15W0129B100

Pump Monitoring with Pressure PID Control when using a Sinus B Plus VFD

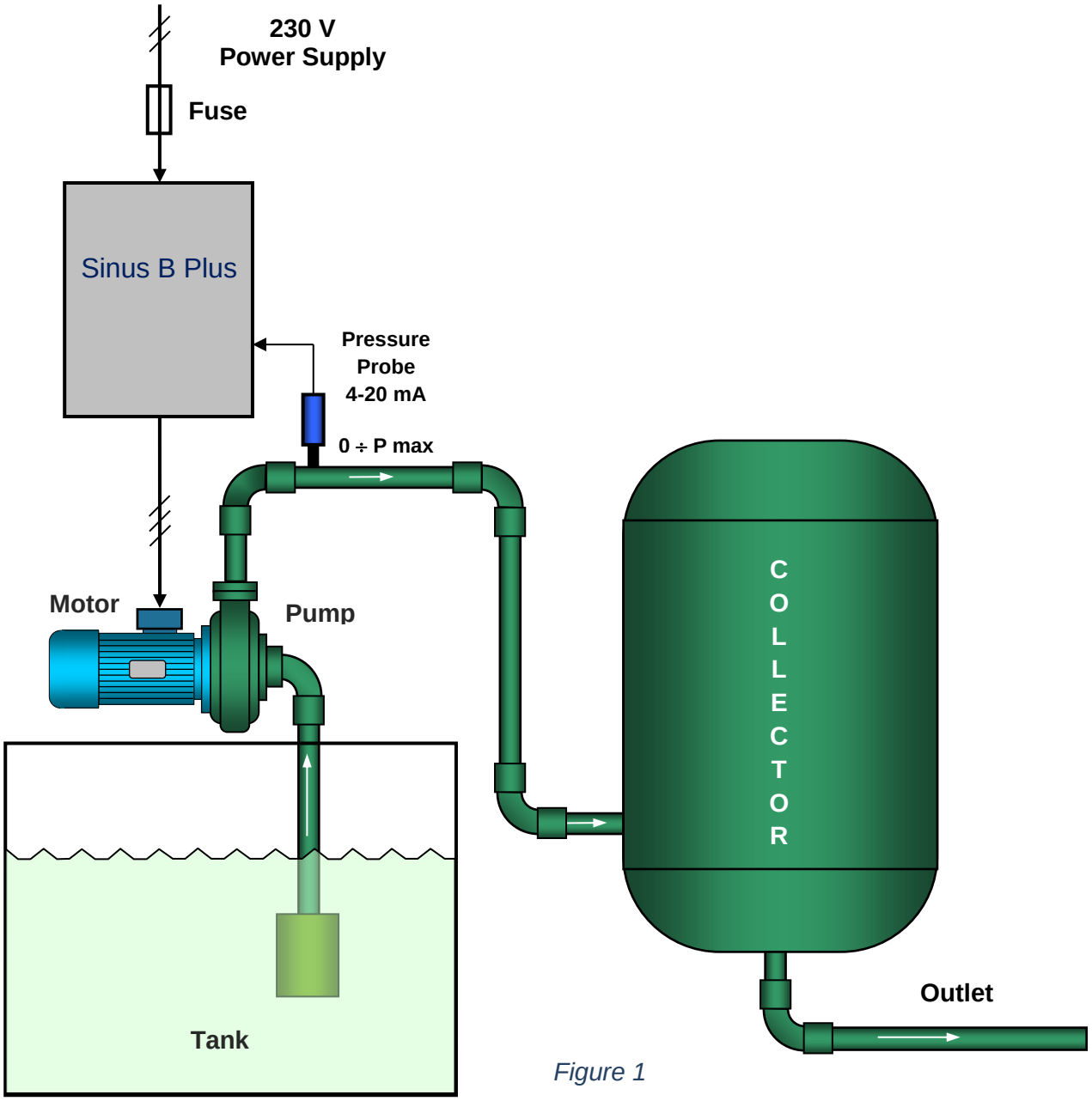

Figure 1

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Electrical Schematic (2-wire Passive Sensor)

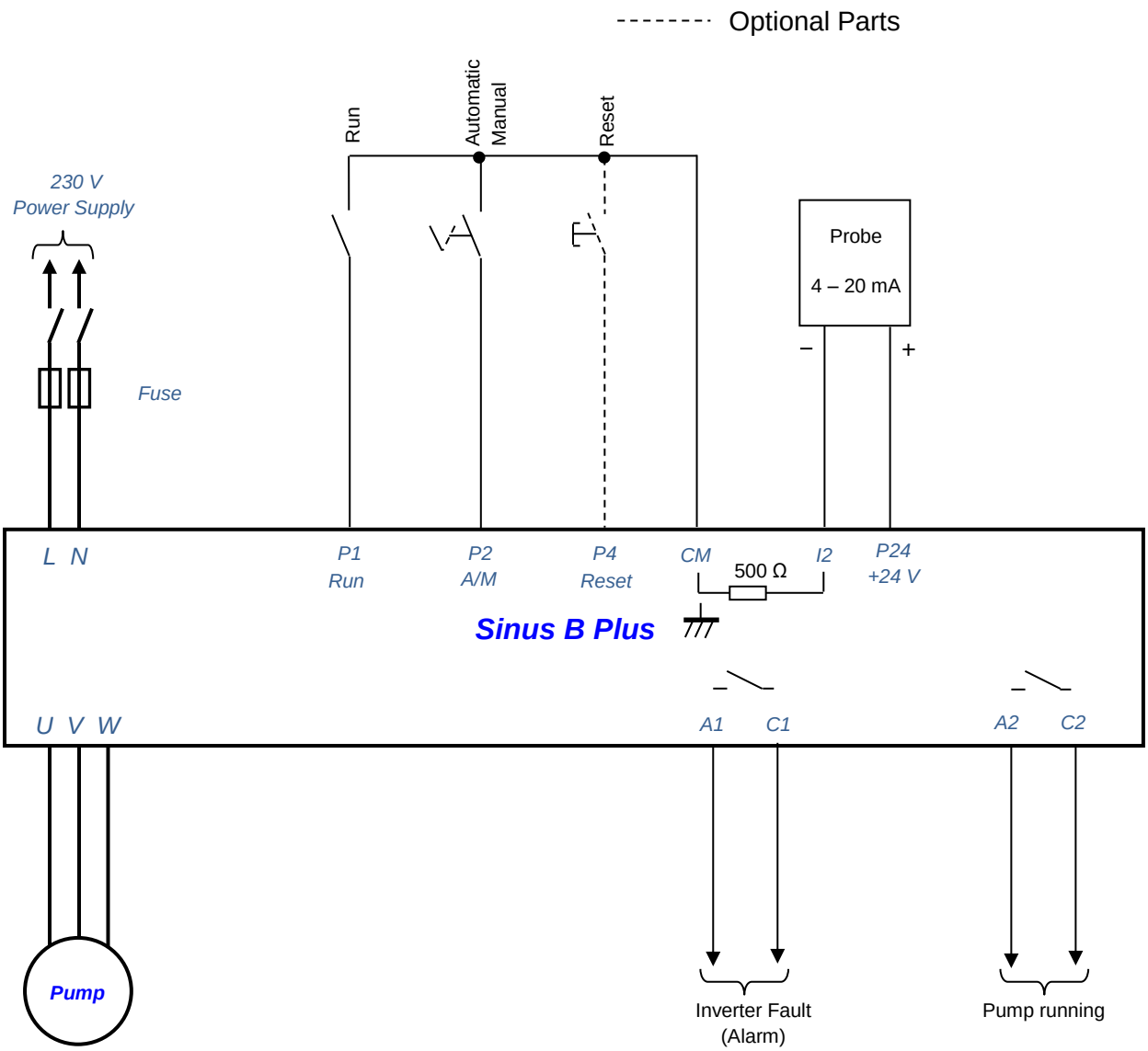

Figure 2

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Electrical Schematic (3-4-wire Active Sensor)

-------- Optional Parts

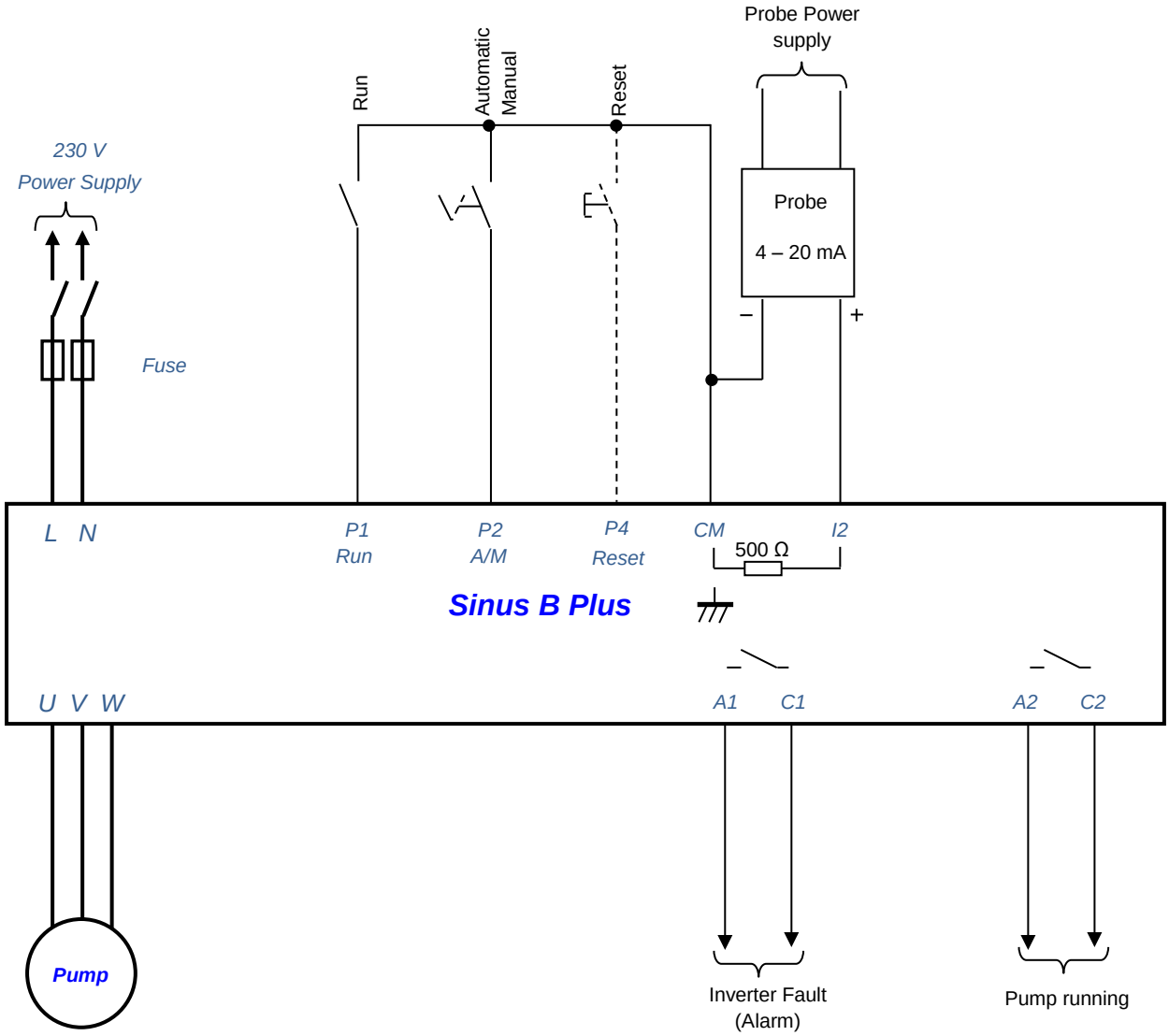

Figure 3

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Programming Example

ACC = Acc ramp	3 s	Acceleration
DEC = Dec ramp	3 s	Deceleration
FRQ = Freq. ref. source w/P2 closed	2	Vo: Built-in Potentiometer
MbF = Motor rated Frequency	50 Hz	see Motor nameplate
FrM = Inverter max Frequency	50 Hz	
MkW = Motor rated Power	…kW	see Motor nameplate
MrC = Motor rated Current	…A	see Motor nameplate
BA07 = V/F pattern	1	Square reduction (quadratic)
AP01 = PID Control	1	
AP02 = PID unit of measure	1	%
AP19 = PID reference		required level of pressure [0.00-100.0%]
AP20 = PID setpoint source	0	for setpoint from Keypad (AP19)
AP21 = PID feedback source	0	for feedback from I2 input (mA)
AP22 = PID proportional gain	.....	Do not touch or adjust based on plant features
AP23 = PID integral time	.....	Do not touch or adjust based on plant features
AP29 = PID max	50 Hz	max frequency implemented by PID controller
AP30 = PID min	30 Hz	example of: min frequency implemented by PID controller
In66 = Multi-function input terminal P2	21	Input allowing disabling the PID controller

The parameters below set the Sleep function (automatic power off of the pump when the pressure level is reached):

AP37 = Sleep delay time	30 s	Pump will automatically stop when this time is over (example)
AP38 = Sleep frequency	35 Hz	example of: Automatic pump stop trip frequency
AP39 = Wake up level	3.5%	example of: Pressure error for automatic pump reactivation

Note: the above values are indicative and shall be adjusted according to the plant characteristics.
Note: make sure that AP38 is set greater than AP30 to prevent the automatic system from disabling.

Description of operation

The diagrams above illustrate pressure control inside a collector with feedback from 4 – 20 mA pressure probe. The pressure setpoint is set via keypad (AP19). Change the setpoint to adjust pressure from 0% to 100%. Pressure is kept constant based on the plant demand.

If pressure settles down at a higher value than the setpoint value, due to a lower demand, the pump will set a minimum frequency (AP30); then, if activated, it will automatically stop if operation at minimum frequency lasts longer than the time set in parameter AP37, below the sleep frequency value (parameter AP38).

When pumping is resumed and pressure in the plant drops below the preset value, with an error equal to or greater than AP39, the pump will promptly restart and will restore the pressure level keeping it constant via the internal PID.

The example given in this document makes it also possible to disable the automatic PID control and to manually control the pump frequency via the “Automatic/manual P2” selector. When in manual mode and pressure is adjusted via built-in potentiometer, it will act as a simple frequency regulator from 0 to maximum frequency

Important:

The diagrams and the values set in the above parameters are given as an indication only. They may vary based on the plant requirements and construction features. Hence the installer is responsible for the proper operation of the plant.

The installer is responsible for observing the safety regulations in force and applying the state-of-the-art rules. Please refer to the User Manual available for download from santerno.com.

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