



Options for the DataSite Configured Panel

Introduction

Proper selection of the DataSite configured panel and options needs to account for variables such as location, sunlight hours, temperature, local code requirements, and backup time. This publication is meant to be a guide for the selection of options based on these variables.

The DataSite configured panel utilizes the DataSite controller. Configuration of the DataSite controller is required for the DataSite configured panel. Please contact your local Allen-Bradley distributor or Rockwell Automation Sales office for application assistance. You may also refer to the DataSite Hardware User Manual ([1758-UM001](#)).

Selection of solar panels and batteries must be based on temperature and sunlight hours to help ensure reliable operation.

Local codes may require the use of a display unit and Class 1 Division 2 Hazardous Location certification. This publication will explain the certifications of the DataSite configured panel as well as the options that have been designed to help meet local code requirements.

Other selection decisions for the panel, not related to certification or location, need to be made for options such as terminal blocks for wiring, voltage of measuring instruments and selection of radio broadcast equipment.

DataSite Controller Selection

The DataSite controller is the core device in the DataSite configured panel. This device is responsible for the measurement and calculations of the process being evaluated. Four variations of the DataSite controller exist and are configurable in the DataSite configured panel.

The DataSite controller is available with two different calculation types. The first type is for flow measurements. This type of DataSite controller can perform AGA gas flow calculations when used with proper measuring instruments. The second type is for non-AGA calculations. This type of DataSite controller does not contain the hardware required for AGA calculations.

Both types of calculations are available with current or voltage analog inputs. The current analog input is a 4...20 mA input and the voltage input is from 0...10V DC.

The DataSite controller is field-programmable and will require the end user to program the controller. A user accelerator toolkit is available for the DataSite controller and is available from your local Rockwell Automation sales office.

Backup Battery Selection

The DataSite configured panel has been designed to work without the presence of utility power. Backup batteries have been added to the panel to provide backup energy during periods of time when sunlight is unavailable. The size of the battery, location of the panel, ambient temperature, and number of sunlight hours will determine the size of the battery that should be selected for the DataSite configured panel.

Depending on your region, temperature, sunlight hours and required number of backup hours, the size of the battery may vary.

Valve-regulated lead acid absorbent glass mat (VRLA AGM) batteries were chosen for the DataSite configured panel and are recommended because they are more reliable and require less maintenance than other types. With all types of batteries, capacity and battery life are affected with respect to the ambient temperature. It is important to note these effects since they will impact the overall life and capacity of the batteries used in the DataSite configured panel.

The enclosure will contain two vents rated IP 66/UL Type 4X/ NEMA Type 4X. These vents will serve as a means to remove excess heat from the enclosure during operation and help ensure that the inside pressure of the enclosure remains as close to the outside atmospheric pressure as possible.

There are two parameters that are important when considering the reliability of the battery backup system, charge capacity and battery life. Charge capacity is defined as the amount of available energy from the battery, usually measured in ampere-hours. The number of ampere-hours available will determine the amount of backup time of the DataSite configured panel. The battery life is defined as the number of charge and discharge cycles as well as the number of months the battery will last. End of life for a battery is determined by the loss of 40% of the rated capacity. This means that if a battery is determined to be at the end of its life, the available capacity will only be 60% of the rated capacity.

Typically batteries are rated for their capacity at 20 °C (68 °F). The warmer the ambient temperature, the higher the capacity. If a battery has a rated capacity of 20 Ah at 20 °C (68 °F) that same battery may have 25 Ah at an ambient temperature of 40 °C (104 °F). The reverse is also true. As the ambient temperature decreases below 20 °C (68 °F) the capacity available from the battery decreases. Following the previous example, the 20 Ah battery may only have 10Ah of available capacity at -20 °C (-4 °F).

Battery life is defined as the number of charge and discharge cycles. The number of available cycles is a function of the ambient temperature. Battery cycles are typically rated at a temperature of 20 °C (68 °F), but as that

temperature changes, the number of available cycles will change as well. As the temperature decreases from 20 °C (68 °F), the number of available cycles will increase, but as the temperature increases from 20 °C (68 °F), the number of cycles will decrease. This is not the only effect temperature has on the batteries. Since the ambient temperature will affect the internal resistance of the battery, it will also affect the number of months the battery will last. For instance, a battery that is designed to last four years will only last about four months when it is placed in an ambient temperature around 60 °C (140 °F).

The following table is the de-rating table for the DataSite configured panel batteries. Depending on the expected ambient temperature, the de-rating table must be considered when selecting your DataSite configured panel battery.

Backup Time De-rating Table by Temperature (In Hours)

Temperature	14 Ah	28 Ah	56 Ah
-40 °C (-40 °F)	8	16	32
-30 °C (-22 °F)	11	22	45
-20 °C (-4 °F)	14	28	57
-10 °C (14 °F)	18	36	72
0 °C (32 °F)	21	42	84
10 °C (50 °F)	23	46	92
20 °C (68 °F)	24	48	97
30 °C (86 °F)	25	50	101
40 °C (104 °F)	25	51	103
50 °C (122 °F)	26	52	105
60 °C (140 °F)	26	52	105
70 °C (158 °F)	26	52	105

The length of backup time depends on the system load. When the DataSite configured panel is equipped with 24V DC power for customer use, the battery backup time is reduced. This is due to efficiencies of the DC-DC converter, with the DC-DC conversion being 75% efficient for 24V DC devices. On the average, the backup time for a 1 W device at 24V DC will be decreased by 20%.

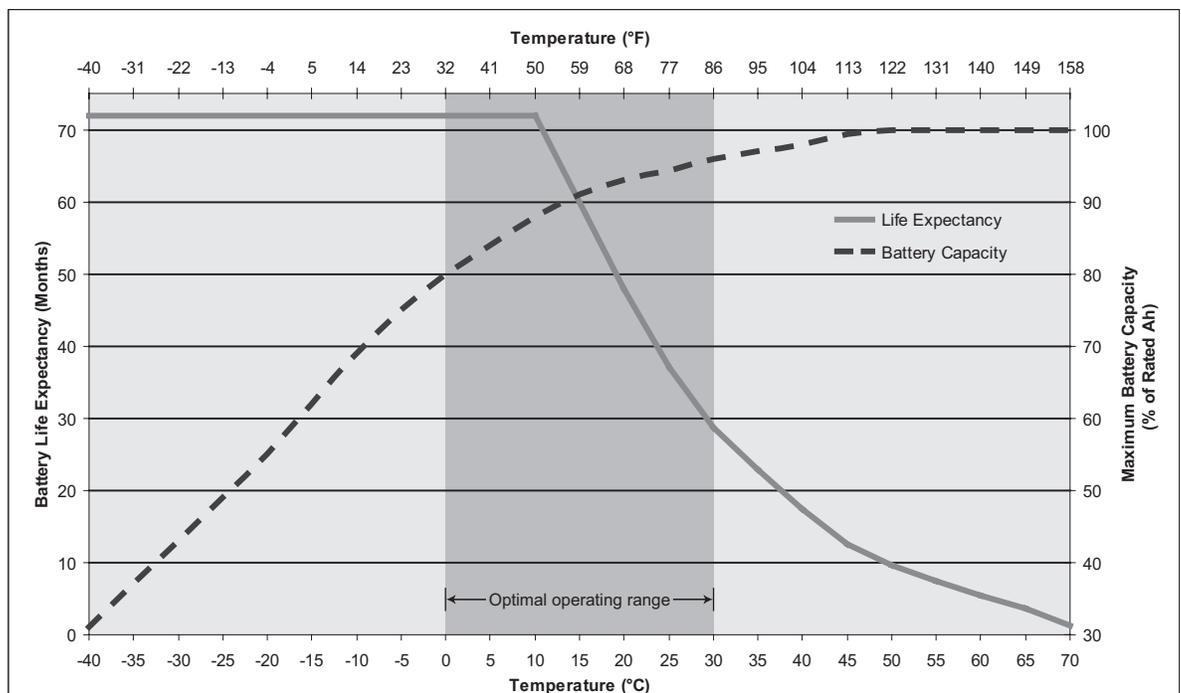
The following table is a summary of the expected battery life based on the ambient temperature.

Expected Battery Life (In Years)

Temperature	14 Ah	28 Ah	56 Ah
-40 °C (-40 °F)	NA	NA	1.25
-30 °C (-22 °F)	NA	0.75	2.25
-20 °C (-4 °F)	NA	1	3
-10 °C (14 °F)	0.5	1.33	3
0 °C (32 °F)	0.75	2.25	3
10 °C (50 °F)	0.75	2.25	3.5
20 °C (68 °F)	0.75	2.5	3.5
30 °C (86 °F)	1	2.5	2.5
40 °C (104 °F)	1	1.5	1.5
50 °C (122 °F)	0.75	0.75	0.75
60 °C (140 °F)	0.5	0.5	0.5
70 °C (158 °F)	0.33	0.33	0.33

This figure shows the affect of ambient temperature on the capacity and life expectancy of the DataSite configured panel batteries.

Effects of Ambient Temperature on Battery Capacity and Life Expectancy



Mounting Bracket Selection

The DataSite configured panel is available in two mounting types—pole mounting and wall mounting.

A pole mounting kit is available to mount the panel to a free standing pole. All required hardware except the pole is included in the kit. When a pole mounting kit is selected, the panel can be installed on a pole or wall mounted.

If wall mounting is selected, an appropriate kit with instructions will be provided.

Radio Selection

Wireless communication is available for the DataSite configured panel by use of either an Ethernet or a serial radio. Both communication types are available in 900 MHz and 2.4 GHz frequencies from Prosoft, Datalinc, and Freewave. The DataSite configured panel is also available without a radio.

When the DataSite configured panel is configured with a factory installed radio, the product will include a lightning suppressor and an internal antenna cable to connect the radio to the suppressor.

When a factory supplied radio is configured, antennas and cables may be added to the configuration. Two types of antennas are available in both 900 MHz and 2.4 GHz frequencies. An Omni or Yagi type antenna may be chosen along with a supporting antenna cable for installation. The Omni antenna is an omnidirectional antenna with 360 degrees of coverage, and a gain of 5 dBi. The Yagi is a focused directional antenna which has a gain of 6 dBi.

Antenna cables come in standard lengths of 10, 25, 50, and 100 feet. The fixed lengths are the suggested lengths of antenna cable for the DataSite configured panel. Custom-length cables are not recommended due to termination losses of field installed connectors.

An important note about the use of manufactured cables is that the crimping and soldering of the connectors usually associates more losses than the cable itself when dealing with short antenna cables. It is suggested that field installed end connectors not be used to terminate the antenna cables. Most often when custom cables are created, the end terminations are not crimped or soldered correctly, thus causing a severe loss in signal strength. As a rule, the excess cable, as long as it is not more than 50% of the total length, should be coiled up and not cut since the possibility of poor terminations is common in the field.

Accessory Options

When necessary, a display device can be included in the DataSite configured panel. The display device is a small human-machine interface (HMI) device designed to give the customer the required measurements typically associated with some local codes.

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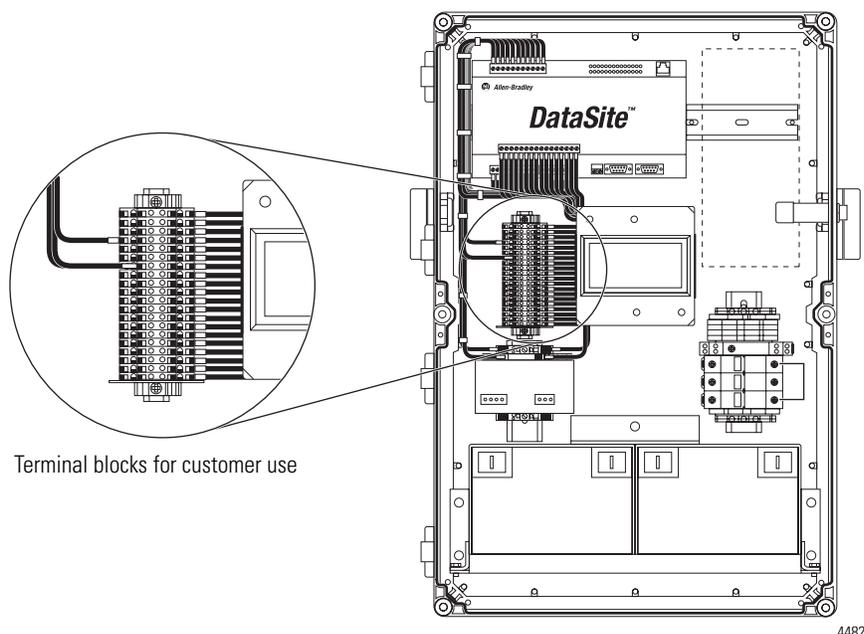
User must program the DataSite controller to switch the HMI on and off. The DataSite configured panel was designed to function so that when the HMI button is pressed, it will only remain ON for a maximum of 30 s. Refer to the DataSite Accelerator Toolkit Quick Start, IASIMP-QS008 for a sample program and more details.

To conserve power in the system, the display is controlled by use of a push button on the front of the enclosure. When the button is pushed, the display power is enabled for a programmed period of time. This reduces power drawn from the backup battery.

Two voltages are available for the DataSite configured panel, 12V DC and 24V DC. As a standard, the panel will use 12V DC to power all of the internal equipment. When the customer requires the use of 24V DC for field attached components, the customer can configure the system for 24V DC. All components within the panel will remain at 12V DC with both 12V DC and 24V DC available for customer use. The use of 24V DC components in the DataSite configured panel will reduce the number of battery backup hours available.

The DataSite configured panel is available with terminal blocks for customer use. These terminal blocks wire directly to the DataSite controller and allow the customer to wire directly to terminal blocks rather than to the DataSite controller. All terminal blocks are labeled with corresponding terminal on the DataSite controller. For specifics on the terminal block numbering and wiring method, refer to the schematic shipped with your panel.

Terminal blocks for customer use



Solar Panel Sizing

Solar panels are not supplied with the DataSite configured panel. The sizing of the solar panel is crucial to the reliability of the DataSite configured panel. In order to capture enough energy to recharge the backup battery, a sufficiently-sized solar panel must be used. The size of the panel is based on the amount of available sunlight in your geographical region.

For all applications, the following table is a suggested sizing of the solar panels based on the number of solar sunlight hours available in the region. The number of solar sunlight hours, sometimes referred to as the solar insolation, must be determined for the region based on the winter season. The number of solar sunlight hours should be determined using the average number of hours during the winter months.

Based on the solar sunlight hours, Rockwell Automation suggests the use of the following solar panels from Kyocera.

Suggested Solar Panel Sizing

Number of solar sunlight hours	Suggested power output, max	Part number of suggested Kyocera solar panel
< 1.9 hours	Not specified	Not specified
2.0...3.0 hours	130 W	KC130TM
3.1...3.9 hours	87 W	KC85T
4.0...5.9 hours	65 W	KC65T
> 6.0 hours	43 W	KC40T

Allen-Bradley Drives

In those regions where the number of solar sunlight hours is less than 2.0, multiple solar panels would be required to ensure the energy taken from the batteries could be replaced within the limited number of sunlight hours.

For information regarding the average number of sunlight hours in your region, you may visit http://rredc.nrel.gov/solar/old_data/nsrdb/redbook/atlas/Table.html.

For information about using multiple solar arrays to power your DataSite configured panel, you may visit <http://www.kyocerasolar.com/learn/solarfaq.html> and <http://www.sunwize.com>.

Contact your solar panel provider for assistance in sizing the solar panel.

www.rockwellautomation.com

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