/Enable	Close/Disable	16-bit Int	9004	Yes	No
Supply Temperature Alarm	R	BV	Normal	Alarm	16-bit Int	9259	Yes	No
Return Temperature Alarm	R	BV	Normal	Alarm	16-bit Int	9260	Yes	No
Process 1 Temperature Alarm	R	BV	Normal	Alarm	16-bit Int	9261	Yes	No
Process 2 Temperature Alarm	R	BV	Normal	Alarm	16-bit Int	9262	Yes	No

Once all BAS data has been configured, Escape all the way out to the main menu and cycle power to the controller.

Schneider Electric Altivar 212



**MVP Booster AFD Modified
Parameters Table**
Document 221-675 v5.0



WARNING

This table lists parameters which differ from the drive manufacturer's settings. Altering these parameters or installing a drive with parameters not set to these values can cause hazardous conditions and may result in serious personal injury, death, and/or property damage.

Modified Parameter Table for 460 & 208 VAC MVP Models Using Schneider Altivar 212

Title	Function	Lower Limit	Upper Limit	Units	HYFAB Setting	MVP 630-XXX	MVP 850-XXX	MVP 875-XXX	MVP 8100-XXX	MVP 8150-XXX	
tyP	Default setting	0	9	1	2	Same for all models					
CN0D	(CM0d) Command mode selection	0	2	1	0						
FN0D	(FM0d) Frequency setting mode selection	0	5	1	1						
OLN	Electronic-thermal protection characteristic selection	0	7	1	1						
FH	Maximum frequency	30	200	0.01Hz	60						
AU1	Automatic acceleration/deceleration	0	2	1	0						
ACC	Acceleration time 1	0	3200	0.1sec	10						
DEC	Deceleration time 1	0	3200	0.1sec	10						
LL	Lower limit frequency	0	60	0.01Hz	12						
UL	Upper limit frequency	0.5	60	0.01Hz	60						
tHr	Motor rated current overload setting	10	100	Amps	Varies by model	460V 208V	3.7 8.2	6.1 13.0	8.7 18.8	12.4 26.0	18.0 39.0
Pt	V/F control mode selection	0	6	1	3	Same for all models					
uL	Motor Rated Frequency	25	200	0.01Hz	60						
uLu	Motor Rated Voltage	50	330	0.1V	460 208	460V 208V	Same for all models				
F415	Motor rated current (FLA)	0.1	200	0.1A	Varies by model	460V 208V					
F417	Motor rated speed	100	15000	rpm	3450	Same for all models					
F601	Motor Current Limit (FLA)	10	110	Amps	Varies by model	460V 208V	3.7 8.2	6.1 13.0	8.7 18.8	12.4 26.0	18.0 39.0
F400	Auto-tuning enable	0	2	1	2	Set to 1 to initiate auto-tune. Changes automatically to 2 after successful tuning. Autotune is completed by HYFAB during setup and testing					
F203	VIA input point 2 setting	0	100	1%	99						
F416	Motor no-load current as percent of FLA	10	100	1%	Varies by model	460V 208V	40 30	40 30	31 24	29 22	28 20
F602	Drive Fault Memory	0	1	1	1	Same for all models					
F603	Emergency stop selection	0	2	1	1						
F721	Local mode motor stop type	0	1	1	1						
F730	Disabling of keypad speed reference change keys	0	1	1	0						
F735	Disabling of keypad fault reset operation	0	1	1	0						
F802	Modbus address	0	247	1	1,2,3,4						
F803	Modbus time-out	0	100	1 Sec	1						
F807	Communication command channel selection	0	1	1	1						
F820	Modbus Network Baud Rate	0	1	1	1						
F821	Modbus Network Parity	0	2	1	1						
F829	Selection of communication protocol	1	5	1	1						
F856	Number of motor poles for communication	1	8	1	1						
F732	Disabling of keypad local/remote key	0	1	1	1						
tyP	Default setting	0	9	1	7						
F700	Parameter Lock	0	1	1	1						

Allen Bradley PowerFlex 523



**MVP Booster AFD Modified
Parameters Table**
Document 221-675 v5.0



WARNING

This table lists parameters which differ from the drive manufacturer's settings. Altering these parameters or installing a drive with parameters not set to these values can cause hazardous conditions and may result in serious personal injury, death, and/or property damage.

Modified Parameter Table for 460 & 208 VAC MVP Models Using Allen Bradley PowerFlex 523

Title	Function	Lower Limit	Upper Limit	Units	HYFAB Setting		MVP 630-XXX	MVP 850-XXX	MVP 875-XXX	MVP 8100-XXX	MVP 8150-XXX	
P030	Language	1	15	1	1							
P031	Motor Rated Voltage	20	460	1	460	460V	Same for all models					
		10	208		208	208V						
P032	Motor Nameplate Hertz	15	500	1	60							
P033	Motor OL Current (SFA)	0	DR x 2	0.1	Varies by model	460V 208V	4.37 9.20	6.90 14.72	9.89 20.70	13.80 29.44	20.13 41.40	
P034	Motor Nameplate Full Load Amps	0	DR x 2	0.1	Varies by model	460V 208V	3.80 8.00	6.00 12.80	8.60 18.00	12.00 25.60	17.50 36.00	
P035	Motor Nameplate Poles	2	40	1	2	3600RPM	Same for all models					
					4	1800RPM						
P036	Motor Nameplate RPM	0	24000	1	3450	3600RPM						
						1725	1800RPM					
P039	Torque Perf Mode	0	4	1	0							
P040	Autotune	0	2	1	1							
P041	Acceleration Time	0.00	600.00	0.01sec	10.00							
P042	Deceleration Time	0.00	600.00	0.01sec	10.00							
P043	Minimum Frequency	0.00	500.00	0.01Hz	12.00							
P044	Maximum Frequency	0.00	500.00	0.01Hz	60.00							
P045	Stop Mode	0	11	1	0							
P046	Start Source (Must be set to 2 for auto operation)	1	5	1	1							
P047	Speed Reference	1	16	1	5							
T076	Relay Output 1 Select	0	31	1	2							
C123	RS485 Data Rate	0	5	1	4							
C124	RS485 Node Address	1	247	1	1,2,3,4							
C126	Communication Loss Time	0.1	60.0	0.1sec	5.0							
C127	RS485 Format	0	5	1	1							
A484	Current Limit 1 (Motor Nameplate Full Load Amps)	0	DR x 1.5	0.1	Varies by model	460V 208V	3.80 8.00	6.00 12.80	8.60 18.00	12.00 25.60	17.50 36.00	
A492	Stall Fault Time	0	5	1	5		Same for all models					
A553	Program Lock Mod	0	3	1	1							
A552	Program Lock	0000	9999	1	0001							

Schneider Magellis STU 655/855



Cleaning the Display



CAUTION

EQUIPMENT DAMAGE

- Power off the unit before cleaning.
- Do not use hard or pointed objects to operate the touch panel, since it can damage the panel surface.
- Do not use paint thinner, organic solvents, or strong acid compounds to clean the unit.

Failure to follow these instructions can result in equipment damage.

Cleaning the Gasket

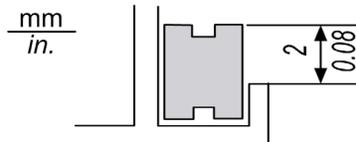
- With the gasket in place, the unit meets IP65 rating.
- Change the gasket at least once a year, or as soon as scratches or dirt become visible.
- During normal maintenance and reinstallation, check the gasket for dirt and scratches.

Inserting the Gasket

NOTICE: The gasket must be inserted correctly into the groove to comply with IP65.

The upper surface of the gasket should protrude approximately 2 mm (0.08 in.) out from the groove. Verify that the gasket is correctly inserted before installing the unit into a panel.

NOTICE: Verify the gasket seam is inserted into the straight bottom section of the groove. Inserting it into a corner may lead to eventual tearing.



Periodic Check Points

Electrical Specifications

The input voltage must be within 20.4 to 28.8 Vdc.

Related Items

- Verify that all power cords and cables are connected properly and that there are no loose cables.
- Verify that all the mounting brackets are holding the unit securely.
- Verify that there are no scratches or traces of dirt on the installation gasket.

Booster Installation

Location

- Place the pump as near the liquid source as practical. Place below level of liquid for automatic re-priming capability.
- Allow adequate space for servicing and ventilation. Protect the unit from weather and water damage due to rain, flooding or freezing temperatures.
- Protect the pump and piping from freezing temperatures.
- Allow adequate space around the unit for service and ventilation.

Close-Coupled Units

- For vertical operation, the motor should be fitted with a drip cover or otherwise protected against liquid entering the motor (rain, spray, condensation, etc.)

NOTICE: DO NOT INSTALL WITH MOTOR BELOW PUMP. ANY LEAKAGE OR CONDENSATION WILL AFFECT THE MOTOR.

Piping

Piping Suction

NOTICE: DO NOT USE THE BALL VALVE TO THROTTLE PUMP. THIS MAY CAUSE LOSS OF PRIME, EXCESSIVE TEMPERATURES AND DAMAGE TO PUMP, VOIDING WARRANTY.

Wiring & Grounding



- Install, ground and wire according to local and National Electrical Code Requirements.
- Install an all leg electrical power disconnect switch near the pump.
- Disconnect and lockout electrical power before installing or servicing the pump.
- Electrical supply **MUST** match pump's nameplate specifications. Incorrect voltage can cause fire, damage motor and void the warranty.
- Motors without built-in protection **MUST** be provided with contactors and thermal overloads for single phase motors, or starters with heaters for three phase motors. See motor nameplate.
- Use only copper wire to motor and ground. The ground wire **MUST** be at least as large as the wire to the motor. Wires should be color coded for ease of maintenance.
- Follow motor manufacturer's wiring diagram on the motor nameplate or terminal cover carefully.

FAILURE TO PERMANENTLY GROUND THE PUMP, MOTOR AND CONTROLS BEFORE CONNECTING TO ELECTRICAL POWER CAN CAUSE SHOCK, BURNS OR DEATH.

Rotation

NOTICE: INCORRECT ROTATION MAY DAMAGE THE PUMP AND VOID THE WARRANTY.

- For frame mounted units, switch power on and off quickly to observe rotation.
- On close coupled units, remove motor end plug or cover to observe rotation.
- To reverse three phase motor rotation, interchange any two power supply leads.

Operation



OPERATION AT OR NEAR ZERO FLOW CAN CAUSE EXTREME HEAT, PERSONAL INJURY OR PROPERTY DAMAGE.



SPLASHING OR IMMERSING OPEN DRIP PROOF MOTORS IN FLUID CAN CAUSE FIRE, SHOCK, BURNS OR DEATH.

NOTICE: DO NOT RUN PUMP DRY OR SEAL WILL BE DAMAGED.

Check the piping after stabilizing the system at normal operating conditions. Adjust the pipe supports if necessary. Booster piping connections **MUST NOT** be used to **SUPPORT EXTERNAL PIPING**.

Maintenance



FAILURE TO DISCONNECT AND LOCKOUT ELECTRICAL POWER BEFORE ATTEMPTING ANY MAINTENANCE CAN CAUSE SHOCK, BURNS OR DEATH.



FAILURE TO RELIEVE SYSTEM PRESSURE AND DRAIN SYSTEM BEFORE ATTEMPTING ANY MAINTENANCE CAN CAUSE PROPERTY DAMAGE, PERSONAL INJURY AND DEATH.



IF PIPING CONTAINS HAZARDOUS OR TOXIC FLUIDS, SYSTEM MUST BE FLUSHED PRIOR TO PERFORMING SERVICE.

TURN OFF ALL POWER BEFORE OPENING CABINET. ELECTRIC ARC FLASH HAZARD WILL CAUSE SEVERE INJURY OR DEATH. FOLLOW ALL REQUIREMENTS IN NFPA 70E FOR SAFE WORK PRACTICES AND FOR PERSONAL PROTECTIVE EQUIPMENT.

BEFORE SERVICING VARIABLE FREQUENCY DRIVES, REMOVE ALL POWER, WAIT 15 MINUTES. HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH.

THE DRY TYPE DISTRIBUTION TRANSFORMER (IF USED) MUST ONLY BE INSTALLED AND SERVICED BY QUALIFIED ELECTRICAL PERSONNEL. HAZARD OF ELECTRIC SHOCK OR BURN. TURN OFF POWER SUPPLYING THIS EQUIPMENT BEFORE WORKING INSIDE CONTROL CABINET.



MOTOR MUST BE GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND LOCAL CODES BY TRAINED PERSONNEL TO PREVENT SERIOUS ELECTRICAL SHOCKS. TO SERVICE MOTOR, DISCONNECT POWER SOURCE FROM MOTOR AND ANY ACCESSORY DEVICES AND ALLOW MOTOR TO COME TO A COMPLETE STANDSTILL.



HAZARDOUS VOLTAGE. DISCONNECT AND LOCKOUT POWER TO PUMP PRIOR TO PERFORMING ANY SERVICE OR MAINTENANCE. REFER TO INSTRUCTION MANUAL FOR PROPER INSTALLATION. ELECTRICAL AND PLUMBING INSTALLATION MUST CONFORM TO LOCAL AND NATIONAL CODES. DO NOT RUN PUMP DRY. DO NOT OPERATE AT CLOSED DISCHARGE. FAILURE TO FOLLOW WARNING INSTRUCTIONS MAY RESULT IN PERSONAL INJURY INCLUDING DEATH AND PROPERTY DAMAGE.

Close-Coupled Unit

Bearings are part of the motor. For Lubrication information, refer to motor manufacturer's instructions.

Seasonal Service

- To **REMOVE** pump from service, remove drain plug and drain all unprotected piping.
- To **RETURN** pump to service, replace drain plug using Teflon™ tape or equivalent on male threads.
- Reconnect suction line if removed. Examine union and repair if necessary.
- Refer to **OPERATION** section of manual.

NOTICE: For disassembly and reassembly information and instructions, refer to the applicable Goulds pump manual.

Monthly Maintenance

Touchscreen

- Make sure that the touchscreen controls are operating efficiently.
- Review the alarm history and data log history.

Motor Lubrication

- In grease-filled bearings, check that the inside of the motor is not overfilled.

Sound/Visual Inspection

- Watch/listen for any rubbing, grinding, or electrical arcing in the system. Look for anything that is binding or appears unusual.

NOTICE: Harmonic vibrations will occur with the pumps and motor. Excessive vibration or noise can cause problems and require immediate service. If excessive vibration is found, do not operate the pump.

- Ensure that the eMVP/MVP is operating in temperatures between 35°F and 104°F.
- Ensure that water, grease or oil is not leaking.
- Ensure that no hardware is loose.

Troubleshooting Guide



DISCONNECT AND LOCKOUT ELECTRICAL POWER BEFORE ATTEMPTING ANY MAINTENANCE. FAILURE TO DO SO CAN CAUSE A SHOCK, BURN OR DEATH.

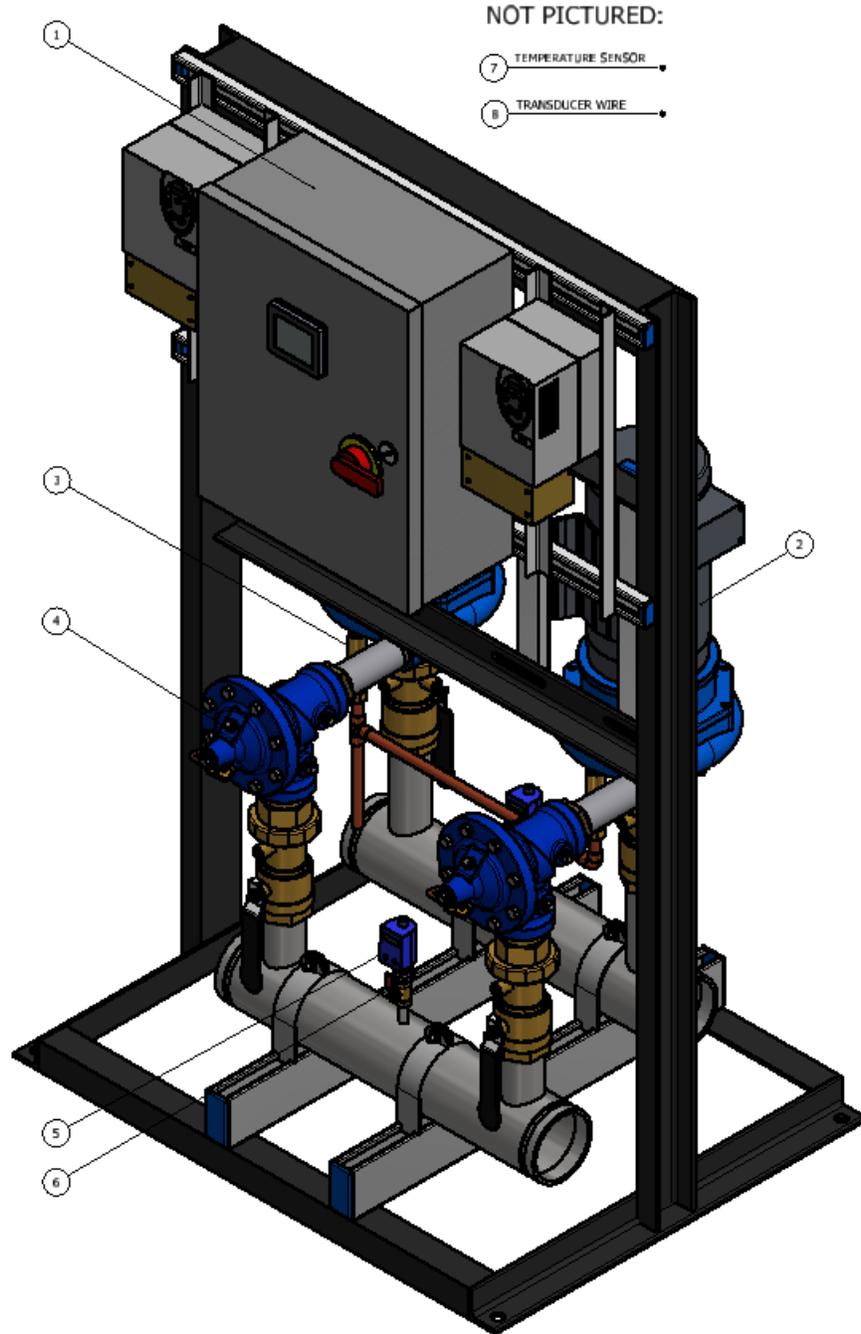
Motor Not Running	
Cause	Solution
Motor thermal protector tripped	Let motor cool, then reset the thermal protector.
Open circuit breaker or blown fuse	Check circuit breaker and fuses.
Impeller binding	Make sure the pump can be turned by hand. Check for a bound impeller.
Motor improperly wired	Securely connect motor wiring.
Defective motor	Repair or replace the motor.

Excessive Power Consumption	
Cause	Solution
Impeller binding	Make sure the pump can be turned by hand. Check for a bound impeller.
Incorrect impeller diameter	Trim or replace the impeller.
Discharge head too low- excessive flow rate	Check the discharge piping and valves. Make sure that pipes and plugs are not plugged. Make sure that the isolation valves are open and that there are no clogs.

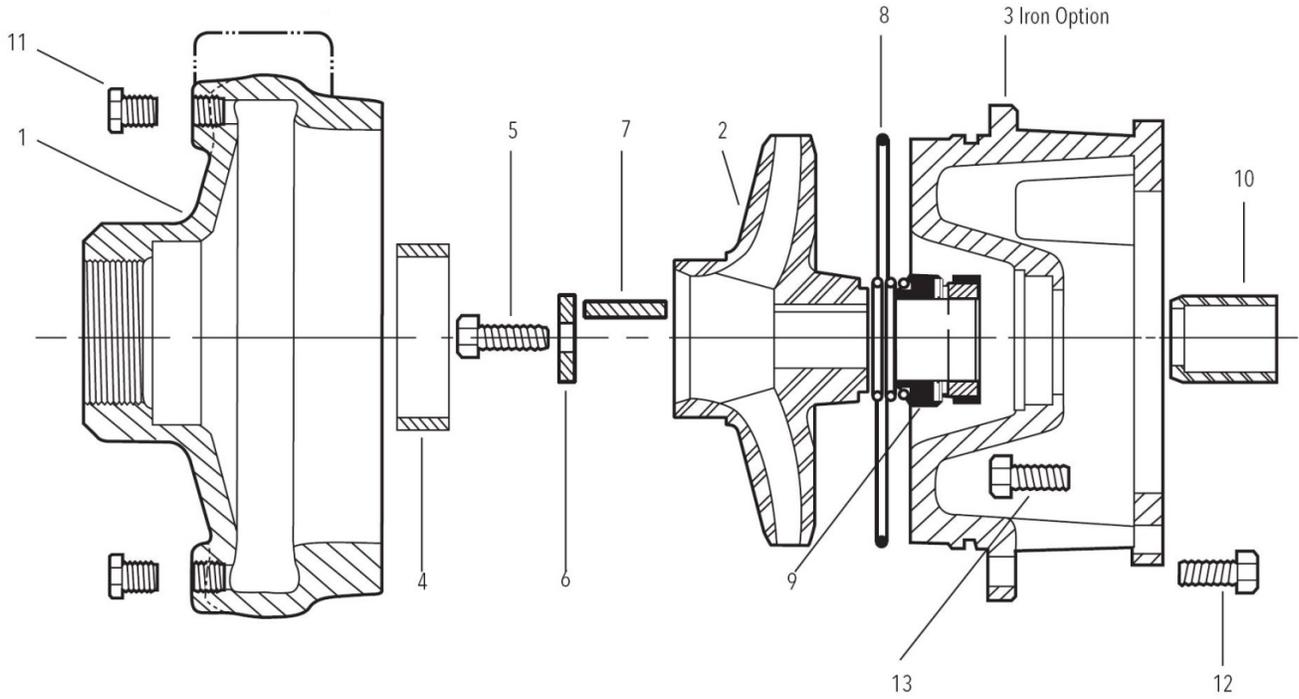
Little or No Liquid Delivered	
Cause	Solution
Pump is not primed, air or gases in pump	Make sure that the pump station is properly primed. Make sure that pumps and components are correctly filled with water.
Discharge, suction plugged or valve closed	Check the discharge piping and valves. Make sure that pipes and plugs are not plugged. Make sure that the isolation valves are open and that there are no clogs.
Incorrect rotation (3 phase only)	Inspect the pump rotation. The pump volute will indicate the proper rotation.
Low voltage or phase loss	Have the incoming power and voltage checked by a qualified electrician.
Impeller worn or plugged	Bring the pump to an authorized pump repair facility.
System head too high	Ensure that the valve or pump is not closed.
(NPSH) Net Positive Suction Head too low – Excessive Suction lift or losses	Check the NPSH. Ensure that proper flooded conditions or positive pressure is being delivered to the pump station. Watch for air in the supply lines. Ensure that supply tanks are correctly filled.
Incorrect impeller diameter	Trim or replace the impeller.

Excessive Noise/Vibration	
Cause	Solution
Impeller binding	Make sure the pump can be turned by hand. Check for a bound impeller.
Pump is not primed, air or gases in pump	Make sure that the pump station is properly primed. Make sure that pumps and components are correctly filled with water.
Discharge, suction plugged or valve closed	Check the discharge piping and valves. Make sure that pipes and plugs are not plugged. Make sure that the isolation valves are open and that there are no clogs.
Impeller worn or plugged	Bring the pump to an authorized pump repair facility.
(NPSH) Net Positive Suction Head too low – Excessive Suction lift or losses	Check the NPSH. Ensure that proper flooded conditions or positive pressure is being delivered to the pump station. Watch for air in the supply lines. Ensure that supply tanks are correctly filled.
Discharge head too low- excessive flow rate	Ensure that there is no excessive water consumption or leakage in the system.
Worn bearing	Bring the pump to an authorized pump repair facility.
Pump, motor, or piping loose	Properly tighten all fasteners and components.

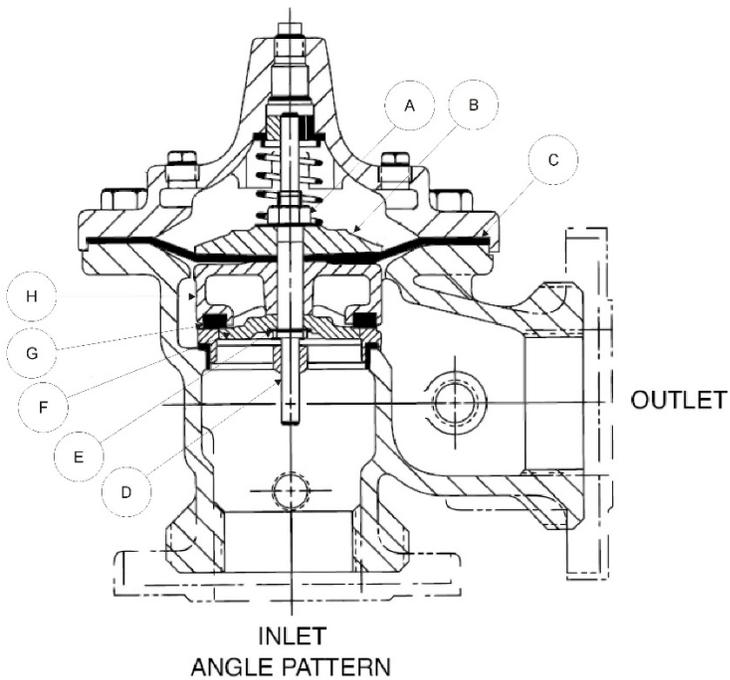
Replacement Parts



Hyfab Model MVP Pressure Booster



Typical Goulds 3656-S Pump End



A	Stem Nut
B	Diaphragm Washer
C	Diaphragm
D	Stem
E	Spacer Washers
F	Disc Guide
G	Disc
H	Disc Retainer

Typical Cla-Val Angle Check Valve

NOTE: ALL PARTS TABLES REPRESENT STANDARD CONSTRUCTION ITEMS. TO ENSURE CORRECT APPLICATIONS, CONTACT YOUR REPRESENTATIVE WITH THE UNIT'S PRD NUMBER, TYPICALLY LOCATED ON THE CONTROLLER ENCLOSURE.

STANDARD MVP BOOSTER COMPONENTS/COMMON REPLACEMENT PARTS								
		MVP-630 (N06F)	MVP-850 (N08G)	MVP-875 (N08H)	MVP-8100 (N08J)	MVP-8150 (N08K)		
1 CONTROL PANEL								
VFD	208V	Allen Bradley	HYFVFD3208-ABS	HYFVFD5208-ABS	HYFVFD7.5208-ABS	HYFVFD10208-ABS	HYFVFD15208-ABS	
		Schneider Electric	HYFVFD3208-SES	HYFVFD5208-SES	HYFVFD7.5208-SES	HYFVFD10208-SES	HYFVFD15208-SES	
	460V	Allen Bradley	HYFVFD3460-ABS	HYFVFD5460-ABS	HYFVFD7.5460-ABS	HYFVFD10460-ABS	HYFVFD15460-ABS	
		Schneider Electric	HYFVFD3460-SES	HYFVFD5460-SES	HYFVFD7.5460-SES	HYFVFD10460-SES	HYFVFD15460-SES	
Touchscreen	HYFCTRL-655							
Controller	HYFCTRL-172							
BAS Module	Schneider Electric	TM171ARS485						
2 CLOSE-COUPLED PUMPS								
2.0	Pump/Motor Assembly	Goulds	3BF1HBC3.HFVFD	5BF1JBH3.HFVFD	5BF1KBG3.HFVFD	5BF1LBC3.HFVFD	5BF1MBB3.HFVFD	
2.1	Volute		1K98	1K102				
2.2	Impeller		2K123	2K769	2K350	2K349	2K347	
2.3	Motor Adaptor		1K111	1K115			1K117	
2.4	Casing Wear Ring		4K68					
2.5	Impeller Bolt		13K43					
2.6	Impeller Washer		13L39					
2.7	Impeller Key		4K11					
2.8	Volute O-Ring		5K207	5K205				
2.9	Mechanical Seal		10K27					
2.10	Shaft Sleeve		4K66					
2.11	Casing Plug		6K2 (Qty. of 4)					
2.12	Hex Casing Bolt		13K69 (Qty. of 8)					
2.13	Hex Motor Adaptor Bolt		13K69 (Qty. of 4)					
2.14	Motor	Baldor	EJMM3158T	EJMM3212T	EJMM3219T	EJMM3312T	EJMM3314T	
3 THERMAL RELIEF VALVE								
	125 Degree Relief	Thermomegatech	242-000000-125					
	Compression Fitting	C-138						
4 CHECK VALVE								
4.0	Check Valve Assembly	Cla-Val	81-12-1F					
4.1	Rebuild Kit		21176618H ¹					
4.2	Repair Kit		21176608K ²					
5 LED DISPLAY/SWITCH								
	Schneider Electric	ZMLPA1P2SW						
6 PRESSURE TRANSDUCER								
	Schneider Electric	XMLP300PD230Q						
7 TEMPERATURE SENSOR								
	Mamac	TE-703-A-8-A-6/11						
8 TRANSDUCER WIRE								
	Schneider Electric	XZCPV1141L5						

WARNING: Control panel items (VFD, Controller, Touchscreen) require Hyfab-specific programming. Failure to obtain the appropriate programming will result in damage to the equipment.

¹ Cla-Val, Includes Parts A-H (Illustrated, Page 59)

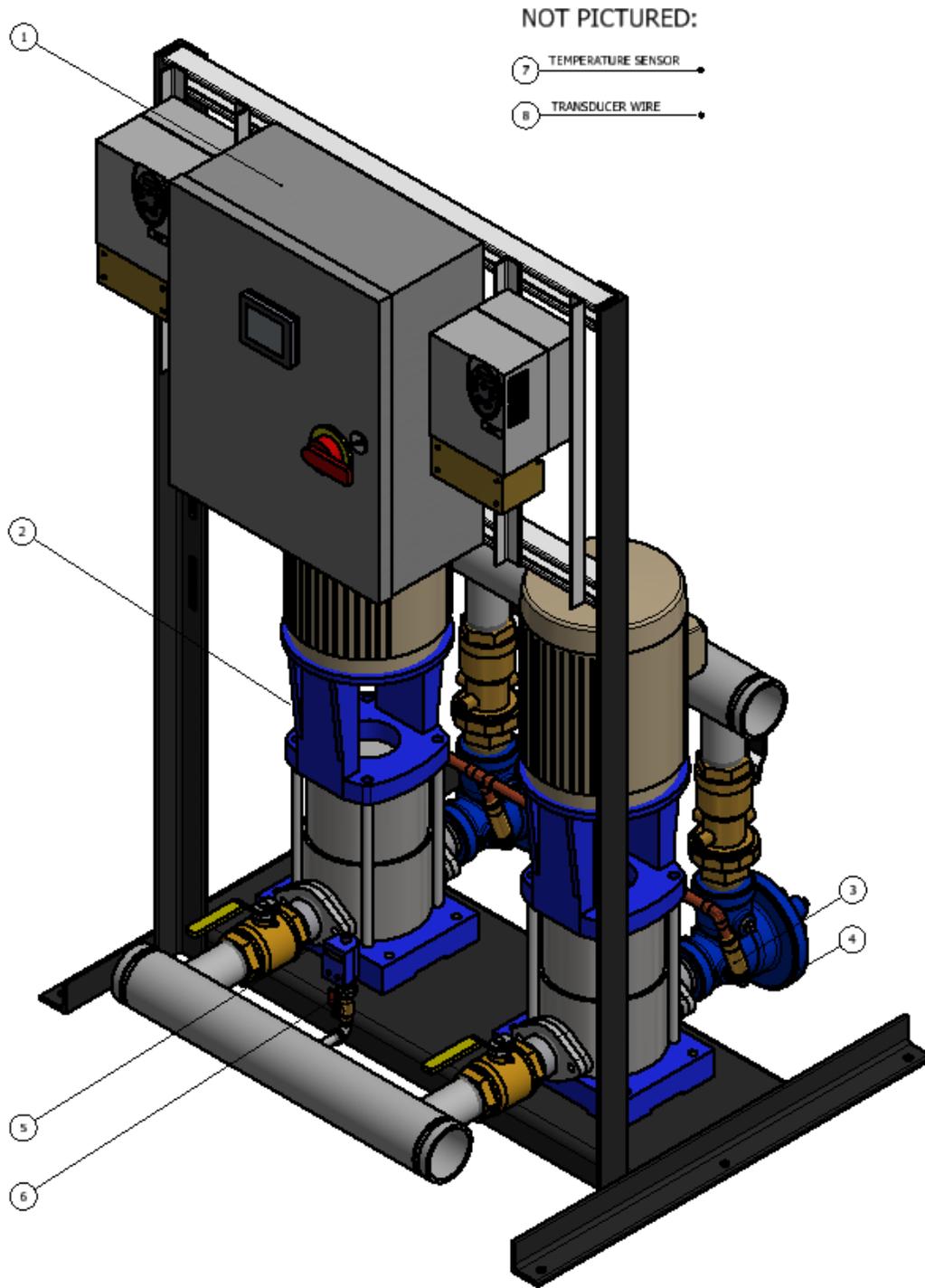
² Cla-Val, Includes Parts C, E, and G Only (Illustrated, Page 59)

STANDARD MVP BOOSTER COMPONENTS/Common Replacement Parts								
		MVP-(N)07G	MVP-(N)07H	MVP-(N)07J	MVP-(N)07K			
1 CONTROL PANEL								
	VFD	208V	Allen Bradley	HYFVFD5208-ABS	HYFVFD7.5208-ABS	HYFVFD10208-ABS	HYFVFD15208-ABS	
			Schneider Electric	HYFVFD5208-SES	HYFVFD7.5208-SES	HYFVFD10208-SES	HYFVFD15208-SES	
		460V	Allen Bradley	HYFVFD5460-ABS	HYFVFD7.5460-ABS	HYFVFD10460-ABS	HYFVFD15460-ABS	
			Schneider Electric	HYFVFD5460-SES	HYFVFD7.5460-SES	HYFVFD10460-SES	HYFVFD15460-SES	
	Touchscreen	HYFCTRL-655						
Controller	HYFCTRL-172							
BAS Module	Schneider Electric	TM171ARS485						
2 CLOSE COUPLED PUMPS								
2.0	Pump/Motor Assembly	Goulds	4BF1JBH3-B	4BF1KBF3-B	4BF1LBD3-B	4BF1MBB3-B		
2.1	Volute		1K100					
2.2	Impeller		2K1108	2K1106	2K1104	2K1102		
2.3	Motor Adaptor		1K118		1K120			
2.4	Casing Wear Ring		4K70					
2.5	Impeller Bolt		13K43					
2.6	Impeller Washer		13L39					
2.7	Impeller Key		4K11					
2.8	Volute O-Ring		5K205					
2.9	Mechanical Seal		10K27					
2.10	Shaft Sleeve		4K66					
2.11	Casing Plug		6K2 (Qty. of 4)					
2.12	Hex Casing Bolt		13K69 (Qty. of 8)					
2.13	Hex Motor Adaptor Bolt		13K69 (Qty. of 4)					
2.14	Motor	Baldor	EJMM3212T	EJMM3219T	EJMM3312T	EJMM3314T		
3 THERMAL RELIEF VALVE								
	125 Degree Relief	Thermomegatech	242-000000-125					
	Compression Fitting	C-138						
4 CHECK VALVE								
4.0	Check Valve Assembly	Cla-Val	81-12-3B					
4.1	Rebuild Kit		21176619G ¹					
4.2	Repair Kit		21176609J ²					
5 LED DISPLAY/SWITCH								
		Schneider Electric	ZMLPA1P2SW					
6 PRESSURE TRANSDUCER								
		Schneider Electric	XMLP300PD230Q					
7 TEMPERATURE SENSOR								
		Mamac	TE-703-A-8-A-6/11					
8 TRANSDUCER WIRE								
		Schneider Electric	XZCPV1141L5					

WARNING: Control panel items (VFD, Controller, Touchscreen) require Hyfab-specific programming. Failure to obtain the appropriate programming will result in damage to the equipment.

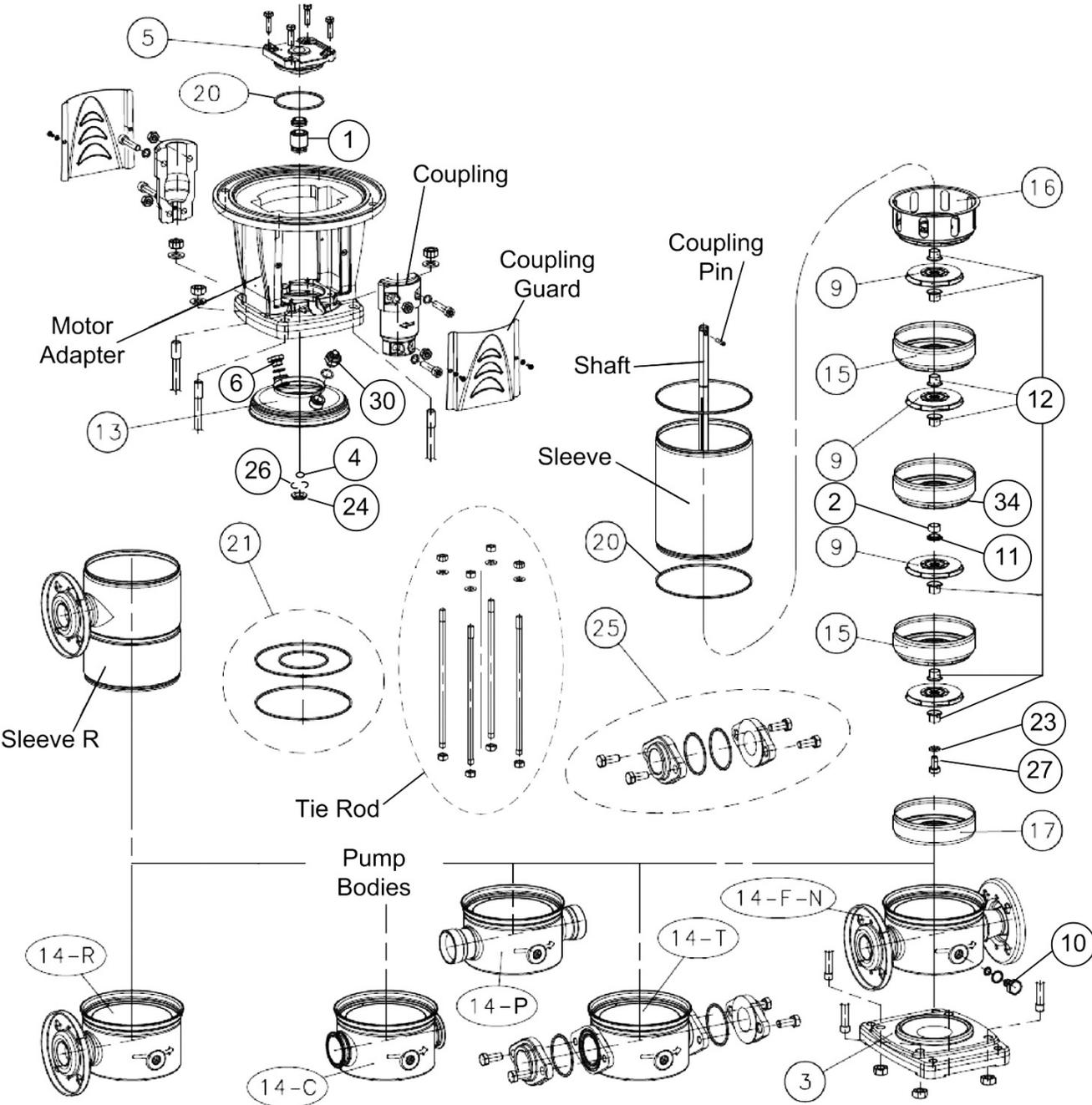
¹ Cla-Val, Includes Parts A-H (Illustrated, Page 59)

² Cla-Val, Includes Parts C, E, and G Only (Illustrated, Page 59)



Hyfab Model eMVP Pressure Booster
(Using 5SV-22SV Goulds e-SV Pumps)

Typical Goulds e-SV, Models 5SV – 22SV*



*Numerical references are specific to the Goulds e-SV repair parts manual, not the Hyfab booster parts matrix

e-SV repair parts listed represent the most commonly requested items. For a more comprehensive parts list, see e-SV repair parts manual

<https://documentlibrary.xylemappliedwater.com/wp-content/blogs.dir/22/files/2012/07/ReSV-R7.pdf>

eMVP BOOSTER COMPONENTS/COMMON REPLACEMENT PARTS, 5SV – 22SV						
1 CONTROL PANEL						
VFD	HP	Allen Bradley		Schneider Electric		
		208V	460V	208V	460V	
	1	HYFVFD1208-ABS	HYFVFD1460-ABS	HYFVFD1208-SES	HYFVFD1460-SES	
	1.5	HYFVFD1.5208-ABS	HYFVFD1.5460-ABS	HYFVFD1.5208-SES	HYFVFD1.5460-SES	
	2	HYFVFD2208-ABS	HYFVFD2460-ABS	HYFVFD2208-SES	HYFVFD2460-SES	
	3	HYFVFD3208-ABS	HYFVFD3460-ABS	HYFVFD3208-SES	HYFVFD3460-SES	
	5	HYFVFD5208-ABS	HYFVFD5460-ABS	HYFVFD5208-SES	HYFVFD5460-SES	
	7.5	HYFVFD7.5208-ABS	HYFVFD7.5460-ABS	HYFVFD7.5208-SES	HYFVFD7.5460-SES	
	10	HYFVFD10208-ABS	HYFVFD10460-ABS	HYFVFD10208-SES	HYFVFD10460-SES	
	15	HYFVFD15208-ABS	HYFVFD15460-ABS	HYFVFD15208-SES	HYFVFD15460-SES	
	20	HYFVFD20208-ABS	HYFVFD20460-ABS	HYFVFD20208-SES	HYFVFD20460-SES	
	25	N/A	HYFVFD25460-ABS	HYFVFD25208-SES	HYFVFD25460-SES	
30	N/A	HYFVFD30460-ABS	HYFVFD30208-SES	HYFVFD30460-SES		
Touchscreen	HYFCTRL-655					
Controller	HYFCTRL-172					
BAS Module	Schneider Electric	TM171ARS485				
MOTORS – FRAME VALUES REFERENCE IDENTIFIED MODELS ONLY						
HP	Frame Size	ODP – PE		TEFC - PE		
		230V/460V, USABLE AT 208V		230V/460V, USABLE AT 208V		
1	56C	VEM31115		VEM3545		
1.5		VEM31120		VEM3550		
2		VEM31155		VEM3555		
3		VEM31158		VEM3559		
5	180TC	VEM3212T		VEM3613T		
7.5		VEM3219T		VEM3616T		
10	210TC	VEM3312T		VEM3711T		
15		VEM3314T		VEM3713T		
20	250TC	VEM2514T		VEM4106T		
25		VEM2516T		Consult Factory		
30	Consult Factory	Consult Factory		Consult Factory		
2 e-SV PUMPS, 5SV – 22SV						
2.0	Pump Variant	Goulds	5SV	10SV	15SV	22SV
2.1	Pump Body	T Code (304SS Oval)	1L655		1L659	
		G Code (Cast Iron 250#)	1L664		1L659	
2.2	Impeller		2L921		1L665	
2.3	Diffuser		3L57	2L923	2L925	2L927
2.4	Casing		SEE E-SV REPAIR PARTS MANUAL FOR APPLICABLE TABLES			
2.5	Shaft					
2.6	Adaptor					
2.7	Base					
		G Code (Cast Iron 250#)	N/A – SEE PUMP BODY			
2.8	Coupling		SEE E-SV REPAIR PARTS MANUAL FOR APPLICABLE TABLES			
2.9	Seal Plate		1L842	1L844		
2.10	Mechanical Seal		10K168	10K169		
2.11	Casing O-Ring Kit		5K517		5K519	
2.12	Coupling Guard		SEE E-SV REPAIR PARTS MANUAL FOR APPLICABLE TABLES			
2.13	Shaft Bushing		4L602	4L603		
2.14	Vent Plug		6L19			
2.15	Tie Rods		SEE E-SV REPAIR PARTS MANUAL FOR APPLICABLE TABLES			
2.16	Wear Ring		N/A – SEE DIFFUSER			
2.17	Seal Gland		1K669	1K701		
3 THERMAL RELIEF VALVE						
	125 Degree Relief	Thermomegatech	242-000000-125			
	Compression Fitting	C-138				

WARNING: Control panel items (VFD, Controller, Touchscreen) require Hyfab-specific programming. Failure to obtain the appropriate programming will result in damage to the equipment.

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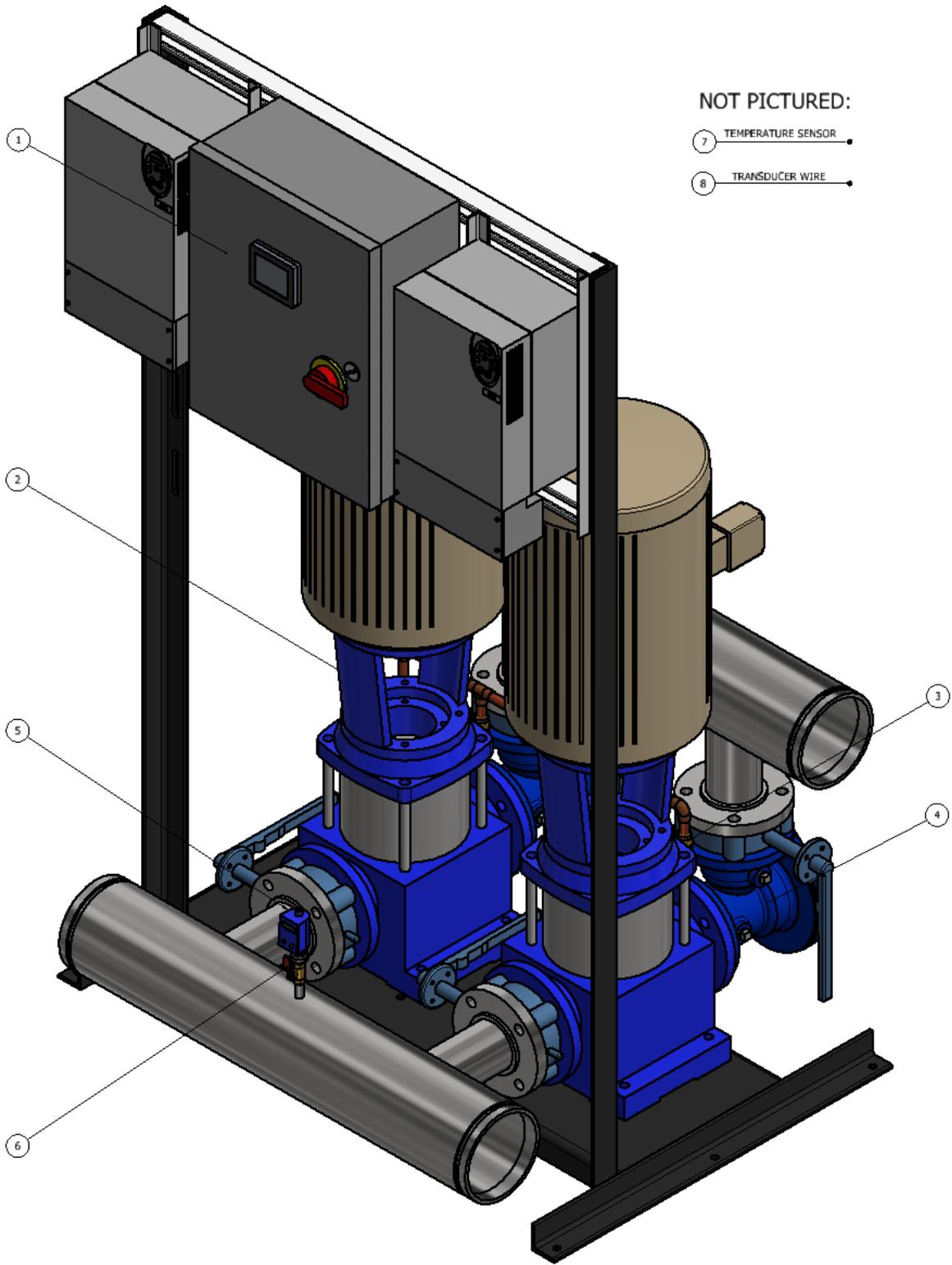
e-SV repair parts listed represent the most commonly requested items. For a more comprehensive parts list, see e-SV repair parts manual

<https://documentlibrary.xylemappliedwater.com/wp-content/blogs.dir/22/files/2012/07/ReSV-R7.pdf>

4		CHECK VALVE		
4.0	Check Valve Assembly	Cla-Val	1-1/2"	2"
		NPT	81-12-13C	81-12-1F
		300#	N/A	81-12-14B
4.1	Rebuild Kit	NPT	21176617J ¹	21176618H ¹
		300#	N/A	
4.2	Repair Kit	NPT	21176603E ²	21176608K ²
		300#	N/A	
5		LED DISPLAY/SWITCH		
	Schneider Electric	ZMLPA1P2SW		
6		PRESSURE TRANSDUCER		
	Schneider Electric	XMLP300PD230Q		
7		TEMPERATURE SENSOR		
	Mamac	TE-703-A-8-A-6/11		
8		TRANSDUCER WIRE		
	Schneider Electric	XZCPV1141L5		

¹ Cla-Val, Includes Parts A-H (Illustrated, Page 59)

² Cla-Val, Includes Parts C, E, and G Only (Illustrated, Page 59)

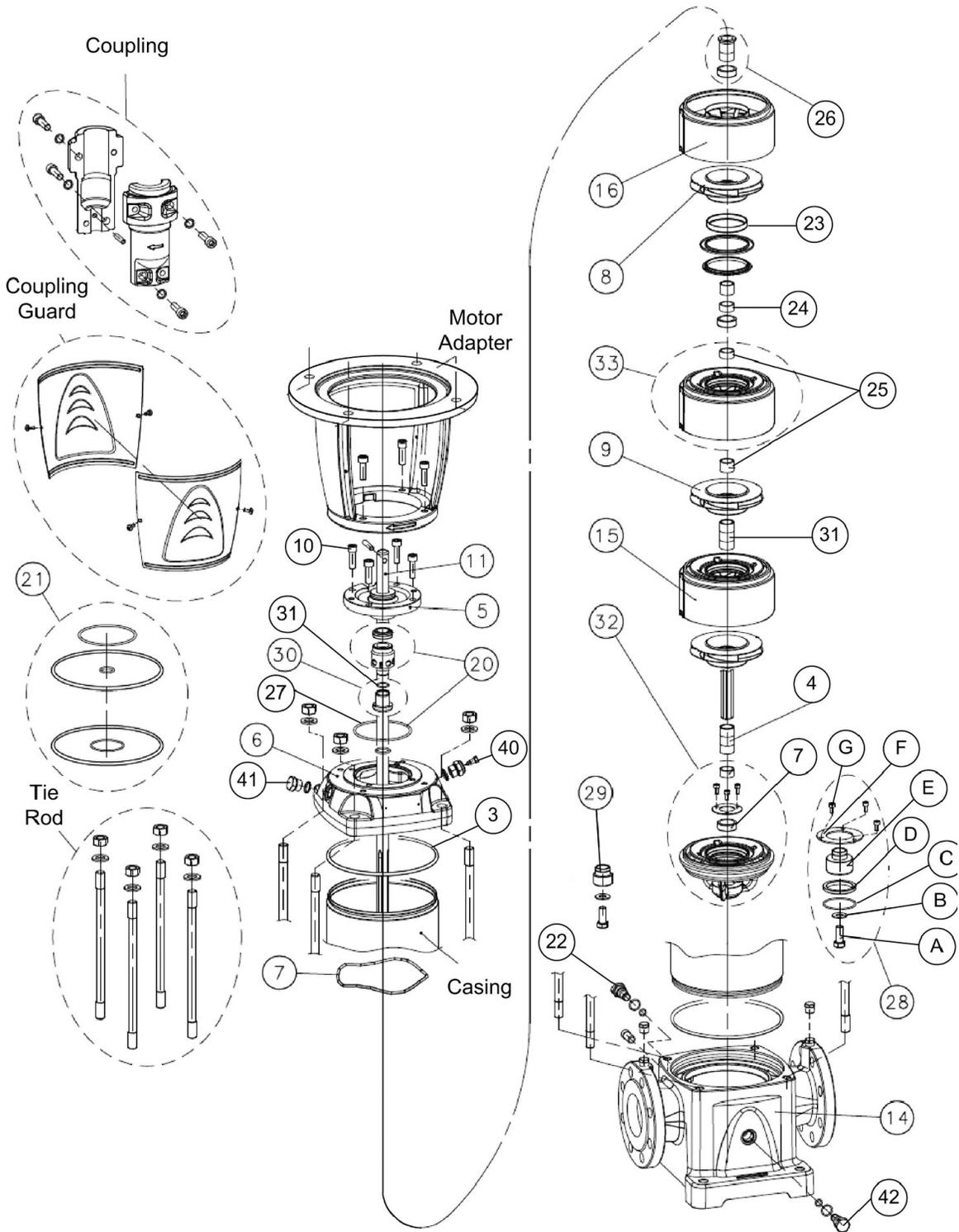


NOT PICTURED:

- 7 TEMPERATURE SENSOR
- 8 TRANSDUCER WIRE

Hyfab Model eMVP Pressure Booster
(Using 33SV-125SV Goulds e-SV Pumps)

Typical Goulds e-SV, Models 33SV – 92SV*



*Numerical references are specific to the Goulds e-SV repair parts manual, not the Hyfab booster parts matrix

e-SV repair parts listed represent the most commonly requested items. For a more comprehensive parts list, see e-SV repair parts manual

<https://documentlibrary.xylemappliedwater.com/wp-content/blogs.dir/22/files/2012/07/ReSV-R7.pdf>

eMVP BOOSTER COMPONENTS/COMMON REPLACEMENT PARTS, 33SV – 92SV								
1 CONTROL PANEL								
	VFD	HP*	Allen Bradley		Schneider Electric			
			208V	460V	208V	460V		
				5	HYFVFD5208-ABS	HYFVFD5460-ABS	HYFVFD5208-SES	HYFVFD5460-SES
				7.5	HYFVFD7.5208-ABS	HYFVFD7.5460-ABS	HYFVFD7.5208-SES	HYFVFD7.5460-SES
				10	HYFVFD10208-ABS	HYFVFD10460-ABS	HYFVFD10208-SES	HYFVFD10460-SES
				15	HYFVFD15208-ABS	HYFVFD15460-ABS	HYFVFD15208-SES	HYFVFD15460-SES
				20	HYFVFD20208-ABS	HYFVFD20460-ABS	HYFVFD20208-SES	HYFVFD20460-SES
				25	N/A	HYFVFD25460-ABS	HYFVFD25208-SES	HYFVFD25460-SES
		30	N/A	HYFVFD30460-ABS	HYFVFD30208-SES	HYFVFD30460-SES		
	Touchscreen	HYFCTRL-655						
	Controller	HYFCTRL-172						
	BAS Module	Schneider Electric	TM171ARS485					
MOTORS – FRAME VALUES REFERENCE IDENTIFIED MODELS ONLY								
HP*	Frame Size	ODP – PE		TEFC - PE				
		230V/460V, USABLE AT 208V		230V/460V, USABLE AT 208V				
1	56C	VEM31115		VEM3545				
1.5		VEM31120		VEM3550				
2		VEM31155		VEM3555				
3		VEM31158		VEM3559				
5	180TC	VEM3212T		VEM3613T				
7.5		VEM3219T		VEM3616T				
10	210TC	VEM3312T		VEM3711T				
15		VEM3314T		VEM3713T				
20	250TC	VEM2514T		VEM4106T				
25		VEM2516T		Consult Factory				
30		Consult Factory		Consult Factory				
2 e-SV PUMPS, 33SV – 92SV								
2.0	Pump Variant	Goulds	33SV	46SV	66SV	92SV		
2.4	Casing O-Rings Kit		5K376	5K377	5K379			
2.5	Mechanical Seal		10K199					
2.15	Tie Rods		SEE E-SV REPAIR PARTS MANUAL FOR APPLICABLE TABLES					
2.17	Vent Plug (Not Shown)		6L53					
2.19	Pump Head		1L632		1L633			
2.20	Impeller		Full Diameter	2L899	2L900	2L901	2L902	
			Reduced Diameter	2L903	2L904	2L905	2L906	
2.27	Casing		SEE E-SV REPAIR PARTS MANUAL FOR APPLICABLE TABLES					
2.29	Seal Housing		1L629					
2.32	Shaft Bushing Spacer		4L510					
2.36	Coupling Guard		SEE E-SV REPAIR PARTS MANUAL FOR APPLICABLE TABLES					
2.37	Shaft		SEE E-SV REPAIR PARTS MANUAL FOR APPLICABLE TABLES					
2.42	Pump Body	G Code (Cast Iron 125#)	1L640	1L642	1L644			
		G Code (Cast Iron 250#)	1L641	1L643	1L645			
2.44	Adaptor		SEE E-SV REPAIR PARTS MANUAL FOR APPLICABLE TABLES					
2.45	Coupling		SEE E-SV REPAIR PARTS MANUAL FOR APPLICABLE TABLES					
2.47	Wear Ring		15L47	15L48	15L49	15L50		
3 THERMAL RELIEF VALVE								
	125 Degree Relief	Thermomegatech	242-000000-125					
	Compression Fitting	C-138						

WARNING: Control panel items (VFD, Controller, Touchscreen) require Hyfab-specific programming. Failure to obtain the appropriate programming will result in damage to the equipment.

*Consult factory for horsepower values over 30HP

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e-SV repair parts listed represent the most commonly requested items. For A More Comprehensive Parts List, See e-SV Repair Parts Manual

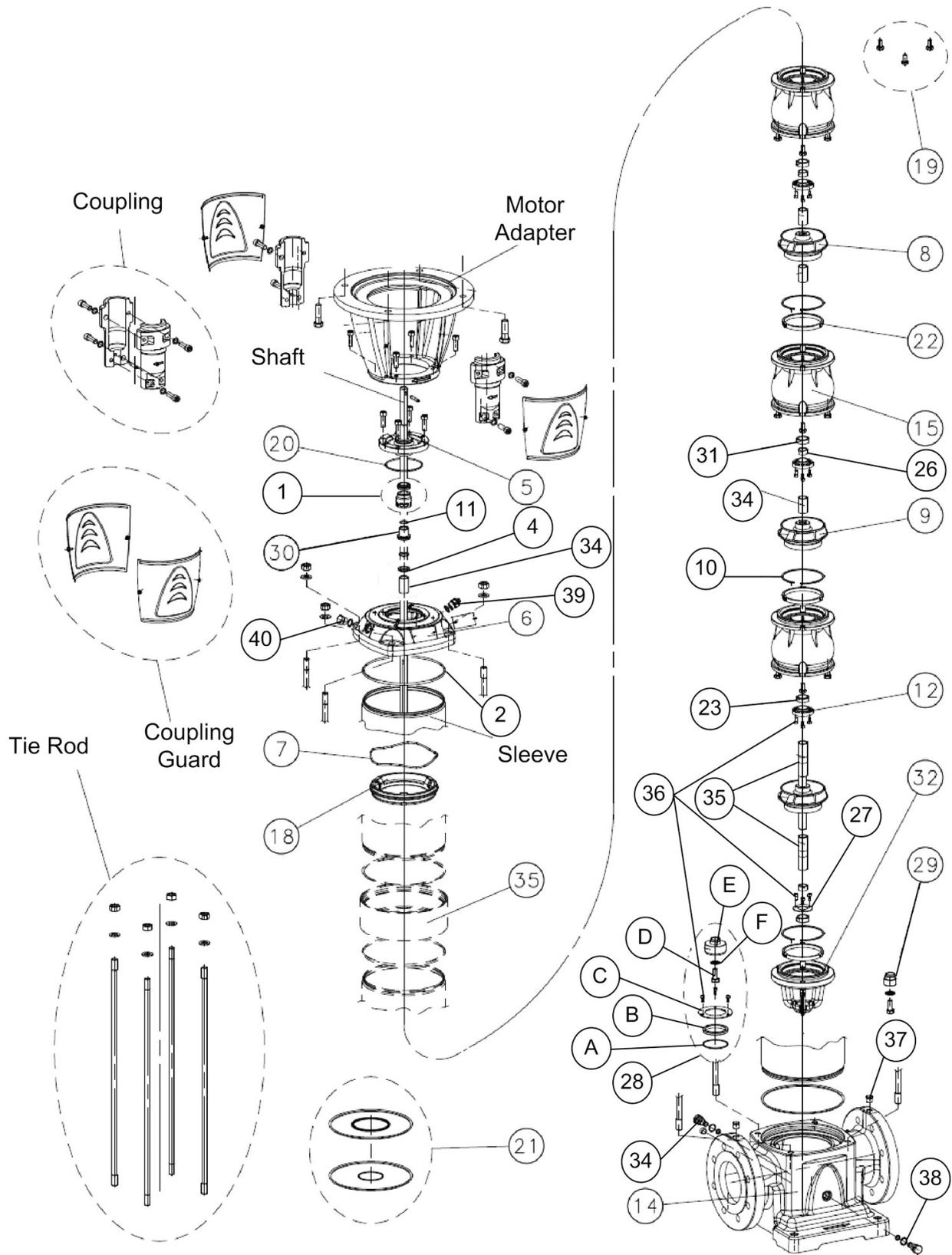
<https://documentlibrary.xylemappliedwater.com/wp-content/blogs.dir/22/files/2012/07/ReSV-R7.pdf>

4		CHECK VALVE			
4.0	Check Valve Assembly	Cla-Val	2-1/2"	3"	4"
		150#	81-12-3B	81-12-9J	81-12-24K
		300#	81-12-15A	81-12-16K	81-12-21C
4.1	Rebuild Kit	150#	21176619G ¹	21176620D ¹	21176621C ¹
		300#			
4.2	Repair Kit	150#	21176609J ¹	21176604D ²	21176605C ²
		300#			
5		LED DISPLAY/SWITCH			
	Schneider Electric	ZMLPA1P2SW			
6		PRESSURE TRANSDUCER			
	Schneider Electric	XMLP300PD230Q			
7		TEMPERATURE SENSOR			
	Mamac	TE-703-A-8-A-6/11			
8		TRANSDUCER WIRE			
	Schneider Electric	XZCPV1141L5			

¹ Cla-Val, Includes Parts A-H (Illustrated, Page 59)

² Cla-Val, Includes Parts C, E, and G Only (Illustrated, Page 59)

Typical Goulds e-SV, Models 125SV*



*Numerical references are specific to the Goulds e-SV repair parts manual, not the Hyfab booster parts matrix

e-SV repair parts listed represent the most commonly requested items. For A More Comprehensive Parts List, See e-SV Repair Parts Manual

<https://documentlibrary.xylemappliedwater.com/wp-content/blogs.dir/22/files/2012/07/ReSV-R7.pdf>

eMVP BOOSTER COMPONENTS/COMMON REPLACEMENT PARTS, 125SV						
1 CONTROL PANEL						
	VFD	HP*	Allen Bradley		Schneider Electric	
			208V	460V	208V	460V
		15	HYFVFD15208-ABS	HYFVFD15460-ABS	HYFVFD15208-SES	HYFVFD15460-SES
		20	HYFVFD20208-ABS	HYFVFD20460-ABS	HYFVFD20208-SES	HYFVFD20460-SES
		25	N/A	HYFVFD25460-ABS	HYFVFD25208-SES	HYFVFD25460-SES
		30	N/A	HYFVFD30460-ABS	HYFVFD30208-SES	HYFVFD30460-SES
	Touchscreen	HYFCTRL-655				
	Controller	HYFCTRL-172				
	BAS Module	Schneider Electric	TM171ARS485			
	MOTORS – FRAME VALUES REFERENCE IDENTIFIED MODELS ONLY					
	HP*	Frame Size	ODP – PE		TEFC - PE	
			230V/460V, USABLE AT 208V		230V/460V, USABLE AT 208V	
	15	210TC	VEM3314T		VEM3713T	
	20	250TC	VEM2514T		VEM4106T	
	25		VEM2516T		Consult Factory	
	30	Consult Factory	Consult Factory		Consult Factory	
2 e-SV PUMPS, 125SV						
2.0	Pump Variant	Goulds	125SV			
2.4	Casing O-Ring Kit		5K379			
2.5	Mechanical Seal		10K199			
2.15	Tie Rods		SEE E-SV REPAIR PARTS MANUAL FOR APPLICABLE TABLES			
2.17	Vent Plug (Not Shown)		6L53			
2.19	Pump Head		1L633			
2.20	Impeller		A (141mm)	B (136mm)	C (145mm)	
			2K1235	2K1232	2K1231	
2.27	Casing		SEE E-SV REPAIR PARTS MANUAL FOR APPLICABLE TABLES			
2.29	Seal Housing		1L629			
2.32	Shaft Bushing Spacer		4L514			
2.36	Coupling Guard		SEE E-SV REPAIR PARTS MANUAL FOR APPLICABLE TABLES			
2.37	Shaft					
2.42	Pump Body		G Code (Cast Iron 125#)	1L666		
			G Code (Cast Iron 250#)	1L667		
2.44	Adaptor		SEE E-SV REPAIR PARTS MANUAL FOR APPLICABLE TABLES			
2.45	Coupling					
2.47	Wear Ring	4K1014				
3 THERMAL RELIEF VALVE						
	125 Degree Relief	Thermomegatech	242-000000-125			
	Compression Fitting	C-138				
4 CHECK VALVE						
4.0	Check Valve Assembly	Cla-Val	6"			
		150#	81-12-16G			
		300#	81-12-5B			
4.1	Rebuild Kit	150#	21176622B ¹			
		300#				
4.2	Repair Kit	150#	21176606B ¹			
		300#				
5 LED DISPLAY/SWITCH						
	Schneider Electric	ZMLPA1P2SW				
6 PRESSURE TRANSDUCER						
	Schneider Electric	XMLP300PD230Q				
7 TEMPERATURE SENSOR						
	Mamac	TE-703-A-8-A-6/11				
8 TRANSDUCER WIRE						
	Schneider Electric	XZCPV1141L5				

¹ Cla-Val, Includes Parts A-H (Illustrated, Page 59)

² Cla-Val, Includes Parts C, E, and G Only (Illustrated, Page 59)

OPTIONAL BOOSTER ACCESSORIES			
Kit	Booster Header Size	Part Number	Description
Flange Adaptor Kits	3"	MVP-FK3	Grooved Stub Ends With 150# Backer Flanges (Pair) Includes Stainless to Stainless Grooved Couplings
	4"	MVP-FK4	
	6"	MVP-FK6	
Copper Transitions	3"	MVP-TF3	Grooved (Header Connection) Copper Stub Ends (Pair) Includes Copper to Stainless Grooved Couplings
	4"	MVP-TF4	
	6" and above	N/A	
Flexible Transition Fittings	3"		N/A
	4"	MVP-FTC-3C	Flexible Transitions, 4" Header to 3" Copper Stub System Connection (Pair), Includes Grooved Couplings
		MVP-FTC-4C	Flexible Transitions, 4" Header to 4" Copper Stub System Connection (Pair), Includes Grooved Couplings
		MVP-FTC-4F	Flexible Transitions, 4" Header to 4" 150# Flange System Connection (Pair), Includes Grooved Couplings
	6"		N/A
Tank Easy Connect	3"	MVP-TC-3	Grooved Concentric Fitting with Cold Fill Valve Replaces End Cap on Discharge Header When Used
	4"	MVP-TC-4	
	6"	MVP-TC-6	

Frequently Asked Questions

- **Capital ‘E’ is on the Altivar 212 drive display:**
 - Press the Stop button two times in rapid succession to reset VFD.
 - (The capital ‘E’ will only appear when the Stop button on the VFD is pressed once to stop the drive)
- **System is connected, but will not operate:**
 - The system may be set at an incorrect pressure.
 - If the setpoint is too low, increase it to the appropriate setpoint.
 - (The default setpoint of most systems is 50 psi, unless otherwise requested)
 - If unsure how to adjust the setpoint, review the instructions in this manual.
- **EPHI on the Altivar 212 drive display (Input phase loss) VFD alarm condition is present:**
 - This indicates an input phase failure.
 - An input phase failure can be common after storms and electrical surges.
 - If input power is OK, A system reset will clear the alarm.
- **Touchscreen is not operating:**
 - An unlit touchscreen may indicate no power to the panel.
 - To preserve display life, display backlight powers down after 10 minutes of inactivity. Touching the display area will power up the display, if it has timed out.
- **System is in High System Pressure Shutdown:**
 - Verify that supply pressure sensor is wired and functioning properly (indicating accurate system pressure).
 - Check High Discharge Pressure Shutdown (HPSD) setting. It may be set too low.
 - Verify that system has been tuned via PID settings to ensure smooth, adequate responses to system pressure fluctuations.
- **EPHO on the Altivar 212 drive display (Output phase loss) VFD alarm condition is present:**
 - This indicates a problem with the drive output.
- **Pump is making loud noises:**
 - Loud noise in single-stage pumps may indicate low suction pressure.
 - Make sure that air is totally removed from the system.
 - This could indicate an internal problem with the pump that requires a pump service technician to remedy.
- **Output pressure of the pump is fluctuating:**
 - Continuous pressure fluctuations of more than 8 psi indicate that the PID settings may need to be adjusted.
 - Check the air pressure charge in the hydropneumatic tank.
 - Check the PID Tuning.
 - If the booster is overreacting to system pressure fluctuations then the Proportional Gain should be reduced. If the booster isn’t reacting enough then the Proportional Gain should be increased. Make small changes. A little change in the Proportional Gain goes a long way.
 - The Integral may need to be adjusted as well. The Integral is constantly increasing, or reducing the speed of the system to meet setpoint. A larger Integral results in slower increases/decreases.
 - The Proportional and Integral should be adjusted so that the booster reacts to system requirement fluctuations as quickly and as accurately as possible. On a significant fluctuation, the Proportional is responsible for the initial booster reaction and the Integral works to get the booster on setpoint. Small system fluctuations are handled by the Integral, for the most part.
 - Isolate the tank from the system and check:
 - PID Tuning
 - SetPoint
 - Restart Pressure

Additional Components

Baldor Motors

Baldor Motor IOMs are available at <http://www.baldor.com/resources-and-support/download-center#area=%22manuals%22>

Cla-Val Check Valves

Cla-Val Check Valve Literature is available at: <http://www.cla-val.com/81-02-681-02-check-valve-p-127.html>

Goulds Model 3656-S, Model e-SV Pumps

3656-S Literature is available at: <http://goulds.com/centrifugal-pumps-boosters/single-stage-end-suction/3656-s3756-s-group-cast-iron-bronze-pumps/#product-tab-literature>

e-SV Literature is available at: <http://goulds.com/centrifugal-pumps-boosters/multi-stage-pumps/esv-series/#product-tab-literature>

Magelis HMI

HMI Literature is available at: <http://www.schneider-electric.us/en/download/document/EAV15984/>

Modicon Controller Series

Controller Literature is available at: <http://www.schneider-electric.com/en/product/TM172PBG28R/modicon-m172-performance-blind-28-i-os%2C-ethernet%2C-modbus/?range=62420-modicon-m171-m172&node=1427133103-modicon-m171-m172>

Square D Altivar 212 VFD

ATV212 Literature is available at: <http://www.schneider-electric.us/en/download/doc-type/1555855-User%20guide/?category=66009262-AC+Drives+and+Soft+Starters&range=60162-Altivar+212+Drive>

Allen Bradley PowerFlex 523 VFD

PF523 Literature is available at: <http://ab.rockwellautomation.com/Drives/PowerFlex-523#documentation>

Therm-Omega-Tech Econo/HAT-RA

Temperature Relief Valve Literature is available at: <http://www.thermomegatech.com/product/econohat-ra/>

Warranty

HYFAB Packaged Systems Warranty

HYFAB warrants for a period of eighteen (18) months from date of shipment from its factory or one (1) year from date of installation, whichever occurs first, that all Products furnished by HYFAB are free from defects in materials and workmanship.

HYFAB's liability for any breach of this Warranty shall be limited solely to replacement or repair, at the sole option of HYFAB, of any part or parts found to be defective during the Warranty period provided the Product is properly installed and is being used as originally intended. Buyer must notify HYFAB of any breach of this Warranty within the aforementioned Warranty period: defective parts must be shipped by Buyer to Seller with transportation charges prepaid.

IT IS EXPRESSLY AGREED THAT THIS SHALL BE THE SOLE AND EXCLUSIVE REMEDY OF THE BUYER. UNDER NO CIRCUMSTANCES SHALL HYFAB BE LIABLE FOR ANY COSTS, LOSS EXPENSE DAMAGES, SPECIAL DAMAGES, INCIDENTAL DAMAGES OR CONSEQUENTIAL DAMAGES ARISING DIRECTLY OR INDIRECTLY FROM THE DESIGN, MANUFACTURE, SALE, USE OR REPAIR OF THE PRODUCT WHETHER BASED UPON WARRANTY, CONTRACT, NEGLIGENCE OR STRICT LIABILITY. IN NO EVENT WILL LIABILITY EXCEED THE PURCHASE PRICE OF THE PRODUCT. THE WARRANTY AND LIMITS OF LIABILITY CONTAINED HEREIN ARE IN LIEU OF ALL OTHER WARRANTIES AND LIABILITIES, EXPRESSED OR IMPLIED. ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED BY SELLER AND EXCLUDED FROM THIS WARRANTY.

HYFAB neither assumes nor authorizes any person to assume for it, any other Warranty obligation in connection with the sale of the Product. This Warranty shall not apply to any Product or parts of Products which (a) have been repaired or altered outside of HYFAB's facilities; or (b) have been subject to misuse, negligence or accident; or (c) have been used in a manner contrary to HYFAB's instructions.

In the case of products not manufactured by HYFAB, there is no warranty from HYFAB, but HYFAB will extend to the Buyer any Warranty of Seller's supplier of such products.



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eMVP/MVP
Modular Variable Speed
Pressure Boosters with M172 v6.xx Software

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Version A