

SECTION C

ANALOG INPUTS

Revision Date: 4-26-24

DESCRIPTION OF OPERATION

Introduction

Analog Input AIX1 is Standard on all Station Controllers and it allows the connection of a 4-20mA Analog Level Input signal to the Controller for the control of the pumps, level alarms and to provide the Analog Level Input data to SCADA.

Analog Inputs A1-A4 are Optional and they allow the connection of 4-20mA Analog Input signals to the Controller for the collection of Analog Input data and to provide the data to SCADA.

Analog Inputs A1-A4 are Isolated but Analog Input AIX1 is non-isolated unless the Controller is ordered with the "S" option.

The Analog Inputs are Transient Protected and have a 100Ω input load resistor and use a 12-bit Analog to Digital Converter to measure the input signal.

The Analog Inputs are factory calibrated to have the following Analog Input Status values:

819 @ 4.0mA 4095 @ 20mA

For Terminal Block numbers see page C-3.

Status

The status of the Analog Inputs in raw form is made available to be read by SCADA and is available in the menu from Parameters A.100 - A.104. The data is scaled to 819 @ 4.0mA and 4095 @ 20mA.

See page C-2.

Functions

The Analog Inputs are each assigned a Function at the factory and it can not be changed in the field.

See the "ANALOG INPUT FUNCTIONS" below for a description of each of the Functions.

ANALOG INPUT FUNCTIONS

Collect Analog Data for SCADA - Function 0

Analog Inputs A1-A4 are assigned the Function of "Collect Analog Data for SCADA" (Function 0). They only collect data for SCADA and do not perform any other Function in the Controller.

See page C-2.

Analog Level Meter ALM1 - Function 1

The Analog Input AIX1 is assigned the Function of "Analog Level Meter ALM1" (Function 1). Function 1 sends the analog data from AIX1 to the "Analog Level Meter ALM1" for display and for use by the Controller to perform Pump Control and Level Alarms.

The Analog Level Meter ALM1 scales the raw analog data into feet for display on the front of the Controller. The scaled Level Input data is also made available to SCADA from Parameter ALd.1 (Modbus Register 42141) and from Parameter Ld.11 (Modbus Register 40011).

For more information about the Analog Level Meter ALM1 see Section M.

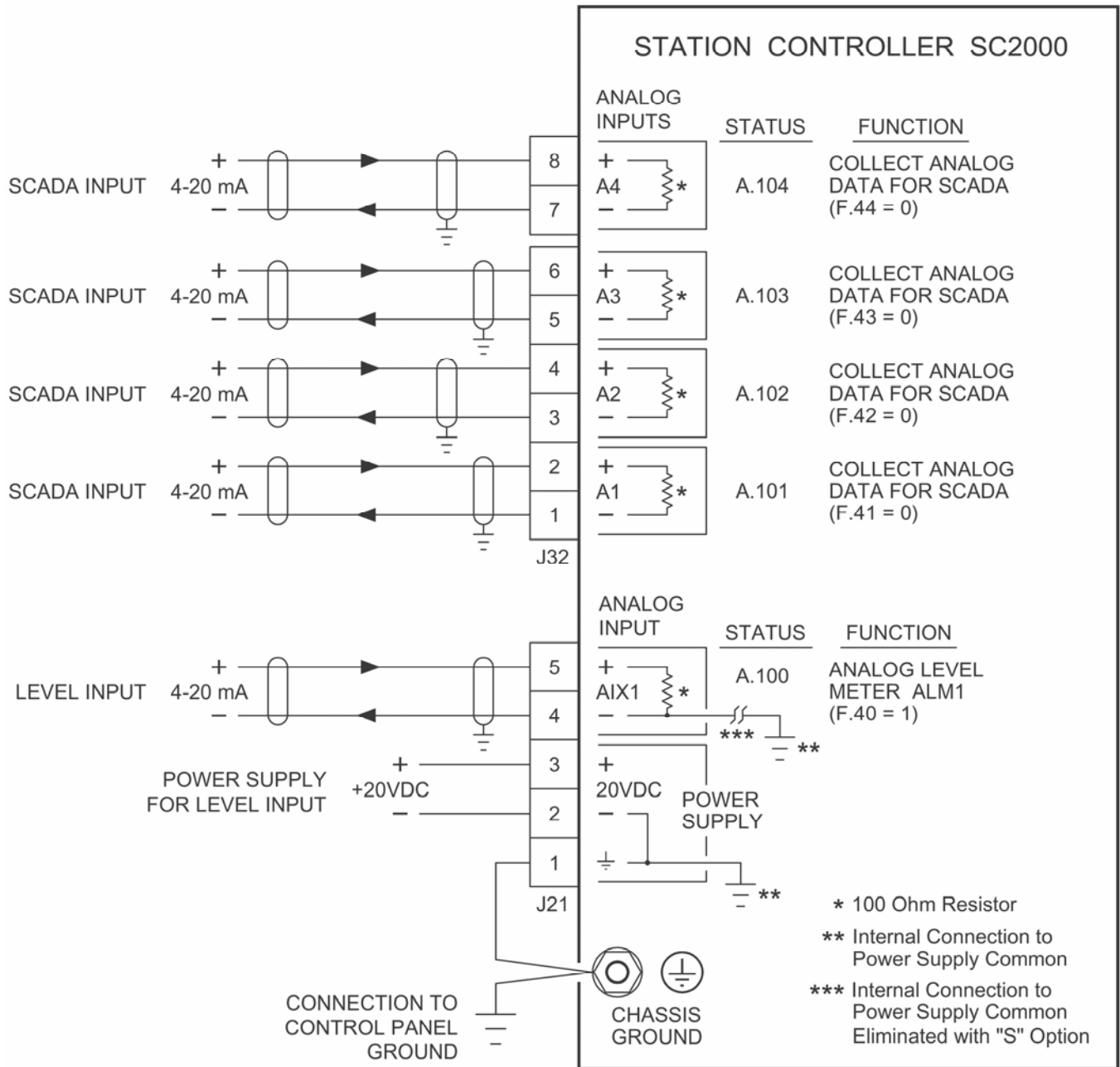
ANALOG INPUTS

User / Operator Info.			SCADA		
Parameter	Default Value	Current Value	Register Address		
Description of Parameters and SCADA Notes					
Analog Input Setup					
Analog Input Function			Analog Input		Function of Input: 0 = Collect Analog Data for SCADA 1 = Analog Level Meter ALM1 Notes: 1. The Function of all Analog Inputs are fixed as shown and can not be changed in the field. 2. Function 1 sends the analog data to Analog Level Meter ALM1 for the purpose of Pump Control and Level Alarms and makes the data available for SCADA. 3. Function "0" collects data for SCADA. The data is not used by the Controller to perform any other function.
F.40	1		40340	Analog Input - AIX1	
F.41	0		40341	Analog Input - A1	
F.42	0		40342	Analog Input - A2	
F.43	0		40343	Analog Input - A3	
F.44	0		40344	Analog Input - A4	

User / Operator Info.		SCADA			
Parameter	Register Address				
Description of Parameters and SCADA Notes					
Analog Input Status - 12-bit					
A.100	40061	Analog Input - AIX1		Note: Parameters A.100 - A.104 are 12-bit Analog to Digital Converter input values that are conditioned and factory calibrated to the following values: 819 @ 4.0mA 4095 @ 20mA	
A.101	40062	Analog Input - AI 1			
A.102	40063	Analog Input - AI 2			
A.103	40064	Analog Input - AI 3			
A.104	40065	Analog Input - AI 4			
Analog Input Status - 10-bit (Legacy)					
—	40071	Analog Input - AI 1		Note: These are the Legacy 10-bit Analog to Digital Converter input values that are conditioned and factory calibrated to the following values: 205 @ 4.0mA 1023 @ 20mA	
—	40072	Analog Input - AI 2			
—	40073	Analog Input - AI 3			
—	40074	Analog Input - AI 4			

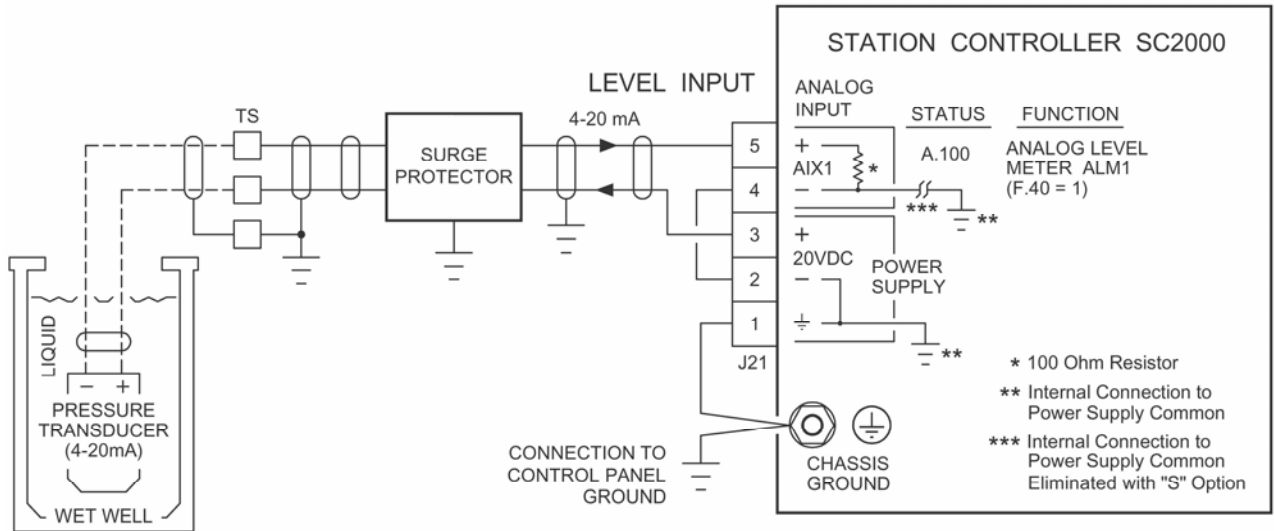
ANALOG INPUTS

Connection Diagram



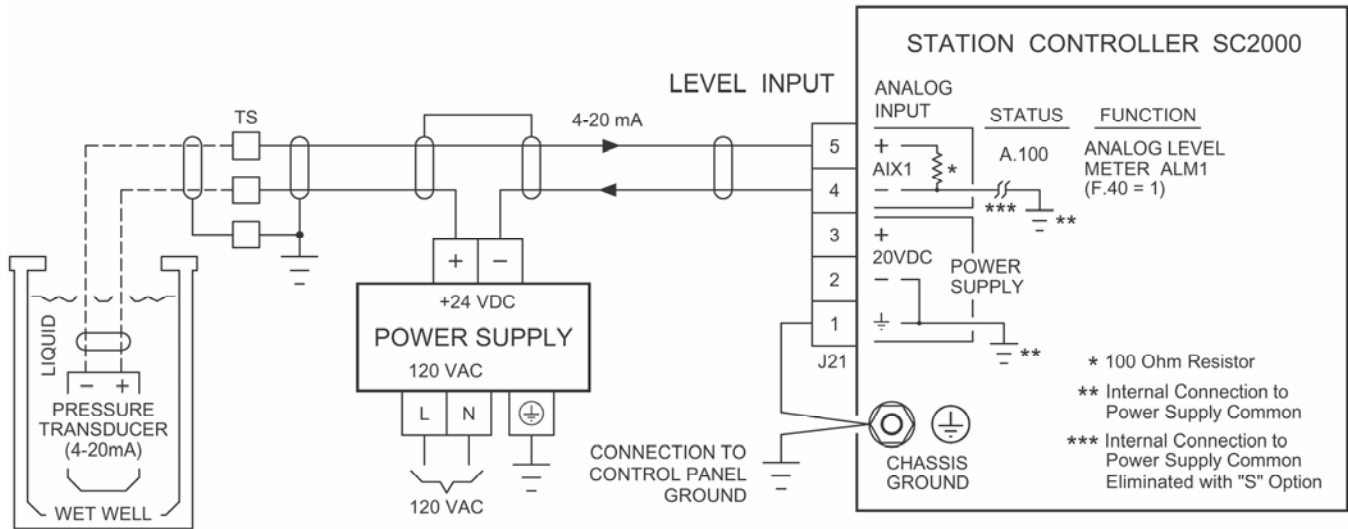
ANALOG LEVEL INPUT EXAMPLES

Example Using the 20VDC Power Supply on the SC2000



Analog Input AIX1 in this example does not need to be Isolated, so the Controller does not need the "S" Option.

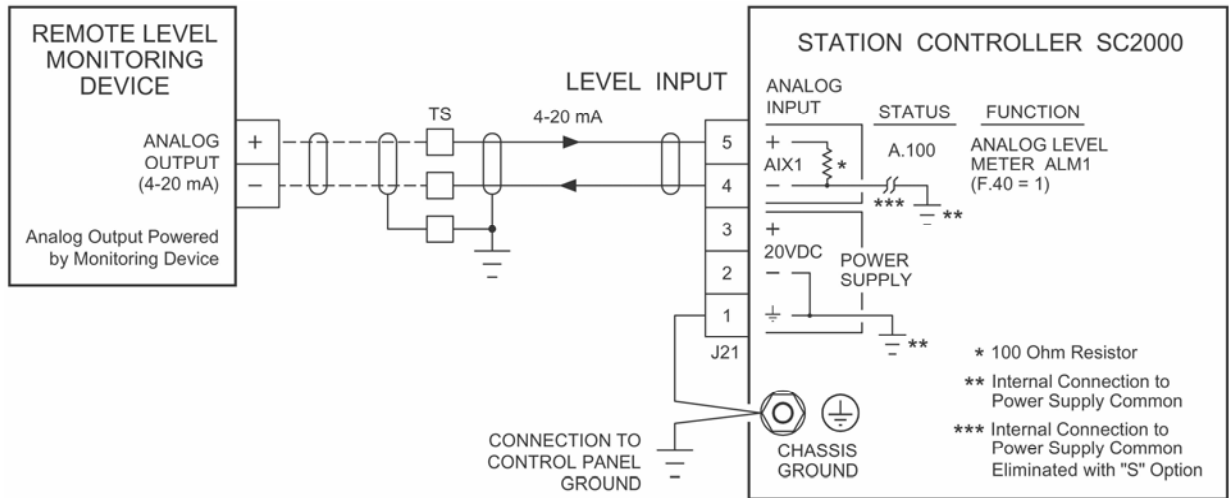
Example Using an External 24 VDC Power Supply



Analog Input AIX1 in this example does not need to be Isolated, so the Controller does not need the "S" Option.

ANALOG LEVEL INPUT EXAMPLES

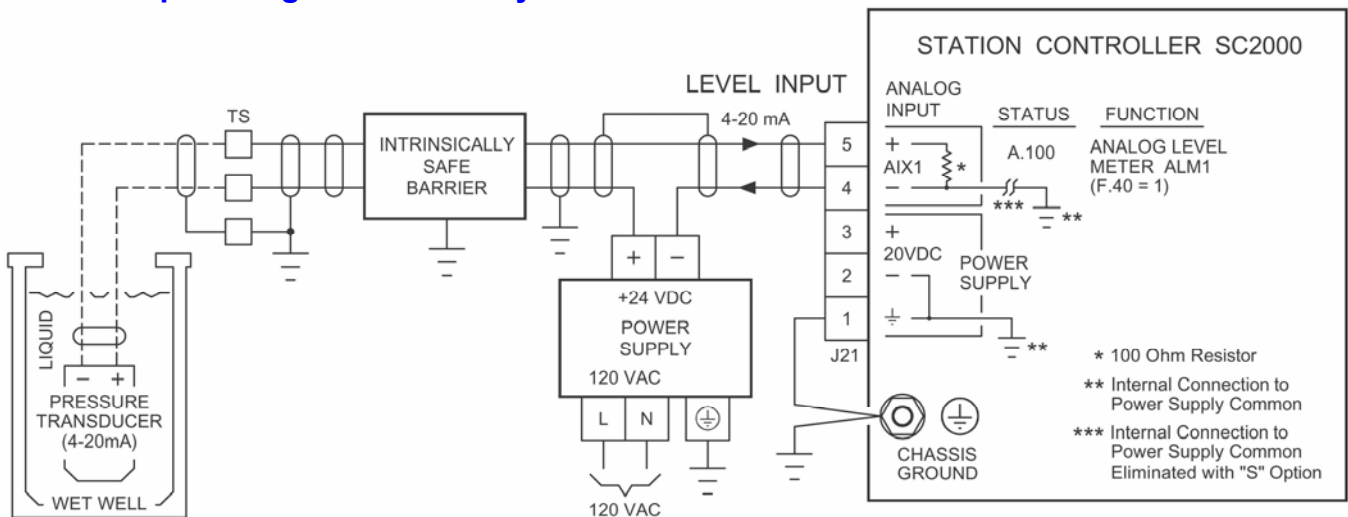
Example of where the Analog Signal is Powered by a Remote Device



The 4-20mA signal in this example **must be Isolated from ground**. This is required to ensure that the Remote Device's Control Panel ground is not connected to the Local Control Panel's ground through the 4-20mA signal wiring. When this is the case it greatly affects the signal's integrity.

The **Controller should be ordered with the "S" Option**, unless it is known that the Analog Output from the Remote Device is Isolated from ground. The Level Input signal must be Isolated from ground at one end or the other or at both ends.

Example using an Intrinsically Safe Barrier



An external +24VDC Power Supply is required when using an Intrinsically Safe Barrier.

Some Intrinsically Safe Barriers (due to how they are made internally and how they are connected in the circuit) can lose part of the analog signal to ground through their internal circuits. When this is the case it greatly affects the analog signal's integrity. In some cases having the "S" Option (where AIX1 is Isolated from the Controller's ground) may correct the problem.

For correctly made Intrinsically Safe Barriers that are connected correctly it is not necessary for the Analog Input AIX1 to be Isolated, so the Controller does not need the "S" Option.