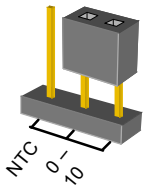


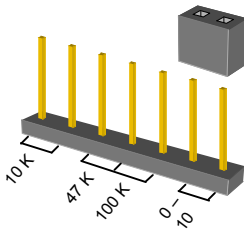
Controller Setup Guide

Hardware Setup

The analog inputs can be individually configured. Each input can be selected for either a 0-10 Volt or a NTC thermistor sensor input. There are 2 jumper settings for each input.



The first jumper selects either 0-10 Volt or NTC thermistor input.



The second jumper selects either 0-10 Volts or which value of NTC thermistor is attached.

Control Parameters Setup

All the DC6 parameters, other than the device address, can be set directly from the DC6 keyboard. The user has the option of configuring the DC6 via a PC or from the BAS system.

In order to gain access to the edit mode the user must press the "+" key for 20 seconds. This feature is to prevent unauthorized persons from adjusting the setpoints etc. The DC6 will remain in edit mode until set back into view only mode. The user can cancel edit mode by pressing the "ENTER" key for 3 seconds.

The temperature control loop can be configured to control on various setpoints. The control mode setting selects which setpoint to use.

Control Mode

Control Mode		
0	Return Air Temperature	Control on return air temperature using current setpoint
1	Supply Air Temperature	Control on supply air temperature using current setpoint
2	Return Air Temperature Schedule	Control on return air temperature using outside air temperature schedule
3	Supply Air Temperature Schedule	Control on supply air temperature using outside air temperature schedule

The Outside Air Temperature (OAT) schedule is used in conjunction with the control mode settings 2 and 3. When the OAT is equal to or exceeds the OAT high temperature then the setpoint will be set to the schedule high setpoint. When the OAT is equal to or lower than the OAT low temperature then the setpoint will be set to the schedule low setpoint. OAT's that fall between the limits result in a setpoint that is proportional to the OAT's position between the OAT limits.

When using the supply air temperature (SAT) schedule, the schedule high setpoint is usually set to the lower limit of the required setpoint range.

When using the Return Air Temperature (RAT) schedule, the schedule high setpoint is usually set to the high limit of the required setpoint range.

Example of a SAT Schedule

	High Limit	Low Limit
Outside Air Temperature	25 Deg C	18 Deg C
Setpoint	12 Deg C	26 Deg C

Results

Outside Air Temperature	Supply Air Temperature Setpoint
30 Deg C	12 Deg C
25 Deg C	12 Deg C
22 Deg C	18 Deg C
20 Deg C	22 Deg C
18 Deg C	26 Deg C
10 Deg C	26 Deg C

Example of a RAT Schedule

	High Limit	Low Limit
Outside Air Temperature	27 Deg C	18 Deg C
Setpoint	25 Deg C	20 Deg C

Results

Outside Air Temperature	Return Air Temperature Setpoint
30 Deg C	25 Deg C
27 Deg C	25 Deg C
25 Deg C	23.75 Deg C
20 Deg C	21 Deg C
18 Deg C	20 Deg C
10 Deg C	20 Deg C

The DC6 maintains 5 control outputs. These outputs are heating, cooling, fresh air damper, humidifier and fan speed. Each of the outputs can be assigned to any one of the 15 output devices. Please refer to the User Selectable Connections table in the next section for details.

The PI parameters for each output device can be individually set.

PI Parameters

PI Setting	Prop Gain	Integral Increment Time For Static pressure loop increments by 0.5 %. For other loops increments proportional to error (1 DEG = 2 % or 2 PCT = 2.5%).
Slow	1 DEG C = 100 PCT	NONE
Medium	1 DEG C = 80 PCT	30 SECS
Fast	1 DEG C = 20 PCT	15 SECS
Very Fast	NO PROP GAIN	7 SECS

The DC6 includes a 7 day time switch facility. The DC6 will operate or switch off according to the time of day (TOD) schedule. This is subject to the run input being "ON".

Example of a TOD Schedule

Day of Week	Time	Command
Monday	08Hr00	ON
Monday	17Hr30	OFF
Wednesday	10Hr00	ON
Thursday	18Hr00	OFF

Other DC6 parameters are as follows:

	Notes
Fresh air damper minimum position	Damper is closed when unit off. Damper will open if cooling / heating required and OAT low / high.
Fan speed low threshold	As the fan speed drops below this threshold the fresh air damper minimum position will be increased. At 10 % below this threshold the fresh air minimum position will be 100%.
Humidity high limit	The second humidity input will be limited to this value. The humidify output will be decreased so as to maintain this limit.
Supply air low limit	The supply air temperature will be kept above this value. The cooling output will be decreased so as to maintain this limit
Humidity deadzone	The DC6 will neither humidify or dehumidify until the humidity moves further than the deadzone from setpoint. Once activated the humidity will be kept at setpoint.
Temperature deadzone	The DC6 will neither heat or cool until the temperature moves further than the deadzone from setpoint. Once activated the temperature will be kept at setpoint.

DC6 Connections

Fixed Connections

Connection	Description	Type
AI 1	Return Air Temperature Sensor	NTC Thermistor / 0 to 10 Volt
AI 2	Supply Air Temperature Sensor	NTC Thermistor / 0 to 10 Volt
AI 3	Outside Air Temperature Sensor	NTC Thermistor / 0 to 10 Volt
AI 4	Differential Pressure Sensor	0 to 10 Volt
AI 5	Humidity Sensor	0 to 10 Volt
AI 6	Humidity Sensor 2 (High limit)	0 to 10 Volt
AI 7	Loop Temperature Sensor	NTC Thermistor / 0 to 10 Volt
AI 8	Spare analog input	NTC Thermistor / 0 to 10 Volt
DI 1	Unit ON / OFF External Input (AUTO MAN OFF)	24 VAC Contact
DI 2	Fan Proof Input	24 VAC Contact
DI 3	Alarm input	24 VAC Contact
DI 4	Alarm input	4 VAC Contact
DI 5	Compressor 1 proof	24 VAC Contact
DI 6	Compressor 2 proof	24 VAC Contact
DI 7	Spare digital input	24 VAC Contact
DI 8	Spare digital input	24 VAC Contact
DO 1	Fan Run Output	Voltage Free Contact
DO 2	Alarm Output	Voltage Free Contact

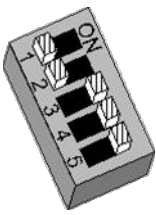
User Selectable Connections

Device Mode	Description	Connection	Output Type
0	No Output		
1	0 to 10 Volt output	AO 1	0 to 10 Volt
2	0 to 10 Volt output	AO 2	0 to 10 Volt
3	0 to 10 Volt output	AO 3	0 to 10 Volt
4	0 to 10 Volt output	AO 4	0 to 10 Volt
5	1 Step Output	DO 3	Voltage Free Contact
6	2 Step Output	DO 3 & 4	Voltage Free Contact
7	4 Step Binary Output	DO 3 & 4	Voltage Free Contact
8	Pulse Width Modulating Output	DO 3	Voltage Free Contact
9	3 Position Motor Output, 120 Seconds	DO 3 & 4	Voltage Free Contact

Device Mode	Description	Connection	Output Type
10	3 Position Motor Output, 150 Seconds	DO 3 & 4	Voltage Free Contact
11	1 Step Output	DO 5	Voltage Free Contact
12	2 Step Output	DO 5 & 6	Voltage Free Contact
13	3 Step Output	DO 5, 6 & 7	Voltage Free Contact
14	4 Step Output	DO 5, 6, 7 & 8	Voltage Free Contact
15	16 Step Binary Output	DO 5, 6, 7 & 8	Voltage Free Contact

BMS Setup

The controllers must each be programmed with an address for BMS operation. The address is set by means of the dip switch on the controller. The dip switch settings have the following values.



Switch Number	OFF Value	ON Value
1	0	1
2	0	2
3	0	4
4	0	8
5	0	16

The address is calculated by adding the values together.

The dip switch shown here has switches 1 & 2 OFF while 3, 4 & 5 are ON. The address is calculated as $4 + 8 + 16 = 28$

Special Notes

There are a few items to bear in mind when using the DC6.

Note 1

The standard DC6 only supports SI units. Non SI can be supplied on request.

Note 2

The Siemens Building Technologies 10k NTC sensor has an internal diode which offsets the value read by the DC6. These sensors can be used. The intercept must be changed from -10 to -5 to correct for effect of the internal diode. The BMS standard report will however show a value which is 5 Deg C lower than actual. The unbundled point will show the correct value.

DC6 Points list (BMS) Version A - Application 170

Point	Description	Units	ON / OFF	Slope	Intercept	Type	Connection
13	HUM DEADZONE	PCT		0.4	0	LAO	

Point	Description	Units	ON / OFF	Slope	Intercept	Type	Connection
14	HUM HIGH LIM	PCT		3.2	54	LAO	
15	FRSH AIR MIN	PCT		3	0	LAO	
16	FAN SPD LOW	PCT		3	0	LAO	
17	TMP DEADZONE	DEG C		0.25	0	LAO	
18	SAT LOW LIM	DEG C		2	-10	LAO	
19	LOOP DEADZONE	DEG C		0.25	0	LAO	
20	RESERVED 1						
21	UNIT RUN		ON.OFF	1	0	LDI	DI 1
22	FAN PRF ALRM		ON.OFF	1	0	LDI	DI 2
23	DI 3 ALARM		ON.OFF	1	0	LDI	DI 3
24	DI 4 ALARM		ON.OFF	1	0	LDI	DI 4
25	COMP PROOF 1		ON.OFF	1	0	LDI	DI 5
26	COMP PROOF 2		ON.OFF	1	0	LDI	DI 6
27	DI 7		ON.OF	1	0	LDI	DI 7
28	DI 8		ON.OFF	1	0	LDI	DI 8
29	DAY.NGT		NIGHT.DAY	1	0	LDO	
30	HEAT DISABLE		ON.OFF	1	0	LDO	
31	DEHUMID DIS		ON.OFF	1	0	LDO	
32	RESERVED 2						
33	RESERVED 3						
34	RESERVED 4						
35	RESERVED 5						
36	RESERVED 6						
37	AI 1	PCT		0.4	0	LAI	AI 1
38	AI 2	PCT		0.4	0	LAI	AI 2
39	AI 3	PCT		0.4	0	LAI	AI 3
40	DIFF PRESS	PCT		0.4	0	LAI	AI 4
41	HUMIDITY	PCT		0.4	0	LAI	AI 5
42	HUMIDITY SUP	PCT		0.4	0	LAI	AI 6
43	AI 7	PCT		0.4	0	LAI	AI 7
44	AI 8	PCT		0.4	0	LAI	AI 8
45	HEATING	PCT		0.5	0	LAI	
46	COLLING	PCT		0.5	0	LAI	
47	FRESHAIR DMP	PCT		0.5	0	LAI	

Point	Description	Units	ON / OFF	Slope	Intercept	Type	Connection
48	HUMID OUTPUT	PCT		0.5	0	LAI	
49	FAN SPEED	PCT		0.5	0	LAI	
51	OUTPUT 1	PCT		0.5	0	LAO	
52	OUTPUT 2	PCT		0.5	0	LAO	
53	OUTPUT 3	PCT		0.5	0	LAO	
54	TEMP SETPNT	DEG C		0.25	-10	LAO	
55	DPRES SETPNT	PCT		0.4	0	LAO	
56	HUMID SETPNT	PCT		0.4	0	LAO	
57	LOOP SETPNT	DEF C		0.25	-10	LAO	
58	CONFIG 1	BITS		1	0	LAO	
59	CONFIG 2	BITS		1	0	LAO	
60	CONFIG 3	BITS		1	0	LAO	
61	CONFIG 4	BITS		1	0	LAO	
62	CONFIG 5	BITS		1	0	LAO	
63	CONFIG 6	BITS		1	0	LAO	
64	CONFIG 7	BITS		1	0	LAO	
65	SCHED SET HI	BITS		0.25	-10	LAO	
66	SCHED SET LO	DEG C		0.25	-10	LAO	
67	SCHED OAT HI	DEG C		0.25	-10	LAO	
68	SCHED OAT LO	DEG C		0.25	-10	LAO	
69	RESERVED 7						
70	RESERVED 8						
71	RESERVED 9						
72	RET AIR TEMP	DEG C		0.25	-10	LAI	AI 1
73	SUPP AIR TMP	DEG C		0.25	-10	LAI	AI 2
74	OUTSIDE AIR	DEG C		0.25	-10	LAI	AI 3
75	TEMP 4	DEG C		0.25	-10	LAI	AI 4
76	TEMP 5	DEG C		0.25	-10	LAI	AI 5
77	TEMP 6	DEG C		0.25	-10	LAI	AI 6
78	LOOP IN TEMP	DEG C		0.25	-10	LAI	AI 7
79	TEMPT 8	DEG C		0.25	-10	LAI	AI 8

DC6 Configure Bits

The configure bits points (number 15 to 18) on the BAS system can be used to configure the DC6 controller once it is communicating on the LAN. These are the user changeable settings.

This number represents several separate settings and to calculate the required number for each configure bits simply add the equivalent value from the tables listed below.

Config 1

Bit	Description	Value	Comment
0 - 3	Static Pressure Output Device	?	See device table below
4 - 7	Humidity Output Device	?	See device table below

Config 2

Bit	Description	Value	Comment
0 - 3	Cooling Output Device	?	See device table below
4 - 7	Heating Output Device	?	See device table below

Config 3

Bit	Description	Value	Comment
0 - 3	Eco Damper Output Device	?	See device table below
4 & 5	Eco Damper PI - SLOW	0	See device table below
4 & 5	Eco Damper PI - MEDIUM	16	
4 & 5	Eco Damper PI - FAST	32	
4 & 5	Eco Damper PI - VERY FAST	48	
6 & 7	Control Mode - RAT	0	
6 & 7	Control Mode - SAT	64	
6 & 7	Control Mode - RAT Schedule	128	
6 & 7	Control Mode - SAT Schedule	192	

Config 4

Bit	Description	Value	Comment
0 & 1	Cooling PI - SLOW	0	
0 & 1	Cooling PI - MEDIUM	1	
0 & 1	Cooling PI - FAST	2	
0 & 1	Cooling PI - VERY FAST	3	
2 & 3	Heating PI - SLOW	0	
2 & 3	Heating PI - MEDIUM	4	
2 & 3	Heating PI - FAST	8	
2 & 3	Heating PI - VERY FAST	12	
4 & 5	Static Pressure PI - SLOW	0	
4 & 5	Static Pressure PI - MEDIUM	16	
4 & 5	Static Pressure PI - FAST	32	
4 & 5	Static Pressure PI - VERY FAST	48	

Bit	Description	Value	Comment
6 & 7	Humidity PI - SLOW	0	
6 & 7	Humidity PI - MEDIUM	64	
6 & 7	Humidity PI - FAST	128	
6 & 7	Humidity PI - VERY FAST	192	

Config 5

Bit	Description	Value	Comment
0 - 3	OUT 1 Output Device	?	See device table below
4 - 7	OUT 2 Output Device	?	See device table below

Config 6

Bit	Description	Value	Comment
0 - 3	OUT 3 Output Device	?	See device table below
4 - 7	LOOP Output Device	?	See device table below

Config 7

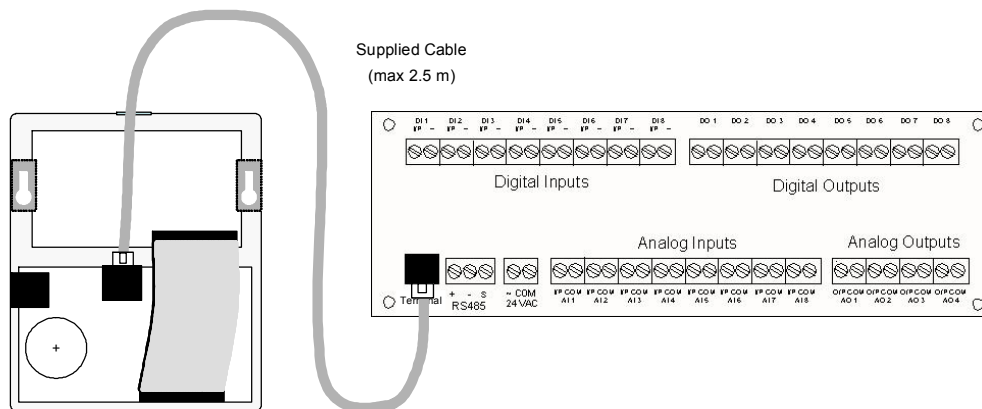
Bit	Description	Value	Comment
0 & 1	LOOP PI - SLOW	0	
0 & 1	LOOP PI - MEDIUM	1	
0 & 1	LOOP PI - FAST	2	
0 & 1	LOOP PI - VERY FAST	3	
2	RAT (AI 1) NTC input	0	
2	RAT (AI 1) 0 - 10 Volt input	4	
3	SAT (AI 2) NTC input	0	
3	SAT (AI 2) 0 - 10 Volt input	8	

Bit	Description	Value	Comment
4	OAT (AI 3) NTC input	0	
4	OAT (AI 3) 0 - 10 Volt input	16	
5	LOOP (AI 7) NTC input	0	
5	LOOP (AI 7) 0 - 10 Volt input	32	

Output Device Values

	Description	Value Bits 0 to 3	Value Bits 4 to 7
0	No output used	0	0
1	AO1	1	16
2	AO2	2	32
3	AO3	3	48
4	AO4	4	64
5	1 Step DO3	5	80
6	2 Step DO3, DO4	6	96
7	2 Step Binary DO3, DO4	7	112
8	Pulsed PWM DO3	8	128
9	120 Second Motor DO3, DO4	9	144
10	150 Second Motor DO3, DO4	10	160
11	1 Step DO5, DO6	12	192
12	2 Step DO5, DO6	12	192
13	3 Step DO5, DO6, DO7	13	208
14	4 Step DO5, DO6, DO7, DO8	14	224
15	4 Step Binary DO5, DO6, DO7, DO8	15	240

Connection Diagram



Note: For more information, refer to the DC6 Technical Data Sheet.