INTERPRETING THE POWERSCOUT REGISTERS – DATA SCALING

The use of Modbus protocols limits the data registers to a maximum of 2 bytes (16 bits) or a maximum decimal value of 65535. Modbus also requires that the values be integer values. To overcome these limitations some measured (and stored) values have to be scaled to fit into the Modbus registers. To convert the raw data read from the Modbus registers a scalar must be multiplied by the raw value. For this meter the scaling is:

DATA SCALAR & RESOLUTION OF MODBUS VALUES FOR REGISTERS 44001 THRU 44061

Register 44602	kW/kWh Demand	kVAR/kVARh	kVA/kVAh	Power Factor	Amps	Volts
0	.00001	.00001	.00001	.01	0.01 A	0.1V
1	.001	.001	.001	.01	0.1	0.1
2	.01	.01	.01	.01	0.1	0.1
3	.1	.1	.1	.01	0.1	0.1
4	1	1	1	.01	1 A	1 V
5	10	10	10	.01	1	1
≥6	100	100	100	.01	1	1

For example, if the scalar value in register 44302 is set to 3 and the total true power for the system (kW) is read from Modbus register 44003 (Offset 4002) and a value of 3465 is returned, the true system kW is 3465 X 0.1 = 346.5 kW.

A raw value of Apparent Power Factor from register 44015 might be 87. This would correspond to an actual power factor of 87 X 0.01 = .87 PF

Additionally, some values (e.g., kilowatt-hours) may cover a dynamic range that is larger than 65535 and require two Modbus registers. Any parameter in Table 1 that shows two registers (identified by the terms “MSW” and “LSW”) is such a wide-ranging parameter.

To correctly interpret the values found in these registers note that the number in the MSW (Most Significant Word) register should be multiplied first by 65536. This number should be added the value found in the corresponding LSW (Least Significant Word) register and *then* multiplied by the appropriate value from the above table.

For example, assume that System Total True Energy (kWh) is desired and the value of 5013 is read from register 44001 (LSW) and 13 is read from register 44002 (MSW) and that the Register 44064 Scalar is set to 3.

TO CALCULATE THE TOTAL KWH RECORDED

Multiply the MSW by 65536 → 13 X 65536 = 851968
Add the LSW → 851968 + 5013 = 856981
Multiply by the Table 2 Scalar of 0.1 → 856981 X 0.1 = 85698.1 kWh