VARIOspeed® Quick Start Manual

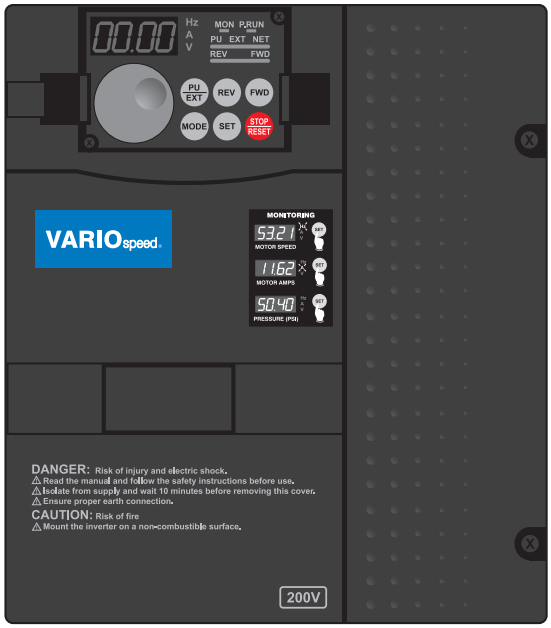
for Constant Pressure Applications

This VARIOspeed® Drive has been factory pre-programmed for your specific pressure control application.

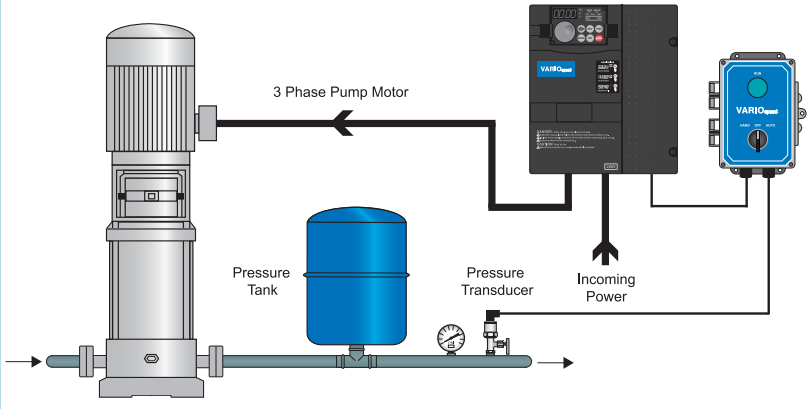
All relevant parameters have been configured to match the provided pump data and system pressure requirements.

Should you need to make minor adjustments, please consult the parameter table enclosed in this document.

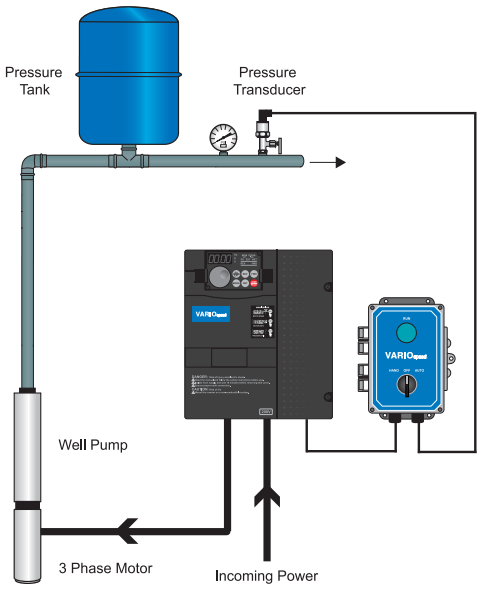
Consult the factory for assistance.



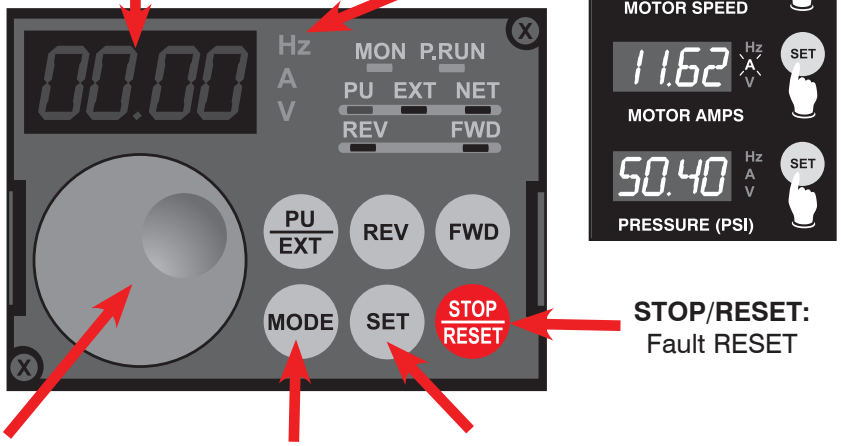
Pressure Booster Pump Application



Deep Well Submersible Pump Application



Display and Keypad



Monitoring Hz, Amps and PSI
Press the SET button to toggle the display from:
- Motor speed (Hz ON)
- Motor Amps (A ON)
- Pressure (Hz, A & V OFF)

SETTING DIAL: Used to scroll through parameter list and edit parameter value.

MODE: To display parameters. Also used to exit back to monitoring display.

SET: Used to save parameter value after editing. During operation the SET button is used to monitor motor Hz, amps and pump discharge pressure.

PARAMETERS	DESCRIPTION
P. 2	Minimum frequency
P. 9	Electronic thermal O/L relay
P. 44	Acceleration time 2
P. 45	Deceleration time 2
P. 77	Parameter write selection
P. 127	Pre-charge Frequency
P. 129	PID proportional band
P. 130	PID integral time
P. 131	High pressure alarm
P. 133	Pressure set point
P. 160	User group read selection
P. 195	Output relay 1
P. 575	Sleep timer
P. 576	Sleep frequency
P. 577	Start pressure (differential)
P. 761	Pre-Charge Pressure
P. 762	Pre-Charge Timer
C. ...	C functions
Pr. CL	Parameter clear
AL LC	All parameter clear
Er. CL	Faults history clear
PCPY	Parameter copy

Example: Changing the Set Pressure

1. Press **MODE** to choose the parameter setting mode.

(The parameter number read previously appears.)

2. Turn the **SETTING DIAL** until P.133 (Pr. 1) appears.

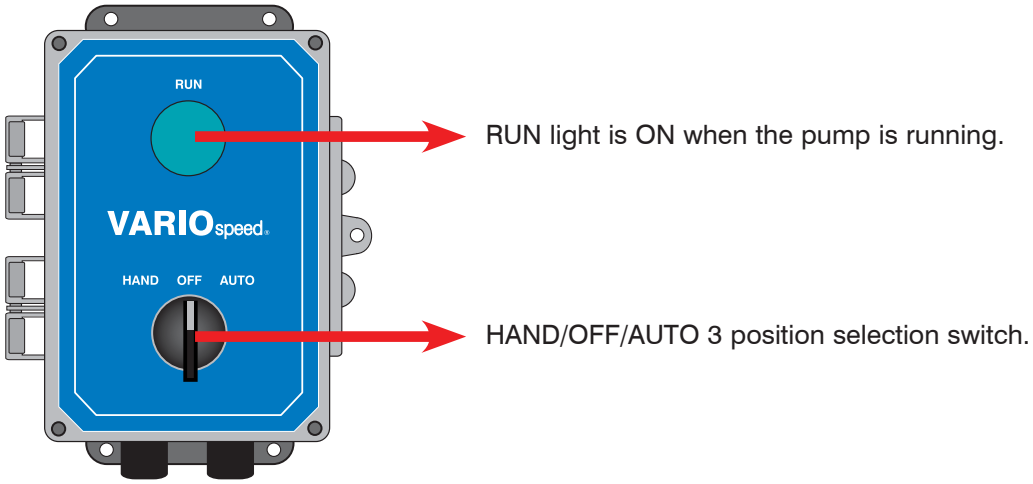
3. Press **SET** to read the current pressure set point value. "50.00" (initial value) appears.

4. Turn the **SETTING DIAL** to change it to the pressure set point value "55.00".

5. Press **SET** to save. **Flash --- Parameter setting complete!**

- Turn **SETTING DIAL** to read another parameter
- Press **SET** to show the setting again.
- Press **SET** twice to show the next parameter.
- Press **MODE** twice to return the monitor to frequency monitor.

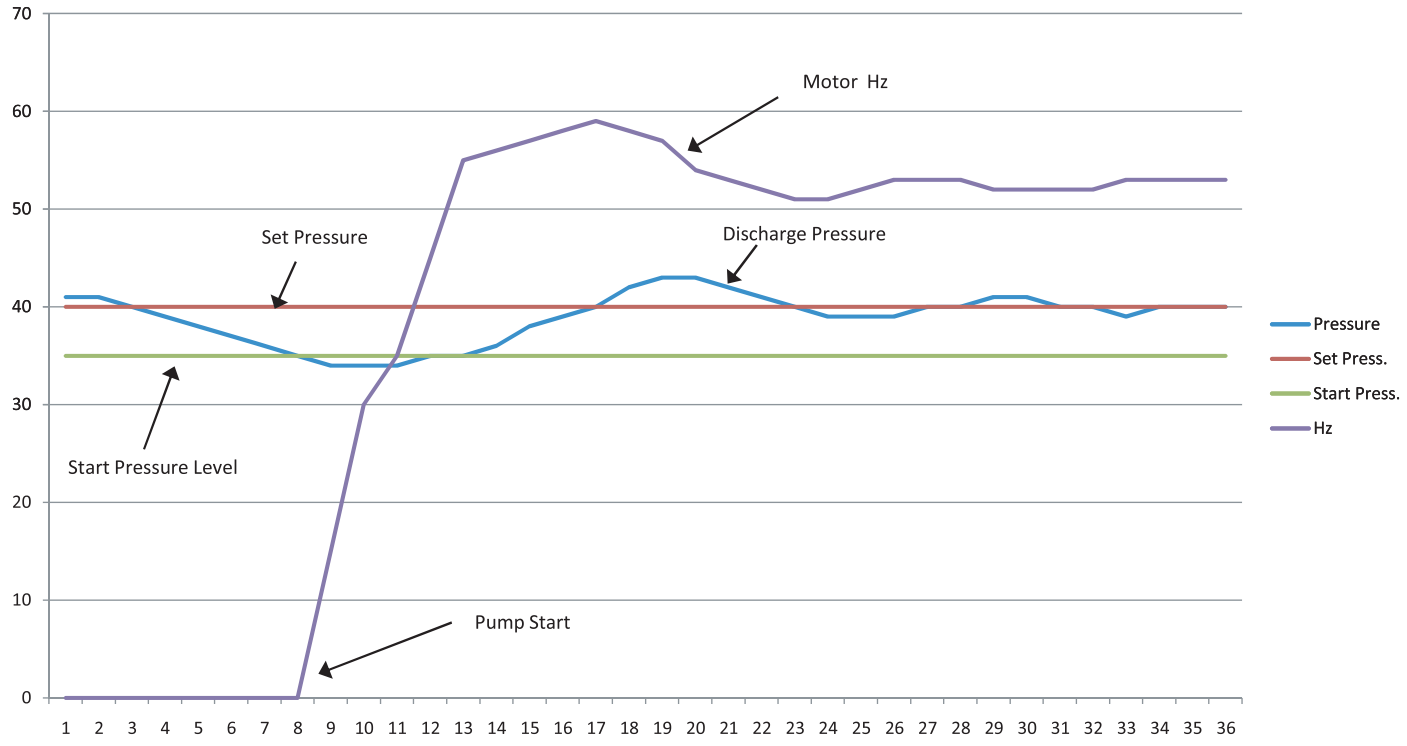
HAND/OFF/AUTO Operation



HAND position
The pump will run immediately. The motor speed is controlled manually by adjusting the setting dial on the VFD and pressing the SET button to accept.

OFF position
The pump will not run

AUTO position
The pump will not run if the pressure is above the set pressure. The pump will run if the pressure drops below the Set Pressure less the Start Pressure. Example if set the set pressure is 40PSI (P.133=40 PSI), and the Start Pressure is 5PSI (P.577=1005). The pump will start when the pressure drops below 35PSI (see example below)



Parameter List

PARAMETERS	DESCRIPTION	RANGE	DEFAULT	TYPICAL
P. 2	Minimum frequency	0 to 120Hz	0Hz	30.0Hz
P. 9	Electronic thermal O/L relay	0 to 3600A	xxx.xA	xxx.xA
P. 44	Acceleration time 2	0 to 360s	5s	5s
P. 45	Deceleration time 2	0 to 360s	5s	5s
P. 77	Parameter write selection	Not used	Not used	Not used
P. 127	Pre-Charge Frequency		9999	30Hz
P. 129	PID proportional band	0.1 to 1000	100%	
P. 130	PID integral time	0.1 to 3600s	1s	2s
P. 131	High pressure Alarm	0 to 200PSI	9999	75PSI
P. 133	Pressure set point	0 to 200PSI	9999	55PSI
P. 160	User group read selection	Not used	Not used	Not used
P. 195	Output relay 1		Alarm	
P. 575	Sleep timer	0 to 3600s	1s	10s
P. 576	Sleep Frequency	0 to 400Hz	0Hz	35Hz
P. 577	Start Pressure (differential)	900 to 1100%	1000%	1005 (5 PSI)
P. 761	Pre-Charge Pressure	0-200PSI	9999	9999 (Disabled)
P. 762	Pre-Charge Timer	0.0 to 3600s	9999	9999 (Disabled)
C. ...	C functions	Not used	Not used	Not used
Pr. CL	Parameter clear	Not used	Not used	Not used
AL LC	All parameter clear	Not used	Not used	Not used
Er. CL	Faults history clear	Not used	Not used	Not used
PCPY	Parameter copy	Not used	Not used	Not used

Minimum frequency: (P.2)
The pump will not be allowed run below this frequency. It must be set at 30Hz for submersible well pumps.

Electronic thermal O/L relay: (P.9)
The electronic overload will trip the VFD and protect the motor from damage in the event an overload condition. Set this value to match the motor nameplate Full Load Amps. For submersible well pumps, set to the motor Max. Amps (Service Factor Amps).

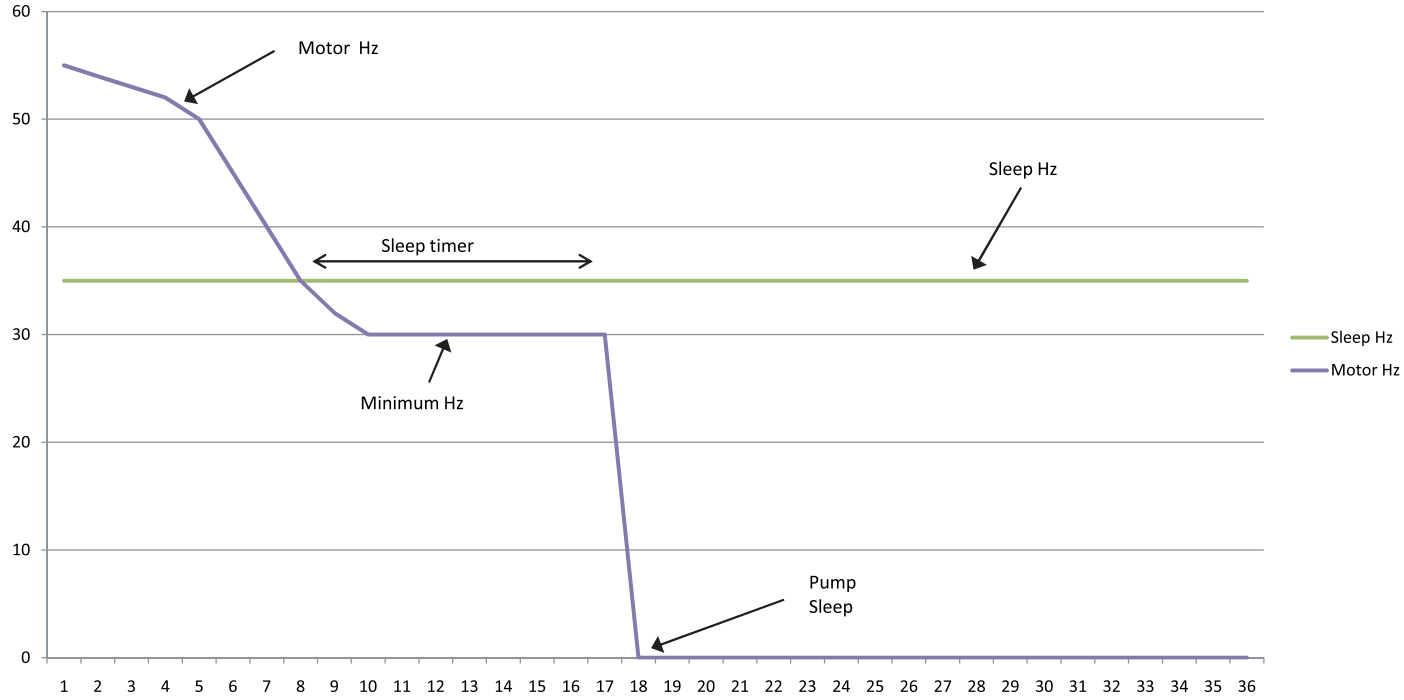
Acceleration/Deceleration time 2: (P.44, P.45)
P.44 Acceleration rate in seconds
P.45 Deceleration rate in seconds
Applicable to the Acceleration/Deceleration rate from 30Hz to 60Hz.

Pre-Charge function: (P.127, P.761, P762)
P.127 Pre-Charge Frequency
P.761 Pre-Charge Pressure
P.762 Pre-Charge Timer
The Pre-Charge function is used for filling a pipe at a lower speed to reduce water hammer. This is particularly useful in irrigation applications with long pipe runs. The pump will run at a fixed frequency "**P.127**" till the "**Pre-Charge TIMER P 762**" is done or the pressure reaches the "**Pre-Charge PRESSURE P. 761**". The pump speed will no longer be fixed after that point and automatic pressure control will resume.
Caution!
Always set Pre-charge pressure (P.761) below the pressure set point (P.133). It is recommended for the Pre-charge pressure to be set at least 20PSI below the pressure set point, even when only using Pre-charge timer

Parameter List

(P.762). PID: (P.133, P.129, P130, P131)
P.133 is the **Pressure Set Point** (target pressure to be maintained at pump discharge). It cannot exceed the range of the pressure transducer (typically 0-200PSI).
P.129 is the **Proportional Band**. For advanced users only.
This parameter is used for adjusting the frequency output control reaction to pressure changes. Decrease for larger (faster) corrections. Default is 100%. Decrease if large pressure overshoots on start up occurs.
P.130 is the **Integral Time**. For advanced users only.
This parameter is used for adjusting the frequency output control reaction to pressure changes. Decrease for larger (faster) corrections. Default is 2sec. Decrease for faster response, increase if quick unstable oscillations occur.
P.131 is the **High Pressure Alarm Set Point**.
The VFD will stop and display E.PId if the pressure rises above this value. Typically set to 20PSI above set point (P.133)

Sleep Mode: (P.575, P.576, P577)
P.575 is the **Sleep Timer**. This timer starts when the VFD output frequency drops below the Sleep Frequency (P.575). The pump will go to sleep (pump stopped) when this timer is done (typically 10Sec).
P.576 is the **Sleep Frequency**. The Sleep Timer (P.575) starts the VFD output frequency drops below this frequency (typically 35Hz).
P.577 is the **Start Pressure (Differential)**. The pump will start if the pressure drops below the Set Pressure less the Start Pressure. **Example:** If set the Set Pressure is 40PSI (P.133=40 PSI), and the Start Pressure is 5PSI (P.577=1005, the pump will start when the pressure drops below 35PSI (see example on page 3.) Typically set to 1005 (5PSI).
Notes:
If the system cycles on and off too frequently try the following: increase the Sleep Timer (P.575), or lower the Sleep Frequency (P.576) or increase the Start Pressure (P.577). A combination of change in all three parameters may be necessary. If the pump does not go to sleep when there is no water demand (no flow), the Sleep Frequency (P.576) must be increased.



Output Relay: (P.195)
VFD relay output1 can be programmed to operate on various system conditions:
Set to 0 for relay activation when the pump is running.
By default, the relay will be energized when the VFD is in an fault state (P.195 = 99)
Terminals A1 (Normally Open Contact), B1 (Normally Closed Contact), and C1 (Common).

Faults, Alarms and Warning Codes

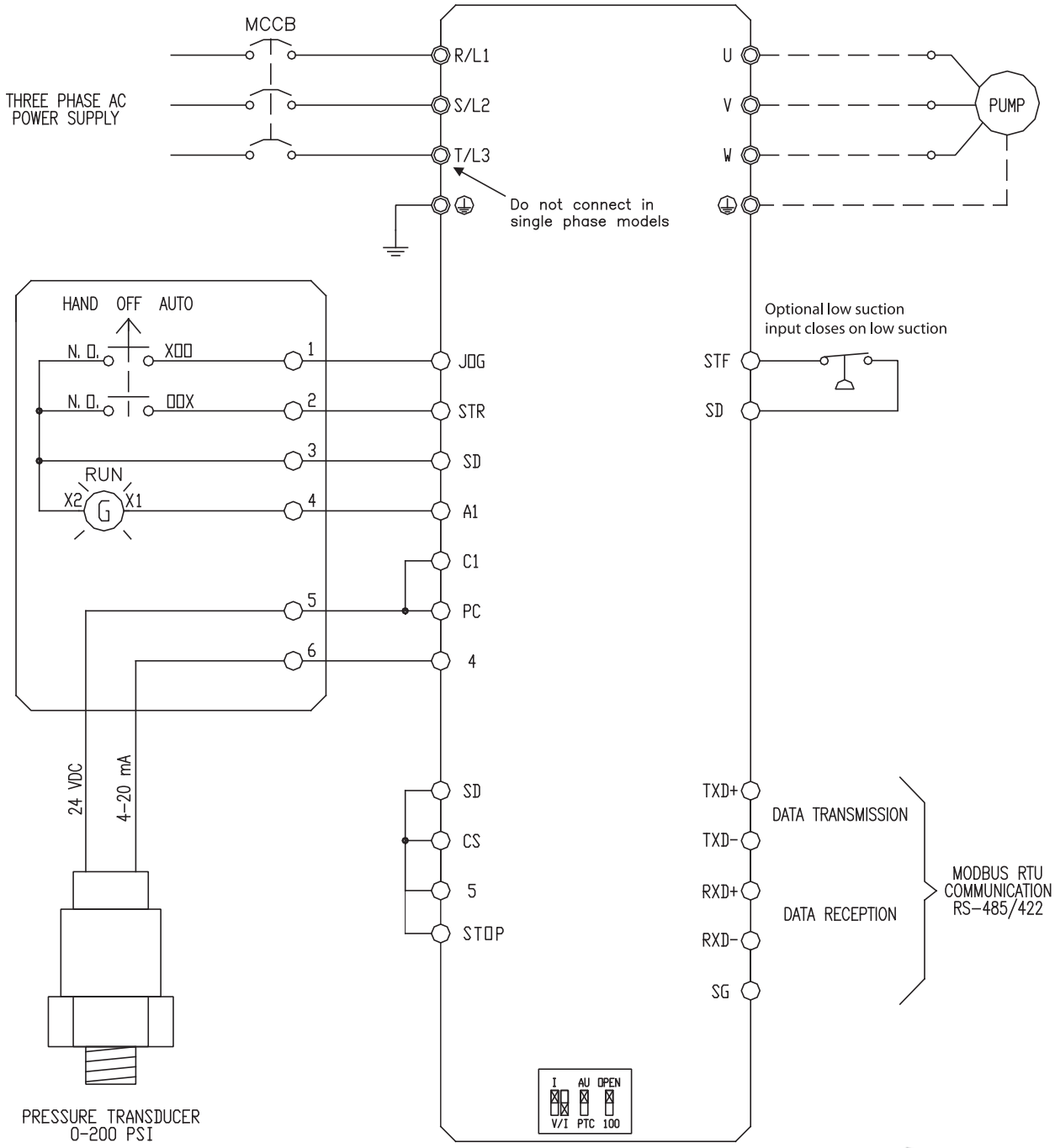
FAULTS	
E.OC1	Overcurrent trip during acceleration
E.OC2	Overcurrent trip during constant speed
E.OC3	Overcurrent trip during deceleration
E.OV1	Regenerative overvoltage
E.OV2	Regenerative overvoltage
E.OV3	Regenerative overvoltage trip
E.THT	Inverter overload trip
E.THM	Motor overload trip
E.FIN	Fin overheat
E.IPF	Instantaneous power failure
E.BE	Brake transistor alarm
E.UVT	Undervoltage
E.ILF	Input phase loss
E.OLT	Stall prevention
E.GF	Output side earth (ground)
E.LF	Output phase loss
E.OHT	External thermal relay
E.PTC	PTC thermistor operation
E.OPT	Option fault
E.OP1	Communication option fault
E. 1	Option fault
E.PE	Parameter storage device
E.PUE	PU disconnection
E.RET	Retry count excess
E.PE2	Parameter storage device
E. 5	CPU Fault
E. 6	CPU Fault
E. 7	CPU Fault
E.CPU	CPU Fault
E.CTE	CPU Fault
E.P24	24VDC power output short
E.CDO	Output current detection
E.IOH	Inrush current limit circuit
E.SER	Communication fault
E.AIE	Analog input fault
E.PID	PID signal fault (High pressure)
E.13	Internal circuit fault
E.PCH	Precharge function fault
E.16	Dry well
E.17	Low pressure fault
E.18	High pressure fault
E.19	Low suction fault

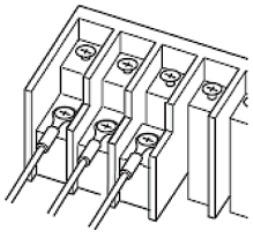
ALARMS	
FN	Fan alarm
E---	Faults history
HOLD	Operation panel lock
Er1 to 4	Parameter write error
rE1 to 4	Copy operation error
Err.	Error

WARNINGS	
OL	Stall prevention overcurrent
oL	Stall prevention overvoltage
RB	Regenerative brake prealarm
TH	Electronic thermal relay function prealarm
PS	PU stop
MT	Maintenance signal output
CP	Parameter copy

IMPORTANT:
Faults can be reset by pressing the STOP/RESET button on the VFD. The selector switch must be in the "OFF" position to reset fault. Please contact your distributor if you are not able to reset a fault.

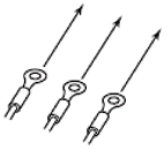
Terminal Connections





IMPORTANT

Ring terminal must be used on POWER (R/L1, S/L2, T/L3) and MOTOR (U, V, W) connection. See the installation manual for sizing and torque requirements.



Notes: _____

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