SECTION O
ANALOG CURRENT METERS

Revision Date: 12-30-22

ANALOG CURRENT METERS ACMA, ACMB & ACMC

Three Analog Current Meters ACMA, ACMB and ACMC are provided to record and display the three phases of the electrical current that flows to the pumps. The purpose for this feature is to make the motor current data of each pump available to an operator so that an issue with one of the pumps may be easily identified.

The Main Analog Current Meter is comprised of three individual meters (ACMA, ACMB and ACMC), one for each of the three phases, A, B and C. The Main Current Meter monitors and displays the electrical current that feeds to all of the pumps. This feature requires that the current in each of the three phases be monitored using AC Current Transducers (one for each phase). (An AC Current Transducer is a device that uses a Current Transformer (CT) to measure the current and then provides a 4-20mA analog output proportional to the measured current.) It is required that the Current Transducers be placed in the control panel's power circuit so that all the power leaving the Main Circuit Breaker on its way to the pumps first go through the three Current Transducers before it branches off to go to each individual Pump Circuit Breaker. The power for the controls must be taken from the Main Circuit Breaker ahead of the Current Transducers, and not routed through them, as shown in the example on page O-4.

The Main Current Meter displays the total current going to all of the pumps. In addition to this, all three phases of the electrical current going to each of the pumps is also recorded and displayed. This is accomplished by having logic that waits until each of the pumps run alone and then the three phases of motor current are recorded and displayed separately for each pump. The pump current data is stored in an EEPROM so that power interruptions do not result in a loss of the data. The pump current data values may be reset back to zero by pressing the "Pump Data Reset" pushbutton on the HMI.

The 4-20mA signals from the three Current Transducers used to measure the current must be connected to three Analog Inputs on the Controller. The three Analog Inputs must be setup so that their data is sent to the three Analog Current Meters ACMA, ACMB and ACMC. To do this, the Analog Inputs selected for this task must have their Analog Input Setup parameters set for Functions 8, 9 and 10 respectively. See Parameters F.299 - F.308 in Section C.

The logic in Current Meters ACMA, ACMB and ACMC takes the selected Analog Inputs in their unscaled form and displays them on Parameters Cd.01, Cd.02 and Cd.03.

The logic in the Current Meters take the values from Parameters Cd.01, Cd.02 and Cd.03 and scales them to the Current Transducer Span (Parameter P.584). The finished value, scaled into Amps, is then made available to be viewed from Parameters Cd.04, Cd.05 and Cd.06.

The setting for the Current Transducer Span (Parameter P.584) must be set to the Current Transducer's calibrated Span or Range, which is the measured current in Amps that corresponds to a 20mA output from the Current Transducers.

Signal conditioning logic is also provided to filter out any sudden changes in the measured current. The Signal Conditioning Control Parameter (P.585) is provided to set the speed at which the values displayed on Current Meters ACMA, ACMB and ACMC may change in response to a change in the measured current.

Notes:

1. The Current Transducers must be sized for the total current required to operate all the pumps at the same time.
2. Care must be taken not to oversize the CTs too much as this will reduce the measurement resolution.
3. Using this feature is not recommended when Variable Frequency Drives or Soft Start Starters are used. Current Transducers are typically designed to measure 50-60Hz sinusoidal waveforms and they generally do not work well in the presence of the harmonics typically generated by Variable Frequency Drives and Soft Start Starters.

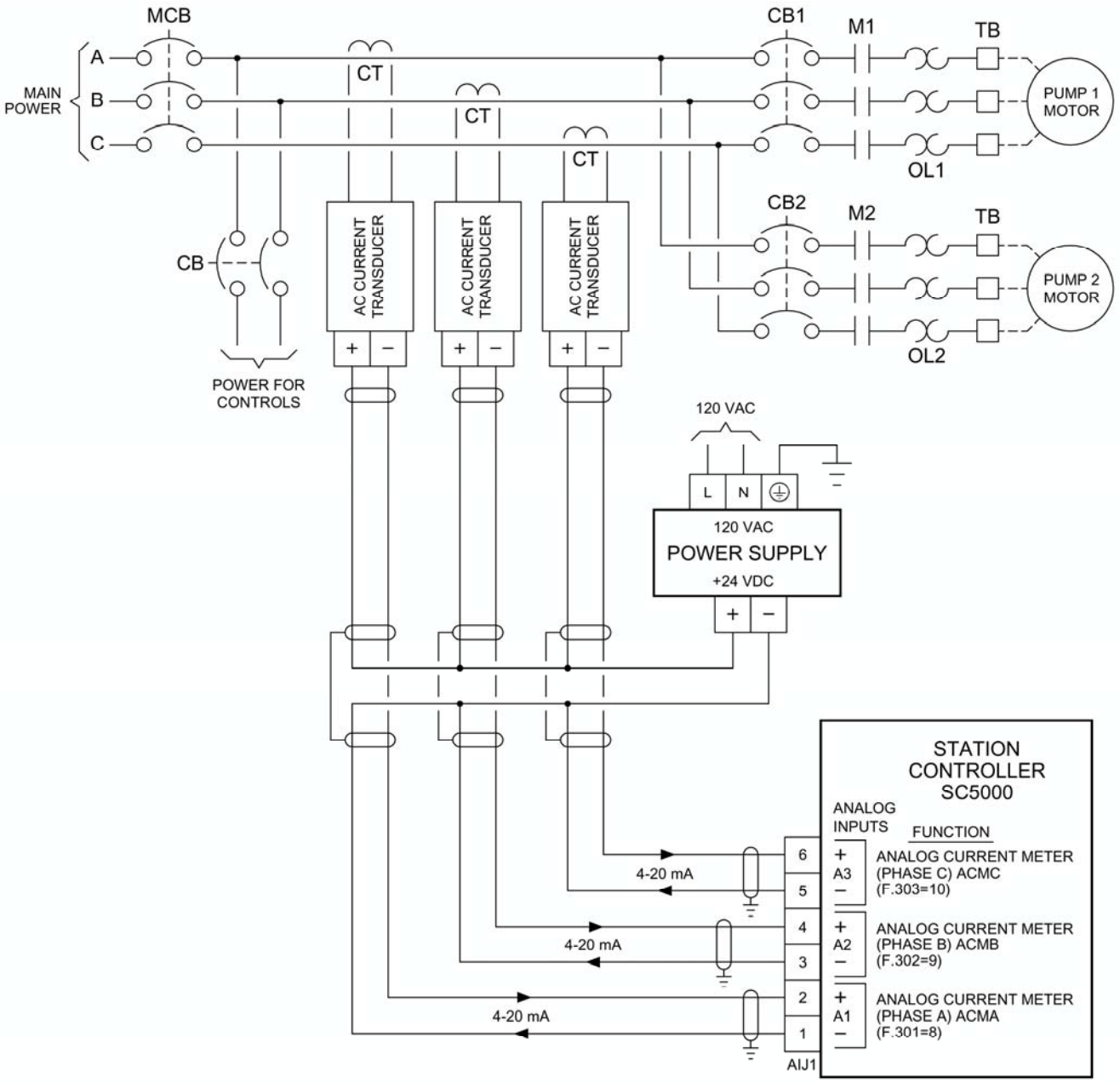
ANALOG CURRENT METERS ACMA, ACMB & ACMC

User / Operator Info.			SCADA	
Parameter	Default Value	Current Value	Register Address	Description of Parameters and SCADA Notes
Analog Current Meters ACMA, ACMB & ACMC - Setup				
P.583	0		40583	Analog Current Meters ACMA, ACMB & ACMC - Current Meters Mode 0 = Current Meters Disabled 1 = Current Meters Enabled
P.584	100 Amps		40584	Analog Current Meters ACMA, ACMB & ACMC - Current Transducer Span Range: 1 - 65,535 Note: This must be set for the Span or Range (in Amps) that the Current Transducer is calibrated for. This sets the displayed value with a 20mA input from the Current Transducer.
P.585	5		40585	Analog Current Meters ACMA, ACMB & ACMC - Signal Conditioning Control 1 = Slow 5 = Normal 10 = Fast Range: 1 - 10 Note: This parameter controls the analog input signal conditioning for the three Current Meters.
Analog Current Meters ACMA, ACMB & ACMC - Analog Input Data				
Cd.01	-	-	42239	Analog Current Meter ACMA - Analog Input Data - Main Phase A
Cd.02	-	-	42240	Analog Current Meter ACMB - Analog Input Data - Main Phase B
Cd.03	-	-	42241	Analog Current Meter ACMC - Analog Input Data - Main Phase C
Notes: 1. Parameters Cd.01 - Cd.03 show the unscaled values from the three Analog Inputs selected as the analog current input for ACMA, ACMB & ACMC. They have a range of: 819 @ 4.0mA & 4,095 @ 20mA. 2. The Analog Inputs selected for ACMA, ACMB & ACMC must have their Analog Input Setup parameters set for Functions 8, 9 &10 respectively.				
Pump Current Data Reset				
To reset the Pump Motor Current Data to zero momentarily set Modbus Coil 279 (Register 40018 Bit 6).				

ANALOG CURRENT METERS ACMA, ACMB & ACMC

User / Operator Info.	SCADA	
Parameter	Register Address	Description of Parameters
Analog Current Meter - Main - Data Scaled into Amps		
Cd.04	42242	Analog Current Meter ACMA - Main - Phase A - Data Scaled into Amps
Cd.05	42243	Analog Current Meter ACMB - Main - Phase B - Data Scaled into Amps
Cd.06	42244	Analog Current Meter ACMC - Main - Phase C - Data Scaled into Amps
Analog Current Meter - Pump 1 - Data Scaled into Amps		
Cd.07	42245	Analog Current Meter ACMA - Pump 1 - Phase A - Data Scaled into Amps
Cd.08	42246	Analog Current Meter ACMB - Pump 1 - Phase B - Data Scaled into Amps
Cd.09	42247	Analog Current Meter ACMC - Pump 1 - Phase C - Data Scaled into Amps
Analog Current Meter - Pump 2 - Data Scaled into Amps		
Cd.10	42248	Analog Current Meter ACMA - Pump 2 - Phase A - Data Scaled into Amps
Cd.11	42249	Analog Current Meter ACMB - Pump 2 - Phase B - Data Scaled into Amps
Cd.12	42250	Analog Current Meter ACMC - Pump 2 - Phase C - Data Scaled into Amps
Analog Current Meter - Pump 3 - Data Scaled into Amps		
Cd.13	42251	Analog Current Meter ACMA - Pump 3 - Phase A - Data Scaled into Amps
Cd.14	42252	Analog Current Meter ACMB - Pump 3 - Phase B - Data Scaled into Amps
Cd.15	42253	Analog Current Meter ACMC - Pump 3 - Phase C - Data Scaled into Amps
Analog Current Meter - Pump 4 - Data Scaled into Amps		
Cd.16	42254	Analog Current Meter ACMA - Pump 4 - Phase A - Data Scaled into Amps
Cd.17	42255	Analog Current Meter ACMB - Pump 4 - Phase B - Data Scaled into Amps
Cd.18	42256	Analog Current Meter ACMC - Pump 4 - Phase C - Data Scaled into Amps
Analog Current Meter - Pump 5 - Data Scaled into Amps		
Cd.19	42257	Analog Current Meter ACMA - Pump 5 - Phase A - Data Scaled into Amps
Cd.20	42258	Analog Current Meter ACMB - Pump 5 - Phase B - Data Scaled into Amps
Cd.21	42259	Analog Current Meter ACMC - Pump 5 - Phase C - Data Scaled into Amps
Analog Current Meter - Pump 6 - Data Scaled into Amps		
Cd.22	42260	Analog Current Meter ACMA - Pump 6 - Phase A - Data Scaled into Amps
Cd.23	42261	Analog Current Meter ACMB - Pump 6 - Phase B - Data Scaled into Amps
Cd.24	42262	Analog Current Meter ACMC - Pump 6 - Phase C - Data Scaled into Amps

ANALOG CURRENT METER EXAMPLE



ANALOG CURRENT METERS - Touchscreen HMI SCREENS