



Dynamic Rating, Monitoring, Control and
Communications

DRMCC-T2 **SICM3B USER** **MANUAL**

Revision: 020308



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INTRODUCTION

The Serial Interface Control Module or SICM is a small, low-cost controller used in the DRMCC-T2 system. The SICM3B is a revised version of this original SICM with modified Analog Inputs and the addition of four Analog Outputs. A 32-bit Microcontroller is also a feature of the SICM3B.

The SICM3B has been developed to interface to DNP 3.00 compatible control system. This is achieved via a multi-drop RS485 communications link. The SICM3B provides 16 general-purpose digital inputs. The analog input sub-system includes eight transducer inputs (link selectable to 0-10 V DC or 0-24 mA DC). Four 0-20 mA current loop outputs are an addition to the SICM3B, the SICM3B has an on-board temperature sensor and eight relay outputs.

SPECIFICATIONS

GENERAL

Power Supply:	Nominal 24 Volt DC. Range: 20.0 V to 29.0 V DC. Fused and reverse polarity protected. Approx 95 mA quiescent current draw.
System Operating Temperature Range:	-40 to +85°C.
Configuration:	Rotary Hex Switches.
Board Dimensions:	305 mm x 110 mm. To fit Weidmuller RS100 profile.
Enclosure/Mounting:	DIN rail mounting. Circuit boards conformally coated.
Noise Immunity:	Designed to be EMC compliant to CE mark and C-tick Mark.
Connections:	Pluggable screw terminal blocks with individual terminal numbering. All cabling to the device enters parallel to the PCB.

COMMUNICATIONS

Protocol:	DNP 3.00 – Level 1.
Data Rate:	A range selected by rotary switch (300, 1200, 2400, 4800, 9600, 19200, 38400, 57600 bps).
Interface:	2 pair (full duplex) RS485 multidrop, with a floating terminal provided for looping the RS485 cable screen.
Indicators:	LED on RX (red) and TX (green).
Protection:	Transient suppressors on RS485 lines.
Line Termination:	RS485 Port has link selectable 120 Ω terminating resistors on the PCB.

DIGITAL INPUTS

Quantity:	16.
Isolation:	Electrically separate (3000 V rms), opto-isolated (PC355NT).
Input Voltage Range:	10 V DC/30 V AC to 140 V DC/AC.
Input Current Requirements:	250 μ A – 4.25 mA (depending on voltage).
Indicators:	LED indication on each input.
Filtering:	Input filters to eliminate external noise (includes fast transient / burst test) and software debouncing that will facilitate all DC inputs of greater than 20 ms to be detected.
Protection:	150 V MOV across each input.

RELAY OUTPUTS

Quantity and Type:	8 relays. Fully sealed. Omron G2R-14-T130-24 (or equivalent).
Power Supply:	Nominal 24 V DC. Range: 19.0 V to 27.0 V DC. Fused and reverse polarity protected.
Contacts:	One changeover set per relay. 10A contact at 250VAC/30VDC.
Connections:	Same Terminal blocks as Base Module for contacts, as well as two additional terminals for 24VDC relay power. All three connections brought out for each relay (common, N/C, N/O).
Indicators:	LED indication on each output.
Isolation:	2kV rms 60s between each set of contacts connected together, all other contacts and ground. 1kV 60s across open contacts.
Protection:	Diode and fuse protection on 24VDC input to Output Module.
General:	All 8 relays may be energised continuously, subject to the external 24VDC supply having sufficient capacity.
Fail-safe Feature:	If communications to the SICM3B are lost for a period of 300 sec or power is lost then all relays are de-energised.

EXTERNAL ANALOG INPUTS

Number of Channels:	8.
Resolution of ADC:	12-bits.
Range:	0 – 24 mA DC or 0 – 10 V DC, plug selectable. 200 Hz sampling, average every 200 samples.
Protection:	12 V Transorb on each input.
Filtering:	Low-pass filter on each input plus EMC filtering for fast transient / burst test.
Accuracy:	Better than 0.5% of range at 25 °C, better than 1% of range from –40 °C to +85 °C.
Isolation:	Analogs not isolated from each other, but all analogs are isolated to earth: 2kV rms 60s.

INTERNAL ANALOG INPUT

Quantity Monitored:	Board Temperature (-40 to +110 °C).
Sampling:	Updated every 1.0 seconds.
Accuracy:	Board temperature ± 1 °C (note that the sensor does not read air temperature. It gives an 'indication only' of the circuit board temperature at one location).

ANALOG OUTPUTS

Number of Channels:	4.
Power Supply:	Nominal 24 V DC. Range: 17.5 V to 30.0 V DC. Fused and reverse polarity protected.
Resolution:	12-bits.
All Outputs:	4 – 20 mA current loop with common external loop supply (24 V DC). Maximum loop resistance 400 Ω .
Protection:	30 V Transorb on each input.
Isolation:	Analogs not isolated from each other, but all analogs are isolated to earth: 2kV rms 60s.
Updating:	Outputs update every 1 second.

CONFIGURATION

The SICM3B is configured using the four rotary hex switches SW1 – SW4.

ROTARY SWITCH OPERATION

- Switch 1 - Address (range 1 – 15).
This address is changed dynamically: i.e. the SICM3B does not have to be restarted for the address change to take effect.
SICM3B is commonly address 3.
- Switch 2 - Baud rate of RS485 comms port as per table.

Switch Posn	Bit Rate (bps)
0	300
1	1200
2	2400
3	4800
4	9600
5	19200
6	38400
7	57600

- SICM3B bit rate is 19200.
- Switch 3 - Second byte of Class.
- Switch 4 - First byte of Class.

Eg: Class 23 (17 hex) would be set as Switch 4 to position 1 and Switch 3 to position 7.

SICM3B TERMINAL CONNECTIONS

All input and output connections to the SICM3B are via pluggable screw terminal blocks. The screw terminal blocks can be unplugged to speed replacement of the unit for maintenance. The power and communications connections are detailed in the following. The definitions for the digital input, relay output, and analog input connections are type/class specific and are detailed in following.

NOTE: The sockets for the terminal blocks are not numbered. The terminal numbers only appear on the terminal blocks themselves. It is therefore crucial to ensure that the terminal blocks are plugged into the correct sockets before commencing wiring. The terminal positions appear on the drawings.

SICM3B POWER/COMMUNICATIONS CONNECTIONS

Function	Connector/Terminal Number
+Supply Volts	J1 – terminal 41
Supply return	J1 – terminal 42
RS485 Rx-	J1 – terminal 43
RS485 Rx+	J1 – terminal 44
RS485 Tx+	J1 – terminal 45
RS485 Tx-	J1 – terminal 46
Not Connected	J1 – terminal 47
GND	J1 – terminal 48
+Loop Supply (Analog Outputs)	J9 – terminal 66
Loop Supply return (Analog Outputs)	J9 – terminal 65

SICM3B I/O CONNECTIONS AND DNP MAPPING

(CLASS 23) DRMCC / STATISTICAL METERING – ANALOG SIGNALS

Terminal Number	Analogue Inputs		I/O Posn	DNP Pt
+49,-50	Transducer 1 (range 0 to 10 V or 0 to 24.2 mA)	409.6 counts/V 169.2 counts/mA	AI 0	0
+51,-52	Transducer 2 (range 0 to 10 V or 0 to 24.2 mA)	409.6 counts/V 169.2 counts/mA	AI 1	1
+53,-54	Transducer 3 (range 0 to 10 V or 0 to 24.2 mA)	409.6 counts/V 169.2 counts/mA	AI 2	2
+55,-56	Transducer 4 (range 0 to 10 V or 0 to 24.2 mA)	409.6 counts/V 169.2 counts/mA	AI 3	3
+57,-58	Transducer 5 (range 0 to 10 V or 0 to 24.2 mA)	409.6 counts/V 169.2 counts/mA	AI 4	4
+59,-60	Transducer 6 (range 0 to 10 V or 0 to 24.2 mA)	409.6 counts/V 169.2 counts/mA	AI 5	5
+61,-62	Transducer 7 (range 0 to 10 V or 0 to 24.2 mA)	409.6 counts/V 169.2 counts/mA	AI 6	6
+63,-64	Transducer 8 (range 0 to 10 V or 0 to 24.2 mA)	409.6 counts/V 169.2 counts/mA	AI 7	7
	SICM TEMP (-40 to +110 °C)	± 10 counts/°C	AI 8	8
-1,+2	Miscellaneous Analog Output 1 (range 0 to 20 mA)	1638.3 counts/mA	AO0	0
-3,+4	Miscellaneous Analog Output 2 (range 0 to 20 mA)	1638.3 counts/mA	AO1	1
-5,+6	Miscellaneous Analog Output 3 (range 0 to 20 mA)	1638.3 counts/mA	AO2	2
-7,+8	Miscellaneous Analog Output 4 (range 0 to 20 mA)	1638.3 counts/mA	AO3	3

Note: Link position – on links JP4 to JP11 when the link is positioned closest to the terminal strip, current input is selected. With no link (or “parked” in the other link position) voltage input is selected.

DIGITAL INPUTS

Terminal Number	Alarm Name	DNP Pt
+9,-10	Miscellaneous Input	0
+11,-12	Miscellaneous Input	1
+13,-14	Miscellaneous Input	2
+15,-16	Miscellaneous Input	3
+17,-18	Miscellaneous Input	4
+19,-20	Miscellaneous Input	5
+21,-22	Miscellaneous Input	6
+23,-24	Miscellaneous Input	7
+25,-26	Miscellaneous Input	8
+27,-28	Miscellaneous Input	9
+29,-30	Miscellaneous Input	10
+31,-32	Miscellaneous Input	11
+33,-34	Miscellaneous Input	12
+35,-36	Miscellaneous Input	13
+37,-38	Miscellaneous Input	14
+39,-40	Miscellaneous Input	15

DIGITAL OUTPUTS

Terminal Number			Name	DNP Pt (Note)
NO	NC	COM		
70	71	72	REL 1	0
73	74	75	REL 2	1
76	77	78	REL 3	2
79	80	81	REL 4	3
82	83	84	REL 5	4
85	86	87	REL 6	5
88	89	90	REL 7	6
91	92	93	REL 8	7
94			24V DC Supply (+ve)	
95			24V DC Supply (-ve)	

Notes:

DNP Points vary between SICM3B and SICM2B. This table specifically applies to SICM2B.