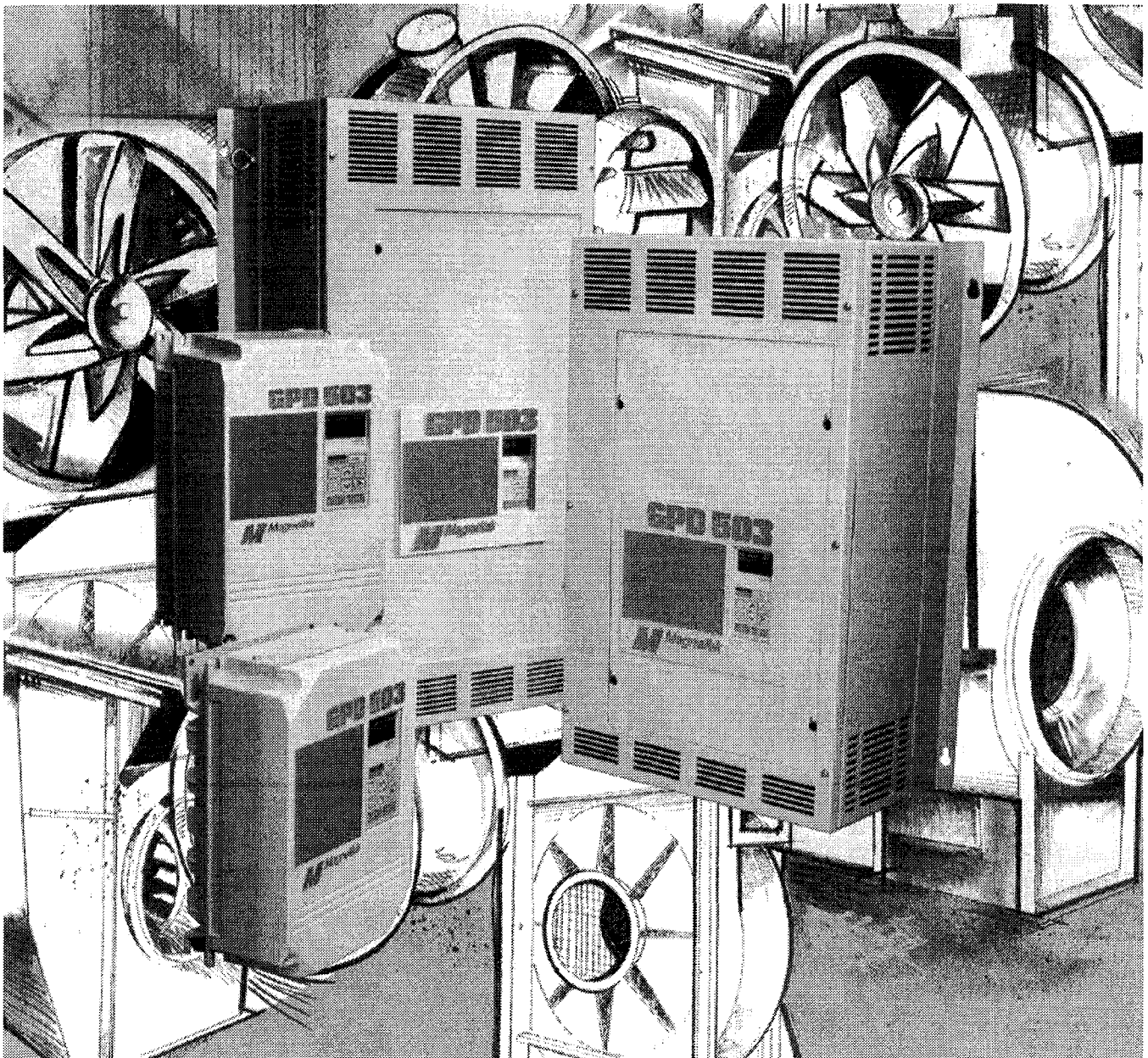# GPD 503
N2 - Metasys® Communication

Additional Technical References

Refer to the following publications for further information about the GPD 503 and Johnson Control, Inc.'s N2 - METASYS.

- MagneTek HVAC GPD 503 Technical Manual
  Publication TM 4231.12

- Johnson Control, Inc Metasys Integrator Technical Bulletin

Contents

Additional Technical Reference

Contents

Chapter 1
Introduction

- Overview

- Simple Start-up Steps

Overview

This manual describes the set-up and protocol for the MagneTek N2 Option Communication kit for the GPD 503, part number *CM041*. Refer to the HVAC GPD 503 technical manual, TM 4231 12, for supporting information

Communication with METASYS is fixed at a baud rate of 9600 BPS, 8 data bit, no parity, 1 stop and start bit. There is a maximum of 255 nodes and the METASYS network with RS-485 2-wire, half-duplex communication only. For data which can be transferred/received over the METASYS network, refer to the Point Map on page 16

Simple Start-Up Steps

The following is a brief overview of how the information in this manual should be used for start-up of the GPD 503 N2 Option Communication kit to enable communication operation

	Reference
Step 1. Remove AC input power to the drive	---
Step 2. Install EPROM kit hardware as required	**Chapter 2**
Step 3. Set dip switch on N2 Option Board for desired address.	**Chapter 2**
Step 4. Install N2 Option Board	**Chapter 2**
Step 5. Connect communication cable from the computer to the N2 Option Board terminals	**Chapter 2**
Step 6. Replace the drive cover.	---
Step 7. Apply power to the drive.	---
Step 8. If EPROMs were replaced, perform Sn-03 drive Reset sequence.	See HVAC GPD 503 technical manual TM 4231 12
Step 9. Set constants related to N2 communication	**Chapter 3**

Communication over METASYS network is now possible

Chapter 2
Installation of the N2 Board

- Installation of Drive EPROMs and N2 Option Board

- N2 - METASYS Network Wiring

- N2 Option Board SW1 Settings

- N2 Option Board SW2 Settings

Installation of Drive EPROMs and N2 Option Board

In order to communicate over the N2 Network, you must first install the N2 network card on the drive and set-up drive parameters This chapters deals with the N2 Option Board set-up

CAUTION: Ensure that input power to the drive is turned off, and the CHARGE lamp inside unit is off, before installing EPROMs and N2 Option Board.

Step 1.   Remove front cover from drive chassis

If drive EPROMs, U5 and U6, are respectively part numbered NSG618620H and NSG618620L, LEAVE THESE EPROMs IN THE DRIVE and skip to Step 3. Below

Step 2.   Carefully remove existing EPROM U5 from the Control PCB; install kit EPROM U5 in its place. Carefully remove existing EPROM U6 from the Control PCB, install kit EPROM U6 in its place Make sure both EPROMs are firmly seated

When installing Control PCB EPROMs, ensure that the notch is oriented to the left, and that all pins of the EPROM fit properly into the socket on the PC board

IMPORTANT: After replacing EPROMs, a Sn-03 Reset sequence must be performed See the HVAC GPD 503 technical manual, TM 4231 12 for details

Step 3.   Installation of N2 Option Board Orient the N2 Option Board as shown in Figure 2. Position connector 2CN (on the back side of the card) to mate with matching connector 2CN on the Control PCB, also aligning the three holes on the right side of the N2 Option Board with the tips of plastic standoffs present on the Control PCB. Press carefully until firmly seated

Due to its physical size, once the N2 Option Board is installed, option which must be mounted at connector 3 CN cannot be used

Route the green pigtail lead from the N2 Option Board to the lower left corner of the Control PCB. Pull the connector end of the existing pigtail lead off male pin "E" on the Control PCB. Fit the ring lug of the N2 Option Board pigtail lead over the pin, and press the Control PCB pigtail connector back into place.

N2 Network Wiring

The N2 Option Board's terminal is jumpered to terminal 3 and terminal 2 is jumpered to terminal 4 in a RS-485 2 wire configuration. METASYS's RS-485 connection needs to be wired to terminal 1 and 2 on the N2 Option Board   Figure 1 shows communication connections Figure 2 shows the terminal locations.

Table 1: Wiring the N2 Bus to the GPD 503 Drive.

GPD 503 N2 Option Board RS-485 Half Duplex (2-Wire) Terminals	N2 Bus
3 - Receive + Polarity *Jumpered to* 1 - Transmit/Send + Polarity	Transmit + Polarity Receive + Polarity
4 - Receive - Polarity *Jumpered to* 2 - Transmit/Send - Polarity	Transmit - Polarity Receive - Polarity

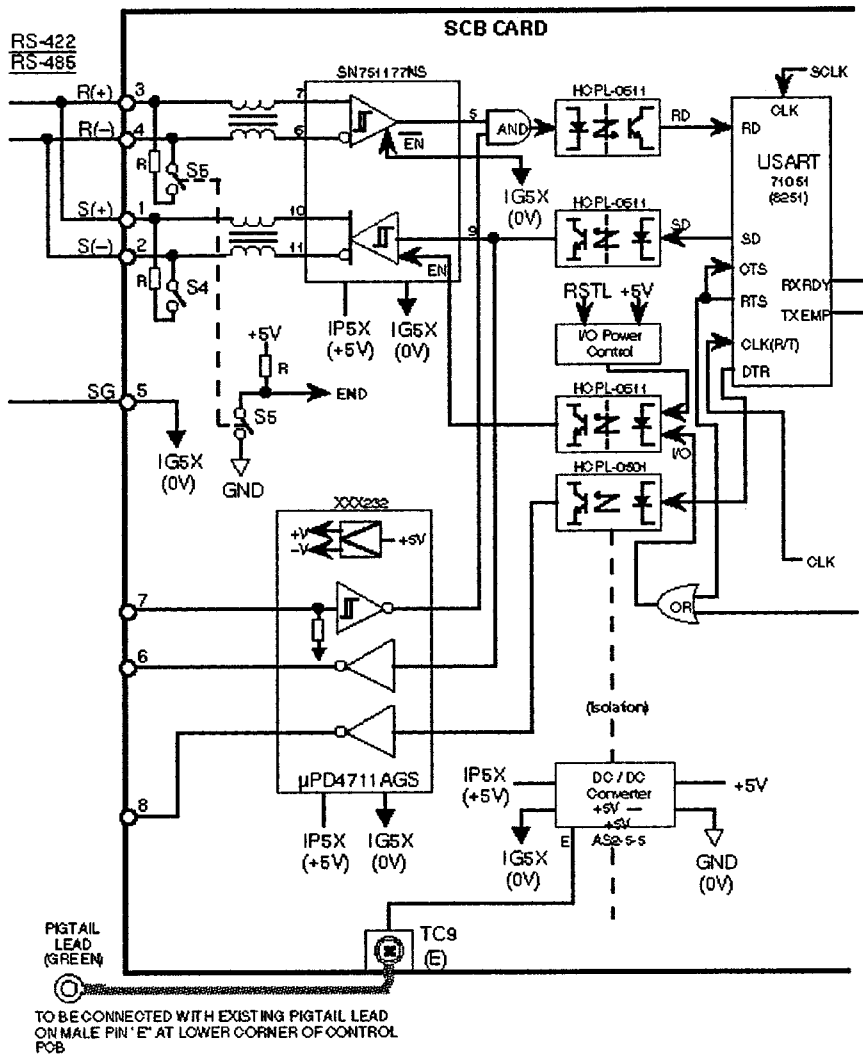NOTE: O INDICATES TERMINAL OF TERMINAL BLOCK TC

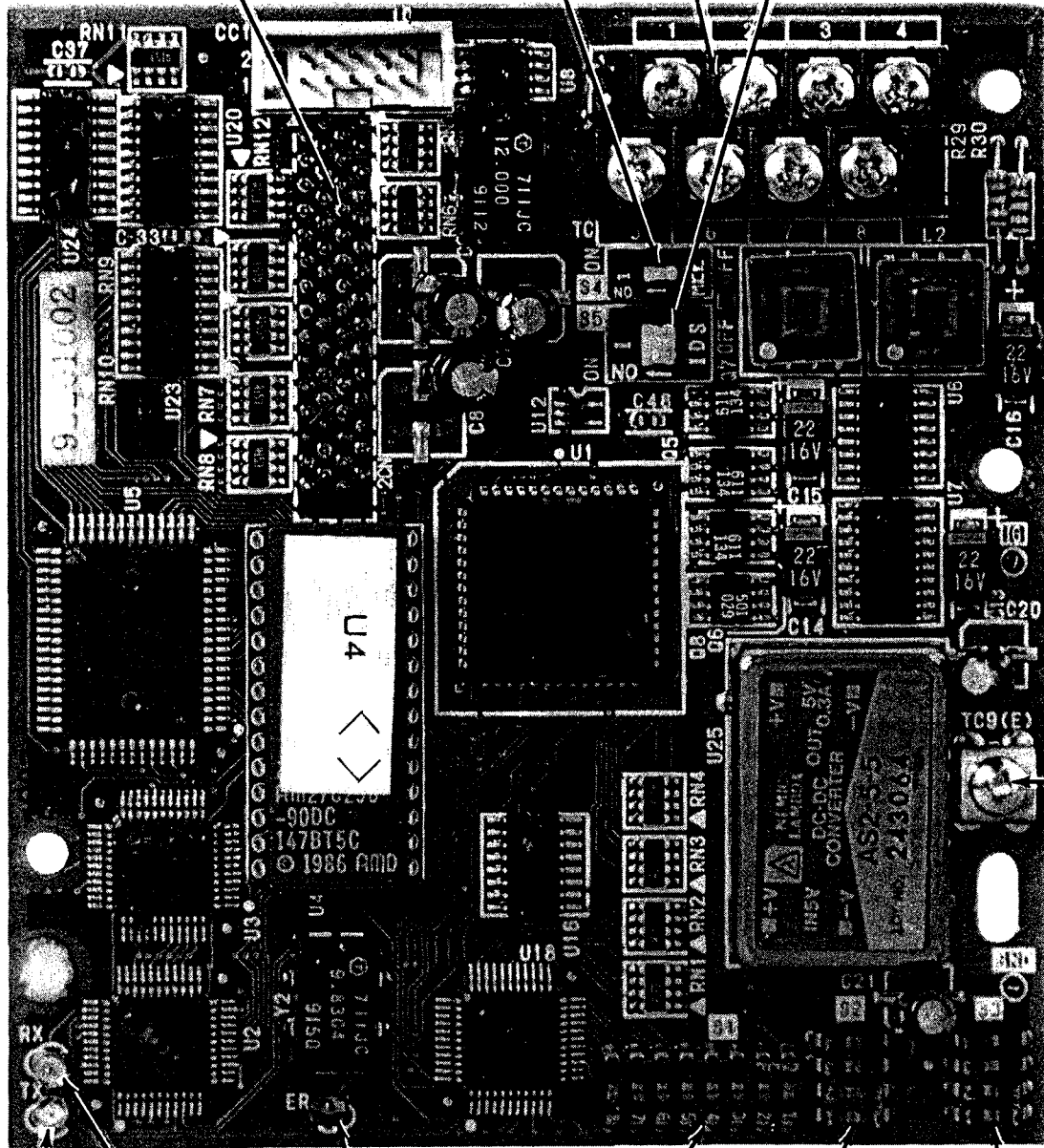## Figure 1: RS-485 Communication Connections to the N2 Option Board.

Position of Connector 2CN
(Mounted on Rear of Card)

DIPSW
S4

Terminal
Block TC

DIPSW
S5

Pigtail Lead (Not
Shown) Connected
at this Terminal

LED
TX

LED RX

LED ER

DIPSW
S1

DIPSW
S2

DIPSW
S3

Figure 2: N2 Option Board - Terminal and Switch Locations.
(shown larger than actual size)

N2 Option Board SW1 Settings

Switch 1 allows for node addresses 1-255 to be configured as shown below All N2 Option Board dip switch settings should be made with AC power off.

Table 2: N2 Option Board SW1 Node Address Selection.

SW8	SW7	SW6	SW5	SW4	SW3	SW2	SW1	Address	SW8	SW7	SW6	SW5	SW4	SW3	SW2	SW1	Address
0	0	0	0	0	0	0	0	Not Used	1	0	0	0	0	0	0	0	128
0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1	129
0	0	0	0	0	0	1	0	2	1	0	0	0	0	0	1	0	130
0	0	0	0	0	0	1	1	3	1	0	0	0	0	0	1	1	131
0	0	0	0	0	1	0	0	4	1	0	0	0	0	1	0	0	132
0	0	0	0	0	1	0	1	5	1	0	0	0	0	1	0	1	133
0	0	0	0	0	1	1	0	6	1	0	0	0	0	1	1	0	134
0	0	0	0	0	1	1	1	7	1	0	0	0	0	1	1	1	135
0	0	0	0	1	0	0	0	8	1	0	0	0	1	0	0	0	136
0	0	0	0	1	0	0	1	9	1	0	0	0	1	0	0	1	137
0	0	0	0	1	0	1	0	10	1	0	0	0	1	0	1	0	138
0	0	0	0	1	0	1	1	11	1	0	0	0	1	0	1	1	139
0	0	0	0	1	1	0	0	12	1	0	0	0	1	1	0	0	140
0	0	0	0	1	1	0	1	13	1	0	0	0	1	1	0	1	141
0	0	0	0	1	1	1	0	14	1	0	0	0	1	1	1	0	142
0	0	0	0	1	1	1	1	15	1	0	0	0	1	1	1	1	143
0	0	0	1	0	0	0	0	16	1	0	0	1	0	0	0	0	144
0	0	0	1	0	0	0	1	17	1	0	0	1	0	0	0	1	145
0	0	0	1	0	0	1	0	18	1	0	0	1	0	0	1	0	146
0	0	0	1	0	0	1	1	19	1	0	0	1	0	0	1	1	147
0	0	0	1	0	1	0	0	20	1	0	0	1	0	1	0	0	148
0	0	0	1	0	1	0	1	21	1	0	0	1	0	1	0	1	149
0	0	0	1	0	1	1	0	22	1	0	0	1	0	1	1	0	150
0	0	0	1	0	1	1	1	23	1	0	0	1	0	1	1	1	151
0	0	0	1	1	0	0	0	24	1	0	0	1	1	0	0	0	152
0	0	0	1	1	0	0	1	25	1	0	0	1	1	0	0	1	153
0	0	0	1	1	0	1	0	26	1	0	0	1	1	0	1	0	154
0	0	0	1	1	0	1	1	27	1	0	0	1	1	0	1	1	155
0	0	0	1	1	1	0	0	28	1	0	0	1	1	1	0	0	156
0	0	0	1	1	1	0	1	29	1	0	0	1	1	1	0	1	157
0	0	0	1	1	1	1	0	30	1	0	0	1	1	1	1	0	158
0	0	0	1	1	1	1	1	31	1	0	0	1	1	1	1	1	159
0	0	1	0	0	0	0	0	32	1	0	1	0	0	0	0	0	160
0	0	1	0	0	0	0	1	33	1	0	1	0	0	0	0	1	161
0	0	1	0	0	0	1	0	34	1	0	1	0	0	0	1	0	162
0	0	1	0	0	0	1	1	35	1	0	1	0	0	0	1	1	163
0	0	1	0	0	1	0	0	36	1	0	1	0	0	1	0	0	164
0	0	1	0	0	1	0	1	37	1	0	1	0	0	1	0	1	165
0	0	1	0	0	1	1	0	38	1	0	1	0	0	1	1	0	166
0	0	1	0	0	1	1	1	39	1	0	1	0	0	1	1	1	167
0	0	1	0	1	0	0	0	40	1	0	1	0	1	0	0	0	168
0	0	1	0	1	0	0	1	41	1	0	1	0	1	0	0	1	169
0	0	1	0	1	0	1	0	42	1	0	1	0	1	0	1	0	170
0	0	1	0	1	0	1	1	43	1	0	1	0	1	0	1	1	171
0	0	1	0	1	1	0	0	44	1	0	1	0	1	1	0	0	172
0	0	1	0	1	1	0	1	45	1	0	1	0	1	1	0	1	173
0	0	1	0	1	1	1	0	46	1	0	1	0	1	1	1	0	174
0	0	1	0	1	1	1	1	47	1	0	1	0	1	1	1	1	175
0	0	1	1	0	0	0	0	48	1	0	1	1	0	0	0	0	176
0	0	1	1	0	0	0	1	49	1	0	1	1	0	0	0	1	177
0	0	1	1	0	0	1	0	50	1	0	1	1	0	0	1	0	178

SW8	SW7	SW6	SW5	SW4	SW3	SW2	SW1	N2 NODE Address	SW8	SW7	SW6	SW5	SW4	SW3	SW2	SW1	N2 NODE Address
0	0	1	1	0	0	1	1	51	1	0	1	1	0	0	1	1	179
0	0	1	1	0	1	0	0	52	1	0	1	1	0	1	0	0	180
0	0	1	1	0	1	0	1	53	1	0	1	1	0	1	0	1	181
0	0	1	1	0	1	1	0	54	1	0	1	1	0	1	1	0	182
0	0	1	1	0	1	1	1	55	1	0	1	1	0	1	1	1	183
0	0	1	1	1	0	0	0	56	1	0	1	1	1	0	0	0	184
0	0	1	1	1	0	0	1	57	1	0	1	1	1	0	0	1	185
0	0	1	1	1	0	1	0	58	1	0	1	1	1	0	1	0	186
0	0	1	1	1	0	1	1	59	1	0	1	1	1	0	1	1	187
0	0	1	1	1	1	0	0	60	1	0	1	1	1	1	0	0	188
0	0	1	1	1	1	0	1	61	1	0	1	1	1	1	0	1	189
0	0	1	1	1	1	1	0	62	1	0	1	1	1	1	1	0	190
0	0	1	1	1	1	1	1	63	1	0	1	1	1	1	1	1	191
0	1	0	0	0	0	0	0	64	1	1	0	0	0	0	0	0	192
0	1	0	0	0	0	0	1	65	1	1	0	0	0	0	0	1	193
0	1	0	0	0	0	1	0	66	1	1	0	0	0	0	1	0	194
0	1	0	0	0	0	1	1	67	1	1	0	0	0	0	1	1	195
0	1	0	0	0	1	0	0	68	1	1	0	0	0	1	0	0	196
0	1	0	0	0	1	0	1	69	1	1	0	0	0	1	0	1	197
0	1	0	0	0	1	1	0	70	1	1	0	0	0	1	1	0	198
0	1	0	0	0	1	1	1	71	1	1	0	0	0	1	1	1	199
0	1	0	0	1	0	0	0	72	1	1	0	0	1	0	0	0	200
0	1	0	0	1	0	0	1	73	1	1	0	0	1	0	0	1	201
0	1	0	0	1	0	1	0	74	1	1	0	0	1	0	1	0	202
0	1	0	0	1	0	1	1	75	1	1	0	0	1	0	1	1	203
0	1	0	0	1	1	0	0	76	1	1	0	0	1	1	0	0	204
0	1	0	0	1	1	0	1	77	1	1	0	0	1	1	0	1	205
0	1	0	0	1	1	1	0	78	1	1	0	0	1	1	1	0	206
0	1	0	0	1	1	1	1	79	1	1	0	0	1	1	1	1	207
0	1	0	1	0	0	0	0	80	1	1	0	1	0	0	0	0	208
0	1	0	1	0	0	0	1	81	1	1	0	1	0	0	0	1	209
0	1	0	1	0	0	1	0	82	1	1	0	1	0	0	1	0	210
0	1	0	1	0	0	1	1	83	1	1	0	1	0	0	1	1	211
0	1	0	1	0	1	0	0	84	1	1	0	1	0	1	0	0	212
0	1	0	1	0	1	0	1	85	1	1	0	1	0	1	0	1	213
0	1	0	1	0	1	1	0	86	1	1	0	1	0	1	1	0	214
0	1	0	1	0	1	1	1	87	1	1	0	1	0	1	1	1	215
0	1	0	1	1	0	0	0	88	1	1	0	1	1	0	0	0	216
0	1	0	1	1	0	0	1	89	1	1	0	1	1	0	0	1	217
0	1	0	1	1	0	1	0	90	1	1	0	1	1	0	1	0	218
0	1	0	1	1	0	1	1	91	1	1	0	1	1	0	1	1	219
0	1	0	1	1	1	0	0	92	1	1	0	1	1	1	0	0	220
0	1	0	1	1	1	0	1	93	1	1	0	1	1	1	0	1	221
0	1	0	1	1	1	1	0	94	1	1	0	1	1	1	1	0	222
0	1	0	1	1	1	1	1	95	1	1	0	1	1	1	1	1	223
0	1	1	0	0	0	0	0	96	1	1	1	0	0	0	0	0	224
0	1	1	0	0	0	0	1	97	1	1	1	0	0	0	0	1	225
0	1	1	0	0	0	1	0	98	1	1	1	0	0	0	1	0	226
0	1	1	0	0	0	1	1	99	1	1	1	0	0	0	1	1	227
0	1	1	0	0	1	0	0	100	1	1	1	0	0	1	0	0	228
0	1	1	0	0	1	0	1	101	1	1	1	0	0	1	0	1	229
0	1	1	0	0	1	1	0	102	1	1	1	0	0	1	1	0	230
0	1	1	0	0	1	1	1	103	1	1	1	0	0	1	1	1	231
0	1	1	0	1	0	0	0	104	1	1	1	0	1	0	0	0	232
0	1	1	0	1	0	0	1	105	1	1	1	0	1	0	0	1	233
0	1	1	0	1	0	1	0	106	1	1	1	0	1	0	1	0	234
0	1	1	0	1	0	1	1	107	1	1	1	0	1	0	1	1	235
0	1	1	0	1	1	0	0	108	1	1	1	0	1	1	0	0	236
0	1	1	0	1	1	0	1	109	1	1	1	0	1	1	0	1	237
0	1	1	0	1	1	1	0	110	1	1	1	0	1	1	1	0	238
0	1	1	0	1	1	1	1	111	1	1	1	0	1	1	1	1	239
0	1	1	1	0	0	0	0	112	1	1	1	1	0	0	0	0	240

N2 OPTION BOARD SWITCH 1 MSB --> LSB								N2 NODE	N2 OPTION BOARD SWITCH 1 MSB --> LSB								N2 NODE
SW8	SW7	SW6	SW5	SW4	SW3	SW2	SW1	Address	SW8	SW7	SW6	SW5	SW4	SW3	SW2	SW1	Address
0	1	1	1	0	0	0	1	113	1	1	1	1	0	0	0	1	241
0	1	1	1	0	0	1	0	114	1	1	1	1	0	0	1	0	242
0	1	1	1	0	0	1	1	115	1	1	1	1	0	0	1	1	243
0	1	1	1	0	1	0	0	116	1	1	1	1	0	1	0	0	244
0	1	1	1	0	1	0	1	117	1	1	1	1	0	1	0	1	245
0	1	1	1	0	1	1	0	118	1	1	1	1	0	1	1	0	246
0	1	1	1	0	1	1	1	119	1	1	1	1	0	1	1	1	247
0	1	1	1	1	0	0	0	120	1	1	1	1	1	0	0	0	248
0	1	1	1	1	0	0	1	121	1	1	1	1	1	0	0	1	249
0	1	1	1	1	0	1	0	122	1	1	1	1	1	0	1	0	250
0	1	1	1	1	0	1	1	123	1	1	1	1	1	0	1	1	251
0	1	1	1	1	1	0	0	124	1	1	1	1	1	1	0	0	252
0	1	1	1	1	1	0	1	125	1	1	1	1	1	1	0	1	253
0	1	1	1	1	1	1	0	126	1	1	1	1	1	1	1	0	254
0	1	1	1	1	1	1	1	127	1	1	1	1	1	1	1	1	255

0 = Switch is "OFF"   1 = Switch is "ON"

N2 Option Board SW2 Settings

Dip switch number two is used for cable loss detection only as show below in Table 3

Table 3: N2 Option Board SW2 Cable Loss Settings.

SW2 SWITCH SETTINGS	DESCRIPTIONS
1	OFF: Cable Loss Detection Disabled ON. Cable Loss Detection Enabled
2 - 4	Not Used

If the cable becomes disconnected and "Cable Loss Detection" is disable, the drive will continue to operate. If the cable becomes disconnected and the "Cable Loss Detection" is enabled, the drive will get an EF3 fault and will operate per Sn-12's 3rd and 4th most significant bit settings. See page 14 for communication error detection and drive mode of operation details

NOTE: The switch SW3 is not used.

N2 Option Board SW4 and SW5 Settings

Both the SW4 and the SW5 switches are active with the N2 network. They are terminating resistors. When "ON", they tell the Metasys Master that this node is the last physical node on the N2 bus These switches should be in the "OFF" position on ALL BUT THE LAST drive when multiple drives are connected.

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Chapter 3
SETTING OF CONSTANTS

- Selection of Operation Command and Frequency Reference Source

- Select Frequency Reference Source

- Select Run/Stop Source

- Initializing Communication (Wait Process Performed By Drive)

- Communication Error Detecting Method and Process

Selection of Operation Command and Frequency Reference Source

The speed frequency reference is determined by the 1st digit of Sn-04 and Sn-08   The source of drive operation command is determined by the 2nd digit of Sn-04 and Sn-08

NOTES: Change constants Sn-04 and Sn-08 only when the drive is in a stopped condition.

For the GPD 503, after a drive reset (2-wire Sn-03=1110 or 3-wire Sn-03 = 1111) Sn-04 value is 0011 and Sn-08 value is 0100 default settings select operation and frequency control from communication option

Table 4: Drive Operational Mode.

Functions Available by Communication Link / Computer	MODE		
	Computer Sn-08 2nd digit = 0 Sn-04 2nd digit = X *3	External Terminal Sn-08 2nd digit = 1 Sn-04 2nd digit = 0	Digital Operator Sn-08 2nd digit = 1 Sn-04 2nd digit = 1
Operation command source	Y	N	N
Fault reset	Y	Y	Y
Operation status monitoring	Y	Y	Y
Change (write) (1)	Y *1	Y *1	Y *1
Read constant	Y	Y	Y
Multifunction input	Effective *2	Effective *2	Effective *2

NOTES:
1   Sn-XX and Cn-XX constants cannot be written to the Digital Operator or from the PLC while the drive is running
2   Logic "OR" of command input from external terminals 3 to 8 and command input
3   X = Setting does not matter

Select Frequency Reference Source

The GPD 503 has three ways of selecting frequency reference source. They are from the digital operator, analog input from terminal 13, or a communication option card   Below is a description of the Sn-04 and Sn-08 setting to select the frequency reference source

Sn-04 1st digit=0:   Drive frequency reference is analog input from external terminal 13 (0-10 Vdc) or 14 (4-20mA).

Sn-04 1st digit=1.   Drive frequency reference input from the Digital Operator.

Sn-08 1st digit=0.   Frequency reference received from the computer is to be main speed reference Digital Operator REMOTE REF LED is "ON". Sn-04 1st digit setting does not matter.

Sn-08 1st digit=1:   Digital Operator frequency reference ("F" display) is to be main speed reference. Sn-04 setting determines it the reference comes from the Digital Operator or analog reference

Table 5: Frequency Reference Source Selection.

FREQUENCY REFERENCE		
Sn-04	**Sn-08**	**Frequency Reference From:**
XXX0	XXX0	Serial Communications Option Card
XXX1	XXX0	Serial Communications Option Card
XXX0	XXX1	Analog Input
XXX1	XXX1	Digital Operator

Select Run/Stop Source

As with the frequency reference for a GPD 503, the drive operation commands (RUN/STOP, FWD/REV, etc.) can be controlled from one of three sources. They are from the digital operator, external terminal, or a communication option card   Below is a description of the Sn-04 and Sn-08 setting to select the frequency reference source.

Sn-04 2nd digit=0   Drive operation command input from external terminal
Sn-04 2nd digit=1   Drive operation commands input from the Digital Operator.
Sn-08 2nd digit=0·   Drive operation commands received from the computer   Digital Operator
                     REMOTE SEQ LED is "ON". Sn-04 2nd digit setting does not matter.
Sn-08 2nd digit=1   Drive operation command from the drive, according to Sn-04 2nd digit

Table 6: Run/Stop Source Selection.

RUN / STOP		
Sn-04	**Sn-08**	**Run/Stop Commands from:**
XX0X	XX0X	Serial Communications Option Card
XX1X	XX0X	Serial Communications Option Card
XX0X	XX1X	External Terminals
XX1X	XX1X	Digital Operator

Initializing Communication (Wait Process Performed By Drive)

Whenever power is applied a GPD 503 drive with a N2 Option Board, the installed EPROM's will initialize, recognize the presence of the N2 Option Board, and prepare the drive for N2 communication. This is indicated by the blinking "**CALL**" display on the Digital Operator while the drive is waiting for the communications. When correct communications is established, "**CALL**" is no longer displayed. Then the drive operation ready bit is changed to 1.

13

Communication Error Detecting Method and Process

Drive reaction to a communication error can be determined by the 3rd and 4th digits of Sn-12 in a GPD 503 that is HVAC specific   The drive displays an N2 communication error is an EF3 fault. The EF3 fault can exclusively represent a communication errors if no terminal connection is wired to external terminal three.   The drive can be configured to continue to run if a communication error, EF3, is detected by configuring the drive parameter Sn-12   The configurable drive reactions after on EF3 fault are as follows

Sn-12

MSB -- > LSB
0 0 X X - Ramp to stop (Major Failure)
0 1 X X - Coast to stop (Major Failure)
1 0 X X - Not used
1 1 X X - Continue operation (Minor Failure)

Note. X do not effect this operation. See the HVAC GPD 503 Manual, TM 4231.12, for details

If the drive is programmed for operation commands or speed reference from the serial communication link, and the BUS ERROR signal is HIGH for 0 1 second or more, the drive processes the communication error according to the setting of the 3rd and 4th digits of Sn-12 in the GPD 503 drive A communication error (time-out) is declared if any data item cannot be received within 5 seconds and after three retries.

Chapter 4
Point Map

- GPD 503 Point Map

- Operating Functions

- Command Priority

GPD 503 Point Map

The Point Map provides in detail the exact drive functions a user can monitor and control over the Metasys N2 network using the N2 Option Board. Table 7 shows the HVAC GPD 503 Point Map

Table 7: GPD 503 Point Map.

NPT	NPA	Unit	CODE	DESCRIPTION
BI	1	0 = Stopped 1 = Running	Inv Stat	Monitor Status- Run/Stop
BI	2	0 = Forward Running 1 = Reverse Running	Inv Stat	Monitor Status Signal - Reverse / Forward
BI	3	0 = Drive not Ready 1 = Drive Ready	Inv. Stat	Monitor Status Signal - Drive Ready
BI	4	0 = No Major Fault 1 = Major Fault	Inv Stat	Monitor Status Signal - Major Fault
BI	5	0 = No Data Setting Error 1 = Data Setting Error	Inv. Stat	Monitor Status Signal - Data Setting Error
BI	6	0 = Output Reset 1 = Output Set	Inv Stat	Monitor Status Signal - Multi-function Output Set 1
BI	7	0 = Output Reset 1 = Output Set	Inv Stat	Monitor Status Signal - Multi-function Output Set 2
BI	8	0 = Output Reset 1 = Output Set	Inv Stat	Monitor Status Signal - Multi-function Output Set 3
BO	1	0 = Stop 1 = Run	Inv Run	Command - Operation Signal - Run Command
BO	2	0 = Forward 1 = Reverse	Inv Run	Command - Operation Signal -Forward/ Reverse
BO	3	0 = Reset 1 = Set	Inv Run	Command - Operation Signal - External Fault
BO	4	0 = Reset 1 = Set	Inv Run	Command - Operation Signal - Fault Reset
BO	5	0 = Reset 1 = Set	Inv Run	Command - Operation Signal - Multi- function Ref. 1
BO	6	0 = Reset 1 = Set	Inv. Run	Command - Operation Signal -Multi- function Ref. 2
BO	7	0 = Reset 1 = Set	Inv. Run	Command - Operation Signal - Multi- function Ref. 3
ADI	1	Speed (Frequency) Reference		Hertz
ADI	2	Output Speed (Frequency)		Un-02, HZ
ADI	3	Output Current		Un-03
ADI	4	Fault Code		
ADI	5	kWH Meter		Un-14
ADI	6	MWH Meter		Un-15
ADI	7	Elapsed Timer		Un-13, Hour

NPT = Network Point Type
NPA = Network Point Address

Operating Functions

Below you will find a list of drive capabilities It explains in general what drive functions can be controlled by the digital operator, drive terminals, or over the network.

Table 8: Operating Functions of the GPD 503.

FUNCTIONS	MODE		
	Via. Network	Via Drive Terminals	Via Digital Operator
Run Command	Programmable *1	Programmable *1	Programmable *1
Frequency Reference	Programmable *2	Programmable *2	Programmable *2
Monitor	Y	N/A	Y
Data Write-in	*3	N/A	Y
Data Read-out	Y	Y	Y
Multi-function Sequence Function	Y	Y	Y
External Fault (Emergency Fault)	Y	Y	Y
Drive Fault Reset	Programmable *1	Programmable *1	Programmable *1
Drive Initialization	*3	Y	Y
Stop	Y	Y	Y

Notes.
1. (Y) = YES, (N) = NO can be selected for run command by drive Sn-08 setting
2 (Y) = YES, (N) = NO can be selected for frequency reference by drive Sn-08 setting.
3 Data cannot be written in while the drive is receiving a run command

For frequency reference (data link system) and reference setting constants An-01 to An-09, writing or changing a setting is possible while the drive is running

For application constants Bn-01 to Bn-12, writing or changing a setting is possible while the drive is running per the Sn-03 setting.

If a communication link fault occurs, operation from the network is not possible and the drive operates according to Sn-08 setting (process selection after communication error).

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Command Priority

The Command Priority table shows which option are available when the drive is controlled from the N2 Network, external terminals and digital operator.

Table 9: The Command Priority List.

No.	Data Name			Operating Rights		
				N2 Network	External Terminal	Operator
				Sn-08=xxxx Sn-04=xx0x	Sn-08=xx0x Sn-04=xx1x	Sn-08=xx1x Sn-04=xx1x
N2 Network	Operation Signal	0	Run Command	O	x	x
		1	Reverse Run Command	O	x	x
		2	External Fault	O	O	O
		3	Fault Reset	*1	*2	O
		4	Multi-function Command 1	O	O	O
		5	Multi-function Command 2	O	O	O
		6	Multi-function Command 3	O	O	O
	Frequency Reference			*4	*4	*4
External Terminal	FWD Run (2-wire), RUN Cmd (3-wire)			x	O	x
	REV Run (2-wire), STOP Cmd (3-wire)			x	O	x
	External Fault			O	O	O
	External Fault Reset			*1	*2	*5
	FWD / REV RUN selection (3-wire)			x	O	x
	RUN Signal Selection			*5	*5	*5
	Option / Drive Command Selection			O	O	O
	Multi-Step Speed Ref. Selection			O	O	O
	Jog Command Selection			O	O	O
	Accel / Decel Time Selection			O	O	O
	External Baseblock A			O	O	O
	External Baseblock B			O	O	O
	Accel/Decel Stop Command [HOLD]			O	O	O
	Drive Overheat Prediction			O	O	O
	Auxiliary Analog Reference Input Effective			O	O	O
	External Fault Signal Selection			O	O	O
	Dynamic Brake Command			O	O	O
	Search Command 1			O	O	O
	Search Command 2			O	O	O
	Energy Saving Operation			O	O	O
Operator	RUN Command			x	x	O
	STOP Command			*3	*3	O
	REV RUN Command			x	x	O
	JOG Command			x	x	O
	Fault Reset			*1	*2	*5

O = Effective at any time
x = Ineffective
*1 = Effective when run command received from the Network is "0" in stopped condition.
*2 = Effective only when external terminal satisfies the following conditions:
- 2-wire mode: Both forward run (terminal 1) and reverse run (terminal 2) command are closed or open in stopped conditions.
- 3-wire mode: Run command (terminal 1) or stop command (terminal 2) command is open in stopped condition.
*3 = Effective when Sn-05 first digit is "0".
*4 = Effective when Sn-08 first digit is "0".
*5 = Effective only when in stopped condition.

Chapter 5
Troubleshooting

- List of Error Codes for the N2 Option Board

- LED Status

List of Error Codes for the N2 Option Board

Drive errors codes are displayed on the digital operator Explanation of these errors can be found in the HVAC GPD 503 technical manual - TM 4231 12. Some errors such as EF3, CPF22, CPF23 can be explained as follows.

- EF3 fault on the GPD 503 is a result of a cable loss when dip switch SW2-1, cable loss detection, is enabled.
- CPF22 indicates the HVAC EPROM numbers, NSG618620, are not installed in the drive.
- CPF04 indicates that the drive was not reset, using Sn-03, after replacing the drive EPROMs

LED Status

The three LEDs on the N2 Option Board - not visible with the drive cover in place - provide status indication for the communication systems, as listed in Table 10

Table 10: N2 Option Board LED Status.

LED	DESCRIPTION
ER	DURING NORMAL OPERATION Extinguished when normal data is received, Blink when a communication error occurs If "ON", check if cable is disconnected.
TX	Blinks or lights steady during data transmission.
RX	Blinks or lights steady during data receiving.

Appendix A
Product Specifications

The N2 specifications are listed below

- Communication with METASYS in accordance with N2 communication specifications
- For data which can be transferred/received over the METASYS network, refer to Chapter 5 - Point Map
- RS-485 2-wire, half-duplex communication only   Cable length is 4000 feet maximum.
- Communication method.
  Baud rate. 9600 BPS fixed
  Data bit. 8 bit fixed
  Parity Parity not provided fixed
  Stop bit. 1 bit fixed
  Start bit 1 bit fixed
- Number of maximum nodes on the METASYS network is 256

Table 11: N2 Option Board Specifications.

N2 Option Board	
Ambient Temperature	-10 to 40°C (+14 to 104°F)
Storage Temperature	-20 to 60°C (-4 to 140°F)
Relative Humidity	90 % RH (No Condensation)
Vibration	1 G at less than 20 Hz, up to 0.2 G at 20 to 50 Hz.

Appendix B
Spare Parts Listing

Table 12: N2 Option Board Spare Parts Listing.

N2 - METASYS Communication Kit for the GPD 503 - CM041		
N2 Option Board	MagneTek	SCB-D0S
N2 EPROM	MagneTek	97SA2110-0011
Drive's HVAC EPROMs	MagneTek	EPROM #. NSG618620H & NSG618620L Part #. 97SA1610-0011 & 97SA1611-0011 HVAC Kit Part # SK-HVAC1-503 (Contains both the above EPROMs 97SA1610-0011 & 97SA1611-0011)
MagneTek N2 Option Board Technical Manual	MagneTek	TM-4231 14

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