

Specification

Supply voltage	24Vac/dc $\pm 10\%$
Supply current	3VA (175mA @ 24Vac)
Inputs	8 x Universal (12-bit resolution)
	0-10Vdc
	Thermistor
	On/off (VFC)
	4-20mA
BACnet	BACnet MS/TP (BAS-C): 9k6, 19k2, 38k4 or 76k8 bps
Modbus	Modbus RTU Slave @ 9k6, 19k2, 38k4 or 57k6
	Selectable parity and stop bit conf
	No parity, 2 stop bit
	Even parity, 1 stop bit
	Odd parity, 1 stop bit

Connections:

Communication	24AWG twisted-shield cable (Beldon 9841 or equivalent)
Electrical	18AWG (0.8mm ²) at least
Ambient:	
Temperature	0 to +50°C
RH	5 to 95% non-condensing
Storage temperature	-30 to +50°C
Housing:	
Material	ABS
Dimensions	160 x 126 x 57mm
Protection	IP30
Country of origin	Canada
Conformity	EMC, CE & UKCA Marked

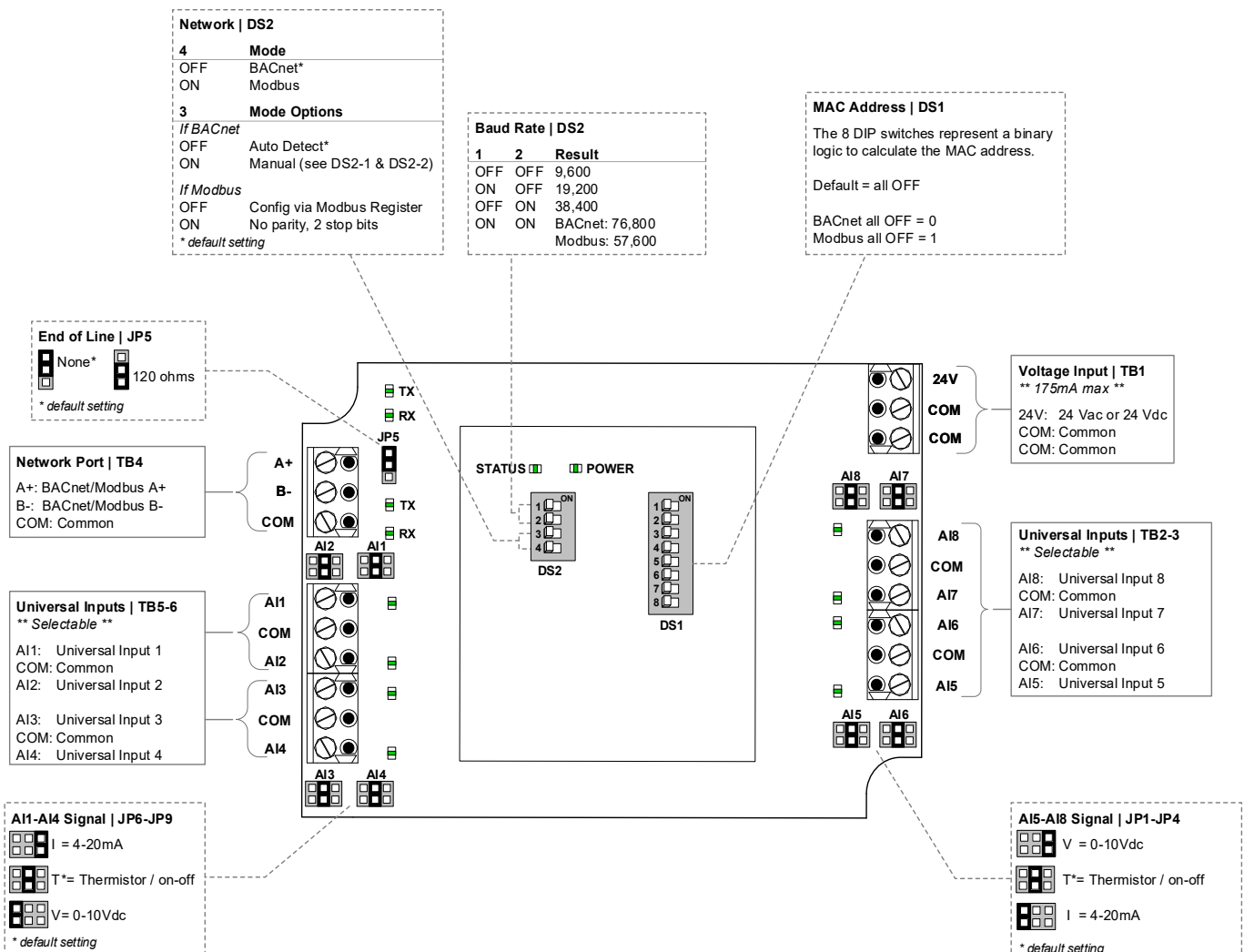
WEEE Directive:



At the end of the products useful life please dispose as per the local regulations. Do not dispose of with normal household waste. Do not burn.



Network Connections



LED Indication

Function	LED status	Description
Power	On	Input voltage normal
	Off	No power
Status	Flashing	Normal operation (watchdog)
RX/TX (BACnet and Modbus)	Flashing	Receiving (RX) and/or transmitting (TX) data
Input Status	On	Input On
	Off	Input Off
	Flashing	Input not connected (thermistor setting only)
	Analogue	When Universal Inputs are set to analogue values (Vdc, mA, or thermistor); the LED intensity corresponds to the input value. For example: At 10Vdc, the LED will be fully on. At 5Vdc, the LED will be at 50% intensity. At 0 Vdc, the LED will be off

MAC Address Settings

Use DS1 for setting MAC address for BACnet and Modbus

BACnet:

Default setting: All switches OFF (MAC address = 0)

If you do not change device instance in program mode, it will be automatically modified according to the MAC address

MAC Address	DS.1 = 1	DS.2 = 2	DS.3 = 4	DS.4 = 8	DS.5 = 16	DS.6 = 32	DS.7 = 64	DS.8 = 128	Default Device Instance
0	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	153000
1	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	153001
2	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	153002
3	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	153003
4	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	153004
...	...	...	...	...	...	...	...	...	...
126	OFF	ON	ON	ON	ON	ON	ON	OFF	153126
...	...	...	...	...	...	...	...	...	...
254	OFF	ON	ON	ON	ON	ON	ON	ON	153254

Modbus:

Default setting: All switches OFF (MAC address = 1)

MAC address is binary value plus 1

MAC Address	DS.1 = 1	DS.2 = 2	DS.3 = 4	DS.4 = 8	DS.5 = 16	DS.6 = 32	DS.7 = 64	DS.8 = 128
0+1 = 1	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
1+1 = 2	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
2+1 = 3	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
3+1 = 4	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
4+1 = 5	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
...	...	...	...	...	...	...	...	...
126+1 = 127	OFF	ON	ON	ON	ON	ON	ON	OFF
...	...	...	...	...	...	...	...	...
246+1 = 247	OFF	ON	ON	OFF	ON	ON	ON	ON

Network Conditions

Please note that all jumper settings must also be set to the same value through BACnet or Modbus. The following is a list of conditions and additional BACnet or Modbus objects.

Universal Inputs (AI1-AI8)

For temperature thermistor reading: with the jumper set to Thermistor, set the AI input type to *10K_TypeG*, *10K_Type3A1*, *10K_Type4A1*, *10K_NTC*, *20K_Type6A1* or *30K_Type6A1*.

For on/off contact input reading: with the hardware jumper set to *Thermistor*, set the AI input type to *Digital_Input*. The polarity can also be set to direct or reverse. For example, in Reverse an "on" signal would be recognized as an "off" signal.

For analog 0-10 Vdc input reading: with the hardware jumper set to 0-10 Vdc, set the AI input type to *0_10V*.

BACnet Objects Table

¹ ID is equal to ObjectType

² Write address in present value, result will be available in description

ID ¹	Name	Description	Writable?	Notes (* = default) († = only when <i>UniversalInputFunction</i> is set to <i>10K_Type3/G</i>)
AI.1	UniversalInput1	Universal input 1 mode selected by MSV.1	Out of service	0 to 10Volt or -40 to 100°C (150°C) [†] or -40 to 212°F (302°F) [†] or 4 to 20mA or 0 to 1 Resolution: 0.01Volt or 0.01°C/0.02°F or 0.01mA or 1
AI.2	UniversalInput2	Universal input 2 mode selected by MSV.12	Out of service	0 to 10Volt or -40 to 100°C (150°C) [†] or -40 to 212°F (302°F) [†] or 4 to 20mA or 0 to 1 Resolution: 0.01Volt or 0.01°C/0.02°F or 0.01mA or 1
AI.3	UniversalInput3	Universal input 3 mode selected by MSV.15	Out of service	0 to 10Volt or -40 to 100°C (150°C) [†] or -40 to 212°F (302°F) [†] or 4 to 20mA or 0 to 1 Resolution: 0.01Volt or 0.01°C/0.02°F or 0.01mA or 1
AI.4	UniversalInput4	Universal input 4 mode selected by MSV.48	Out of service	0 to 10Volt or -40 to 100°C (150°C) [†] or -40 to 212°F (302°F) [†] or 4 to 20mA or 0 to 1 Resolution: 0.01Volt or 0.01°C/0.02°F or 0.01mA or 1
AI.5	UniversalInput5	Universal input 5 mode selected by MSV.57	Out of service	0 to 10Volt or -40 to 100°C (150°C) [†] or -40 to 212°F (302°F) [†] or 4 to 20mA or 0 to 1 Resolution: 0.01Volt or 0.01°C/0.02°F or 0.01mA or 1
AI.6	UniversalInput6	Universal input 6 mode selected by MSV.58	Out of service	0 to 10Volt or -40 to 100°C (150°C) [†] or -40 to 212°F (302°F) [†] or 4 to 20mA or 0 to 1 Resolution: 0.01Volt or 0.01°C/0.02°F or 0.01mA or 1
AI.7	UniversalInput7	Universal input 7 mode selected by MSV.59	Out of service	0 to 10Volt or -40 to 100°C (150°C) [†] or -40 to 212°F (302°F) [†] or 4 to 20mA or 0 to 1 Resolution: 0.01Volt or 0.01°C/0.02°F or 0.01mA or 1
AI.8	UniversalInput8	Universal input 8 mode selected by MSV.60	Out of service	0 to 10Volt or -40 to 100°C (150°C) [†] or -40 to 212°F (302°F) [†] or 4 to 20mA or 0 to 1 Resolution: 0.01Volt or 0.01°C/0.02°F or 0.01mA or 1
AV.226	UniversalInput1Offset	Universal input 1 offset	Present Value	-5.00 to 5.00 °C/°F/Volt/mA (default 0*) Resolution: 0.1 °C/°F/Volt/mA
AV.227	UniversalInput2Offset	Universal input 2 offset	Present Value	-5.00 to 5.00 °C/°F/Volt/mA (default 0*) Resolution: 0.1 °C/°F/Volt/mA
AV.228	UniversalInput3Offset	Universal input 3 offset	Present Value	-5.00 to 5.00 °C/°F/Volt/mA (default 0*) Resolution: 0.1 °C/°F/Volt/mA
AV.229	UniversalInput4Offset	Universal input 4 offset	Present Value	-5.00 to 5.00 °C/°F/Volt/mA (default 0*) Resolution: 0.1 °C/°F/Volt/mA
AV.230	UniversalInput5Offset	Universal input 5 offset	Present Value	-5.00 to 5.00 °C/°F/Volt/mA (default 0*) Resolution: 0.1 °C/°F/Volt/mA
AV.231	UniversalInput6Offset	Universal input 6 offset	Present Value	-5.00 to 5.00 °C/°F/Volt/mA (default 0*) Resolution: 0.1 °C/°F/Volt/mA
AV.232	UniversalInput7Offset	Universal input 7 offset	Present Value	-5.00 to 5.00 °C/°F/Volt/mA (default 0*) Resolution: 0.1 °C/°F/Volt/mA
AV.233	UniversalInput8Offset	Universal input 8 offset	Present Value	-5.00 to 5.00 °C/°F/Volt/mA (default 0*) Resolution: 0.1 °C/°F/Volt/mA
AV.468	CopyCfgStartAdd	Copy configuration start address	Present Value	0-254 Address of first CMDB to copy Available only if BV.101 is set to No
AV.469	CopyCfgEndAdd	Copy configuration end address	Present Value	AV.468 – (AV.468 + 64) Address of last CMDB to copy Available only if BV.101 is set to No
AV.470	CopyCfgResult ²	Copy configuration result	Present Value	AV.468 – AV.469 Result of copy is available on Description property and is available only if BV.101 is set to Yes. Results: Succeed, Prog_Error, Type_Error, Model_Error, FW_Error, Mem_Error, Size_Error, Comm_Error, SlaveDevice, InProgress, AllSucceed

ID	Name	Description	Writable?	Notes (* = default) († = only when <i>UniversalInputFunction</i> is set to <i>10K_Type3/G</i>)	
BV.93	UI1_DI_Polarity	Polarity of universal input 1 when used in digital input mode	Present Value	0= Direct * 1= Reverse	
BV.94	UI2_DI_Polarity	Polarity of universal input 2 when used in digital input mode	Present Value	0= Direct * 1= Reverse	
BV.95	UI3_DI_Polarity	Polarity of universal input 3 when used in digital input mode	Present Value	0= Direct * 1= Reverse	
BV.96	UI4_DI_Polarity	Polarity of universal input 4 when used in digital input mode	Present Value	0= Direct * 1= Reverse	
BV.97	UI5_DI_Polarity	Polarity of universal input 5 when used in digital input mode	Present Value	0= Direct * 1= Reverse	
BV.98	UI6_DI_Polarity	Polarity of universal input 6 when used in digital input mode	Present Value	0= Direct * 1= Reverse	
BV.99	UI7_DI_Polarity	Polarity of universal input 7 when used in digital input mode	Present Value	0= Direct * 1= Reverse	
BV.100	UI8_DI_Polarity	Polarity of universal input 8 when used in digital input mode	Present Value	0= Direct * 1= Reverse	
BV.101	CopyCfgExecute	Start or stop copy configuration	Present Value	0= No * 1= Yes Start copy and give results, must be reset by user.	
BV.102	SystemUnit	Select the unit system to use on the device	Present Value	0= Celsius * 1= Fahrenheit	
MSV.1	UniversalInput1Function	Selected analog input 1 mode	Present Value	1= 0_10V 2= 4_20mA 3= 10K_Type3/G * 4= 10K_Type3A1 5= 10K_Type4A1	6= 10K_Type2 7= 20K_Type6A1 8= 30K_Type6A1 9= Digital_Input
MSV.12	UniversalInput2Function	Selected analog input 2 mode	Present Value	1= 0_10V 2= 4_20mA 3= 10K_Type3/G * 4= 10K_Type3A1 5= 10K_Type4A1	6= 10K_Type2 7= 20K_Type6A1 8= 30K_Type6A1 9= Digital_Input
MSV.15	UniversalInput3Function	Selected analog input 3 mode	Present Value	1= 0_10V 2= 4_20mA 3= 10K_Type3/G * 4= 10K_Type3A1 5= 10K_Type4A1	6= 10K_Type2 7= 20K_Type6A1 8= 30K_Type6A1 9= Digital_Input
MSV.48	UniversalInput4Function	Selected analog input 4 mode	Present Value	1= 0_10V 2= 4_20mA 3= 10K_Type3/G * 4= 10K_Type3A1 5= 10K_Type4A1	6= 10K_Type2 7= 20K_Type6A1 8= 30K_Type6A1 9= Digital_Input
MSV.57	UniversalInput5Function	Selected analog input 5 mode	Present Value	1= 0_10V 2= 4_20mA 3= 10K_Type3/G * 4= 10K_Type3A1 5= 10K_Type4A1	6= 10K_Type2 7= 20K_Type6A1 8= 30K_Type6A1 9= Digital_Input
MSV.58	UniversalInput6Function	Selected analog input 6 mode	Present Value	1= 0_10V 2= 4_20mA 3= 10K_Type3/G * 4= 10K_Type3A1 5= 10K_Type4A1	6= 10K_Type2 7= 20K_Type6A1 8= 30K_Type6A1 9= Digital_Input
MSV.59	UniversalInput7Function	Selected analog input 7 mode	Present Value	1= 0_10V 2= 4_20mA 3= 10K_Type3/G * 4= 10K_Type3A1 5= 10K_Type4A1	6= 10K_Type2 7= 20K_Type6A1 8= 30K_Type6A1 9= Digital_Input
MSV.60	UniversalInput8Function	Selected analog input 8 mode	Present Value	1= 0_10V 2= 4_20mA 3= 10K_Type3/G * 4= 10K_Type3A1 5= 10K_Type4A1	6= 10K_Type2 7= 20K_Type6A1 8= 30K_Type6A1 9= Digital_Input

Modbus Register

- Register address
As per protocol base (base 0); for PLC add 1 to protocol base.
As per holding register (base 40001)
- Functions:
03 Read Holding Register
06 Write Single Register
16 Write Multiple Registers
- Error Codes:
02 Illegal Data Address
03 Illegal Value
06 Slave Device Busy
- W = Writable register, [blank] = read only.
- No Real number in Modbus register, use scale to calculate real number. Register = Real number * Scale => Real number = Register / Scale. Scale could be 1, 10 or 100
- Attention when writing a register that contains a bit string. If bit is writable (conditional or not), the write will always be accepted. If bit is reserved or not writable, the write will be ignored and will keep its actual state.
- Use READ-MODIFY-WRITE sequence.

Protocol Base	Holding Register	Description	Data Type	MSB/LSB		Units/Values	Writable	Default Value	
								MB	LB
0	40001	MSB = Sontay Device ID LSB = MAC Address	Unsigned	105 (69h)	[1..247] (1h- F7h)	* MAC address is writable if all DIP switches of DS2 are OFF.	W*	69h	1h
1	40002	Device Baud Rate	Unsigned Scale 0.01	[96] [192] [384] [576]		9,600 19,200 38,400 57,600	W	96	
2	40003	COM Port Configuration IMPORTANT: The default value is "no parity, 2 stop bits". To change the value, you must set DIP switch DS1-3 to OFF. If set to ON, it will always remain at the default value. Refer to Connections and Configurations on page 1.	Unsigned	[0..2]		0 = no parity, 2 stop bits 1 = even parity, 1 stop bit2 = odd parity, 1 stop bit	W	0	
3	40004	Product Name (characters 8 & 7)	2 x ASCII	char 8	char 7	Valid ASCII character: 32 (20h) – 122 (7ah), Empty = 0	W	43h [C]	40h [M]
4	40005	Product Name (characters 6 & 5)	2 x ASCII	char 6	char 5	Valid ASCII character: 32 (20h) – 122 (7ah), Empty = 0	W	40h [M]	42h [B]
5	40006	Product Name (characters 4 & 3)	2 x ASCII	char 4	char 3	Valid ASCII character: 32 (20h) – 122 (7ah), Empty = 0	W	31h [1]	30h [0]
6	40007	Product Name (characters 2 & 1)	2 x ASCII	char 2	char 1	Valid ASCII character: 32 (20h) – 122 (7ah), Empty = 0	W	36h [6]	20h []
7	40008	Firmware Version	Unsigned Scale 100	102		1.02		102	
8	40009	Application Version	Unsigned Scale 100	100		1.00		100	

Protocol Base	Holding Register	Description	Data Type	MSB/LSB	Units/Values	Writable	Default Value	
							MB	LB
9	40010	System Status 1	Bit String	[B0..B15]	0 = Normal 1 = Fault ----- B0 = System operation		0000, 0001, 1111, 1110b	
10	40011	System Status 2	Bit String	[B0..B15]	Always 0		0000, 0000, 0000, 0000b	
11	40012	Analog Input 1	0-10V: Type: Unsigned, Scale:100, Unit: Volt, Range: 0.00-10.00V, Resolution: 0.01 4-20mA: Type: Unsigned, Scale:100, Unit: mA, Range: 4.00-20.00 mA, Resolution: 0.01 10K Type 3A1, 10K Type 4AI, 10K Type 2, 20K Type 6AI, 30K Type 6AI: Type: Signed, Scale:100, Unit: °C, Range: -40.00 - 100.00 °C, Resolution: 0.01 Type: Signed, Scale:100, Unit: °F, Range: -40.00 - 212.00 °F, Resolution: 0.02 10K Type 3/G: Type: Signed, Scale:100, Unit: °C, Range: -40.00 - 150.00 °C, Resolution: 0.01 Type: Signed, Scale:100, Unit: °F, Range: -40.00 - 302.00 °F, Resolution: 0.02 DI: Type: Unsigned, Scale:1, No Unit, Range: 0-1, Resolution: 1				0	
12	40013	Analog Input 2					0	
13	40014	Analog Input 3					0	
14	40015	Analog Input 4					0	
15	40016	Analog Input 5					0	
16	40017	Analog Input 6					0	
17	40018	Analog Input 7					0	
18	40019	Analog Input 8					0	
19 to 25	40020 to 40026	Reserved						

Protocol Base	Holding Register	Description	Data Type	MSB/LSB	Units/Values	Writable	Default Value	
							MB	LB
26	40027	Universal Input 1 Function	Unsigned	[1..9]	1= 0_10V 2= 4_20mA 3= 10K_Type3/G 4= 10K_Type3A1 5= 10K_Type4A1 6= 10K_Type2 7= 20K_Type6A1 8= 30K_Type6A1 9= Digital_Input	W	3	
27	40028	Universal Input 2 Function					3	
28	40029	Universal Input 3 Function					3	
29	40030	Universal Input 4 Function					3	
30	40031	Universal Input 5 Function					3	
31	40032	Universal Input 6 Function					3	
32	40033	Universal Input 7 Function					3	
33	40034	Universal Input 8 Function					3	
34	40035	Universal Input 1 Offset	Signed Scale 100	[0..100]	Range: +/- 5.00, Resolution: 0.1	W	0	
35	40036	Universal Input 2 Offset					0	
36	40037	Universal Input 3 Offset					0	
37	40038	Universal Input 4 Offset					0	
38	40039	Universal Input 5 Offset					0	
39	40040	Universal Input 6 Offset	Signed Scale 100	[0..100]	Range: +/- 5.00, Resolution: 0.1	W	0	
40	40041	Universal Input 7 Offset					0	
41	40042	Universal Input 8 Offset					0	
42 to 53	40043 to 40054	Reserved						
54	40055	System Options * = digital input mode only	Bit String	[B0..B15]	0 = Direct 1 = Reverse ----- B0 to B3 = Reserved B4 = AI1 polarity * B5 = AI2 polarity * B6 = AI3 polarity * B7 = AI4 polarity * B8 = AI5 polarity * B9 = AI6 polarity * B10 = AI7 polarity * B11 = AI8 polarity * B8 to B14 = Reserved ----- 0 = Celsius 1 = Fahrenheit ----- B15 = System Unit	W	0000, 0000, 0000, 0000b	

Whilst every effort has been made to ensure the accuracy of this specification, Sontay cannot accept responsibility for damage, injury, loss or expense resulting from errors or omissions. In the interest of technical improvement, this specification may be altered without notice.