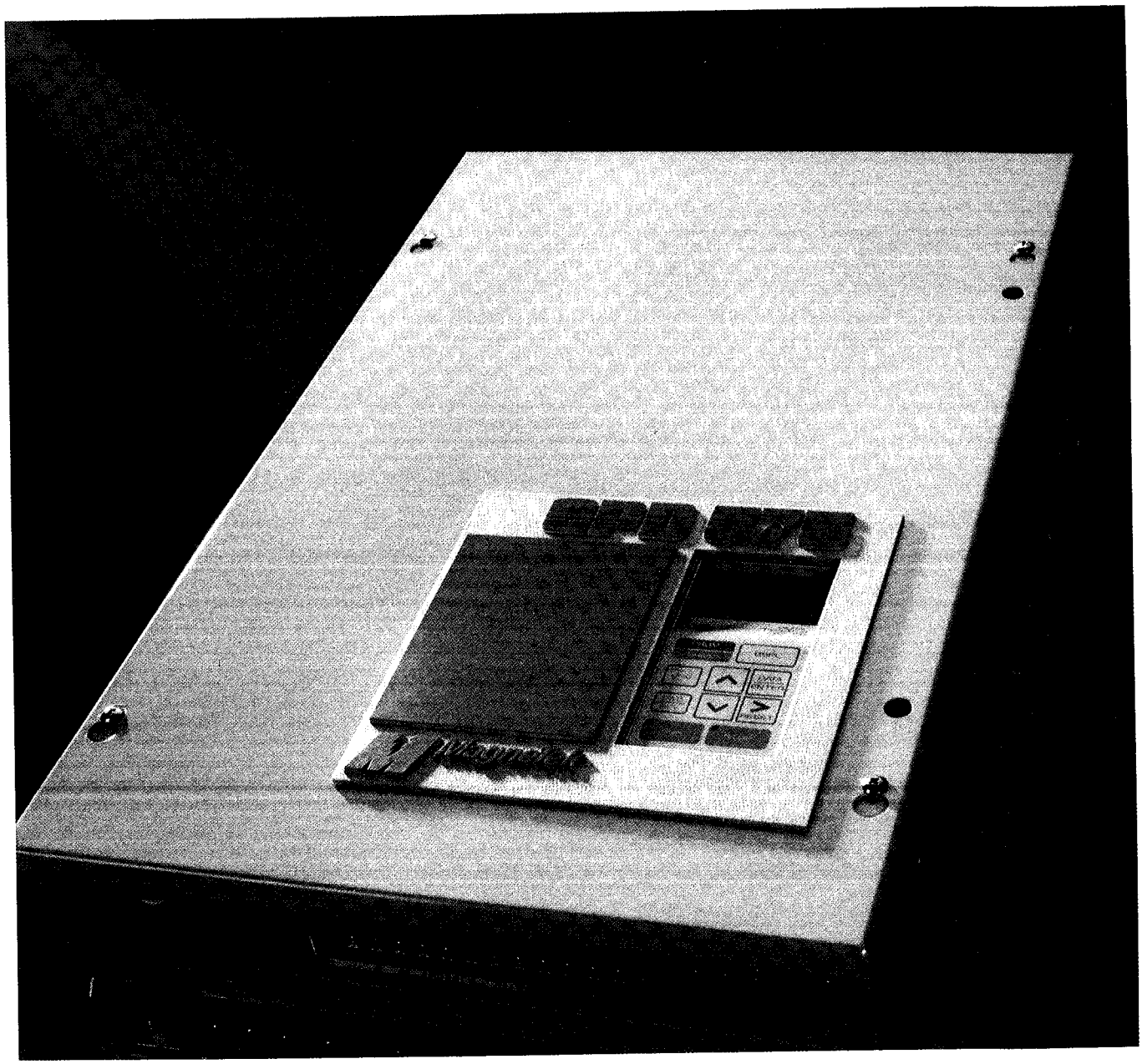
MagneTek

GPD 575
Technical Manual



GPD 575 ABBREVIATED START-UP PROCEDURE

This procedure assumes that the GPD 575 and motor are correctly wired (see pages 1-8 thru 1-11), and startup is to be performed without any changes to factory set constants. Run/Stop and frequency reference setting will be by means of the Digital Operator keypad.

START-UP PROCEDURE	RESULTING ACTION
1. Apply main input power.	• **STOP** lamp lights. If blinking fault code appears on LED display, see Technical Manual for troubleshooting (Sections 6 and 7).
2. Set Run frequency.	• Press **DSPL** key. ***F00.00*** appears on display. • Press ^ or v key to increment or decrement value. • Press > key to move to next digit. • Press **DATA/ENTER** key when desired frequency value is obtained. Value is then written into memory.
3. Select direction of motor rotation.	• Press **FWD/REV** key to select direction. **FWD** or **REV** lamp lights, indicating direction. • Press **DSPL** key. Observe output frequency indication of ***0.00*** on LED display. NOTE: If REV is selected, " – " will appear in display only at non-zero speeds. • Press and hold **JOG** key. Display shows ***6.00*** or ***– 6.00*** (programmed Jog). Verify that motor rotation is correct. If not correct, switch any two motor leads. • Release key. Display reads ***0.00***.
4. Press **RUN** key.	• **RUN** lamp lights. **STOP** lamp goes out. • Output frequency increases to set value. • Motor speed increases and stabilizes at constant speed. START-UP COMPLETE

STOP PROCEDURE	RESULTING ACTION
1. Press **STOP** key.	• **STOP** lamp lights. **RUN** lamp goes out. Motor ramps to stop.
2. Remove input power.	• **STOP** lamp goes out, and LED display goes blank. GPD 575 is disconnected from power source. SHUTDOWN COMPLETE

VARIOUS INTERNAL COMPONENTS REMAIN CHARGED TO LETHAL VOLTAGES. READ TECHNICAL MANUAL BEFORE REMOVING GPD 575 FRONT COVER.

QUICK REFERENCE FOR GPD 575 CONSTANTS (FACTORY SET)

CONSTANT NUMBER	FACTORY SETTING	USER SETTING
An-01	0.00	
An-02	0.00	
An-03	0.00	
An-04	0.00	
An-05	0.00	
An-06	0 00	
An-07	0.00	
An-08	0.00	
An-09	6.00	
bn-01	10.0	
bn-02	10.0	
bn-03	10.0	
bn-04	10 0	
bn-05	100 0	
bn-06	0	
bn-07	1 0	
bn-08	0 0	
bn-09	80	
bn-10	1	
bn-11	1 00	
bn-12	0 50	
bn-13		
bn-14		
bn-15		
bn-16		
bn-17		
bn-18		
Sn-01	*(1)*	
Sn-02	01	
Sn-03	0000	
Sn-04	0011	
Sn-05	0000	
Sn-06	0000	
Sn-07	0000	
Sn-08	0000	
Sn-09	0000	
Sn-10	0000	
Sn-11	0000	
Sn-12	0100	
Sn-13		
Sn-14	0000	
Sn-15	03	
Sn-16	04	
Sn-17	06	
Sn-18	08	
Sn-19	00	
Sn-20	00	
Sn-21	01	

CONSTANT NUMBER	FACTORY SETTING	USER SETTING
Sn-22	02	
Sn-23		
Sn-24		
Sn-25	0000	
Sn-26	0000	
Sn-27	0010	
Sn-28	0100	
Sn-29		
Sn-30		
Sn-31		
Sn-32		
Sn-33		
Sn-34		
Sn-35		
Sn-36		
Sn-37		
Sn-38		
Sn-39		
Sn-40		
Sn-41		
Cn-01	575 0	
Cn-02	*(2)*	
Cn-03	*(2)*	
Cn-04	*(2)*	
Cn-05	*(2)*	
Cn-06	*(2)*	
Cn-07	*(2)*	
Cn-08	*(2)*	
Cn-09	*(1)*	
Cn-10	*(2)*	
Cn-11	50	
Cn-12	0 0	
Cn-13	0.0	
Cn-14	100	
Cn-15	0	
Cn-16	0 0	
Cn-17	0 0	
Cn-18	0 0	
Cn-19	1.0	
Cn-20	0	
Cn-21	0.0	
Cn-22	2 0	
Cn-23	15 0	
Cn-24	15 0	
Cn-25	0	
Cn-26	160	
Cn-27	0.1	
Cn-28	170	
Cn-29	50	
Cn-30	160	

CONSTANT NUMBER	FACTORY SETTING	USER SETTING
Cn-31	*(4)*	
Cn-32	*(4)*	
Cn-33	*(4)*	
Cn-34	30 *(3)*	
Cn-35	2.0	
Cn-36	0	
Cn-37	*(4)*	
Cn-38	150	
Cn-39	2 0 *(4)*	
Cn-40	*(4)*	
Cn-41	100	
Cn-42	0.3	
Cn-43		
Cn-44		
Cn-45		
Cn-46		
Cn-47		
Cn-48		
Cn-49		
Cn-50		
Cn-51		
Cn-52		
Cn-53		
Cn-54		
Cn-55		
Cn-56		
Cn-57		
Cn-58		
Cn-59		
Cn-60		
Cn-61		
Cn-62		
Cn-63		
Cn-64		
Cn-65		
Un-01	N/A	N/A
Un-02	N/A	N/A
Un-03	N/A	N/A
Un-04	N/A	N/A
Un-05	N/A	N/A
Un-06	N/A	N/A
Un-07	N/A	N/A
Un-08	N/A	N/A
Un-09	N/A	N/A
Un-10	N/A	N/A

(1) Setting depends on GPD 575 rating. See Table A3-1 in Technical Manual.
(2) Initial value is related to V/f curve selected by Sn-02 setting
(3) Motor rated current (Cn-09) is set at 100% level Setting range: 10 to 200% of GPD 575 rated capacity.
(4) Initial value differs depending on GPD 575 capacity
(5) Cn-45 thru Cn-65 have no effect on GPD 575 operation unless the associated plug-in option board is present

CONTENTS

CONTENTS - Continued

DO NOT TOUCH CIRCUIT COMPONENTS UNTIL MAIN INPUT POWER HAS BEEN TURNED OFF AND "CHARGE" LAMP IS EXTINGUISHED. THE CAPACITORS ARE STILL CHARGED AND CAN BE QUITE DANGEROUS.

DO NOT CONNECT OR DISCONNECT WIRES AND CONNECTORS WHILE POWER IS APPLIED TO THE CIRCUIT.

KNOW YOUR APPLICATION BEFORE USING THE RESET FUNCTION OF THIS CONSTANT. CONSTANT Sn-03 MUST BE SET TO 0000 FOR DRIVE MODE OPERATION. (SEE PARAGRAPH 2.25 FOR ADDITIONAL INFORMATION.)

1110 = FACTORY 2-WIRE CONTROL RESET (MANITAINED RUN CONTACT)

1111 = FACTORY 3-WIRE CONTROL RESET (MOMENTARY START/ STOP CONTACT

WHEN EITHER OF THESE RESET CODES IS ENTERED, ALL CONSTANTS ARE RETURNED TO FACTORY SETTINGS, EXCEPT Sn-01 AND Sn-02; Sn-03 AUTOMATICALLY RETURNS TO 0000. IF THE GPD 575 IS CONNECTED FOR 3-WIRE CONTROL AND THIS CONSTANT IS SET TO 1110 (2-WIRE CONTROL RESET), THE MOTOR MAY RUN IN REVERSE DIRECTION WITHOUT A RUN COMMAND APPLIED. EQUIPMENT DAMAGE OR PERSONNEL INJURY MAY RESULT.

IMPORTANT

Always ground the GPD 575 using ground terminal G(E). See paragraph 1.4.3, "Grounding".

Never connect main circuit output terminals T1(U), T2(V), T3(W) to AC main circuit power supply.

All constants have been set at the factory. Do not change their settings unnecessarily.

Do not perform a withstand voltage test on any part of the GPD 575. Equipment uses semi-conductors and is vulnerable to high voltage.

The Control PC board employs CMOS ICs which are easily damaged by static electricity. Use proper electrostatic discharge (ESD) procedures when handling the Control PC board.

Section 1. INSTALLATION

1.1 GENERAL

The GPD 575 is a high performance sine-coded pulse width modulated AC motor drive which generates an adjustable voltage/frequency three phase output for complete speed control of any conventional squirrel cage induction motor. The GPD 575 can maintain a 150% current overload capability for 60 seconds with automatic stall prevention and voltage boost to prevent nuisance tripping during load or line side transient conditions. The GPD 575 will not induce any voltage line notching distortion back to the utility line and maintains a displacement power factor of not less than 0.95 throughout its speed range.

When properly installed, operated and maintained, the GPD 575 will provide a lifetime of service. It is mandatory that the person who operates, inspects, or maintains this equipment thoroughly read and understand this manual before proceeding.

This manual primarily describes the GPD 575, but contains basic information for the operator control station as well. For details of the operation of other units in the drive system, refer to their respective manuals.

1.2 RECEIVING

The GPD 575 has been put through demanding tests at the factory before being shipped. After unpacking, verify the part numbers with the purchase order (invoice). Any damages or shortages evident when the equipment is received must be reported immediately to the commercial carrier who transported the equipment. Assistance, if required, is available from your sales representative.

1.3 PHYSICAL INSTALLATION

A. Location and Positioning

Location of the GPD 575 is important to achieve proper performance and normal operating life. The unit should be installed in an area where it will be protected from:

- Direct sunlight, rain or moisture.
- Corrosive gases or liquids.
- Vibration, airborne dust or metallic particles.

For effective cooling as well as proper maintenance, the GPD 575 must be installed vertically to the ground using four mounting screws. There MUST be a MINIMUM 6 in. clearance above and below the GPD 575. A MINIMUM 2 in. clearance is required on each side on the GPD 575.

B. Standard Dimensions

See Table A5-1 in Appendix 5.

1.4 ELECTRICAL INSTALLATION

All interconnections (using the Digital Operator) are shown on either Figure 1-3 or Figure 1-4.

1.4.1 Main Circuit Input/Output

Complete wiring interconnections for the main circuit according to Tables 1-1 and 1-2, while observing the following:

CAUTION

- **USE ONLY FACTORY SUPPLIED INSTALLATION INSTRUCTIONS TO INSTALL DYNAMIC BRAKING RESISTORS. FAILURE TO DO SO MAY CAUSE EQUIPMENT DAMAGE OR PERSONAL INJURY.**
- **USE 600 V VINYL-SHEATHED LEAD OR EQUIVALENT. WIRE SIZE SHOULD BE DETERMINED CONSIDERING VOLTAGE DROP OF LEADS.**
- **NEVER CONNECT AC MAIN POWER TO OUTPUT TERMINALS T1(U), T2(V), AND T3(W).**
- **NEVER ALLOW WIRE LEADS TO CONTACT THE GPD 575 ENCLOSURE. SHORT-CIRCUIT MAY RESULT.**
- **NEVER CONNECT POWER FACTOR CORRECTION CAPACITORS OR NOISE FILTER TO GPD 575 OUTPUT.**
- **SIZE OF WIRE MUST BE SUITABLE FOR CLASS I CIRCUITS.**
- **USE ONLY CLOSED LOOP (RING LUG) CONNECTORS SIZED FOR THE SELECTED WIRE GAUGE. THE CONNECTORS ARE TO BE INSTALLED USING THE CORRECT CRIMP TOOL RECOMMENDED BY THE CONNECTOR MANUFACTURER.**

WIRE SIZE		TERMINAL	CLOSED-LOOP
AWG	mm^2	SCREW	CONNECTOR
20	0.5	M3.5	1.25 - 3.5
18	0.75	M4	1 25 - 4
16	1.25		
14	2	M4	2 - 4
		M5	2 - 5
12	3 5	M4	3.5 - 4
		M5	3.5 - 5
10	5 5	M4	5.5 - 4
		M5	5.5 - 5
8	8	M5	8 - 5
		M6	8 - 6
6	14	M6	14 - 6
4	22	M8	22 - 8
1	38	M8	38 - 8

Table 1-1. Wire Sizing For Main Circuit

500 / 575 V				
HP RATING	TERMINAL SYMBOL	TERMINAL SCREW	WIRE SIZE AWG	WIRE SIZE MM^2
5	L1(R), L2(S), L3(T), –, B1/+, B2, T1(U), T2(V), T3(W), G(E)	M5	14 - 10	2 - 5 5
	G(E)	M8		
	ℓ1(r), ℓ2(s), x, y	M4	20 - 14	0 5 - 2
7.5	L1(R), L2(S), L3(T), –, B1/+, B2, T1(U), T2(V), T3(W)	M5	12 - 10	3.5 - 5.5
	G(E)	M8	14 - 10	2 - 5 5
	ℓ1(r), ℓ2(s), x, y	M4	20 - 14	0 5 - 2
10	L1(R), L2(S), L3(T), –, B1/+, T1(U), T2(V), T3(W)	M5	12 - 10	3 5 - 5.5
	G(E)	M8	14 - 10	2 - 5.5
	ℓ1(r), ℓ2(s), x, y	M4	20 - 14	0.5 - 2
15	L1(R), L2(S), L3(T), –, B1/+, T1(U), T2(V), T3(W)	M6	10 - 8	5.5 - 8
	G(E)	M8	14 - 10	2 - 5.5
	ℓ1(r), ℓ2(s), x, y	M4	20 - 14	0.5 - 2
20	L1(R), L2(S), L3(T), –, B1/+, T1(U), T2(V), T3(W)	M6	10 - 8	5 5 - 8
	G(E)	M8	14 - 10	2 - 5.5
	ℓ1(r), ℓ2(s), x, y	M4	20 - 14	0.5 - 2
25	L1(R), L2(S), L3(T), –, B1/–, B1/+, T1(U), T2(V), T3(W)	M6	10 - 8	5.5 - 8
	G(E)	M8	14 - 10	2 - 5.5
	ℓ1(r), ℓ2(s), x, y	M4	20 - 14	0.5 - 2
30	L1(R), L2(S), L3(T), –, B1/–, B1/+, T1(U), T2(V), T3(W)	M8	10 - 8	5.5 - 8
	G(E)	M8	14 - 10	2 - 5 5
	ℓ1(r), ℓ2(s), x, y	M4	20 - 14	0.5 - 2
40	L1(R), L2(S), L3(T), –, B1/–, B1/+, T1(U), T2(V), T3(W)	M8	8 - 6	8 - 14
	G(E)	M8	14 - 10	2 - 5.5
	ℓ1(r), ℓ2(s), x, y	M4	20 - 14	0 5 - 2
50	L1(R), L2(S), L3(T), –, B1/–, B1/+, T1(U), T2(V), T3(W)	M8	4 - 1	22 - 38
	G(E)	M8	14 - 10	2 - 5.5
	ℓ1(r), ℓ2(s), x, y	M4	20 - 14	0.5 - 2
60	L1(R), L2(S), L3(T), –, B1/–, B1/+, T1(U), T2(V), T3(W)	M8	4 - 1	22 - 38
	G(E)	M8	14 - 10	2 - 5 5
	ℓ1(r), ℓ2(s), x, y	M4	20 - 14	0 5 - 2
75	L1(R), L2(S), L3(T), –, B1/–, B1/+, T1(U), T2(V), T3(W)	M8	4 - 1	22 - 38
	G(E)	M8	14 - 10	2 - 5.5
	ℓ1(r), ℓ2(s), x, y	M4	20 - 14	0.5 - 2

Table 1-1. Wire Sizing For Main Circuit - Continued

Section B. 460V				
HP RATING	TERMINAL SYMBOL	TERMINAL SCREW	WIRE SIZE AWG	WIRE SIZE MM^2
1, 2, 3	L1(R), L2(S), L3(T), N, B1/P, B2, T1(U), T2(V), T3(W), G(E)	M4	14 - 10	2 - 5.5
5	L1(R), L2(S), L3(T), N, B1/P, B2, T1(U), T2(V), T3(W)	M4	14 - 10	2 - 5.5
	G(E)	M5	12 - 10	3.5 - 5.5
7.5	L1(R), L2(S), L3(T), N, B1/P, B2, T1(U), T2(V), T3(W)	M4	12 - 10	3.5 - 5.5
	G(E)	M5	12 - 10	3.5 - 5.5
10	L1(R), L2(S), L3(T), N, B1/P, B2, T1(U), T2(V), T3(W)	M4	10	5.5
	G(E)	M5	10	5.5
15, 20	L1(R), L2(S), L3(T), N, B1/P, B2, T1(U), T2(V), T3(W)	M5	8	8
	G(E)	♦	10 - 2	5.5 - 38
	ℓ1(r), ℓ2(ꞩ)	M4	14 - 10	2 - 5.5
25	L1(R), L2(S), L3(T), B0/N, B1/P, T1(U), T2(V), T3(W)	M6	6 - 4	14 - 22
	G(E)	♦	8 - 2	8 - 38
	ℓ1(r), ℓ2(ꞩ)	M4	14 - 10	2 - 5.5
30	L1(R), L2(S), L3(T), B0/N, B1/P, T1(U), T2(V), T3(W)	M6	4	22
	G(E)	♦	8 - 2	8 - 38
	ℓ1(r), ℓ2(ꞩ)	M4	14 - 10	2 - 5.5
40	L1(R), L2(S), L3(T), B0/N, B1/P, T1(U), T2(V), T3(W)	M8	3 - 1/0	30 - 60
	G(E)	♦	8 - 2	3 - 38
	ℓ1(r), ℓ2(ꞩ)	M4	14 - 10	2 - 5.5
50	L1(R), L2(S), L3(T), B0/N, B1/P, T1(U), T2(V), T3(W)	M8	2 - 1/0	38 - 60
	G(E)	♦	6 - 2	14 - 38
	ℓ1(r), ℓ2(ꞩ)	M4	14 - 10	2 - 5.5
60	L1(R), L2(S), L3(T), B0/N, B1/P, T1(U), T2(V), T3(W)	M8	1/0	60
	G(E)	♦	6 - 2	14 - 38
	ℓ1(r), ℓ2(ꞩ)	M4	14 - 10	2 - 5.5

♦ indicates terminal uses a pressure lug.

Table 1-2. Terminal Functions and Voltages of Main Circuit

500 / 575 V		
TERMINAL	FUNCTION	5 TO 75 HP
L1(R) L2(S) L3(T)	Main circuit input power supply	Three phase 500 / 575V at 50/60Hz
T1(U) T2(V) T3(W)	Main circuit output	Three phase, 0 to 500 / 575V (output cannot exceed input voltage)
– B1/– B1/+	Connection of optional dynamic braking circuitry (see separate Option Instruction Sheet)	– – – –
G(E)	Ground terminal	– – – –

1.4.2 Control Circuit

All control circuit (signal) interconnections are shown in the appropriate diagram:

- Figure 1-3 shows interconnections for external two-wire control in combination with the Digital Operator.
- Figure 1-4 shows interconnections for external three-wire control in combination with the Digital Operator.

Make wiring connections according to the diagram and Table 1-3, observing the following precautions:

- Use twisted shielded or twisted-pair shielded wire, 20-14 AWG (0.5-2mm^2), for control circuit leads. Wire size should be determined considering voltage drop in leads. See Figure 1-1: connect shield sheath AT THE GPD 575 END ONLY; the far end should be dressed neatly and left unconnected.
- Signal leads 1 thru 32 must be separated from main circuit leads L1(R), L2(S), L3(T), T1(U), T2(V), T3(W) and any other power cables, to prevent erroneous operation caused by noise interference.
- Control circuit leads 9, 10, 18, 19, and 20 (contact output) must be separated from leads 1-8, 11-17, and 21-32.
- Lead length should NOT EXCEED 164 feet (50 meters).

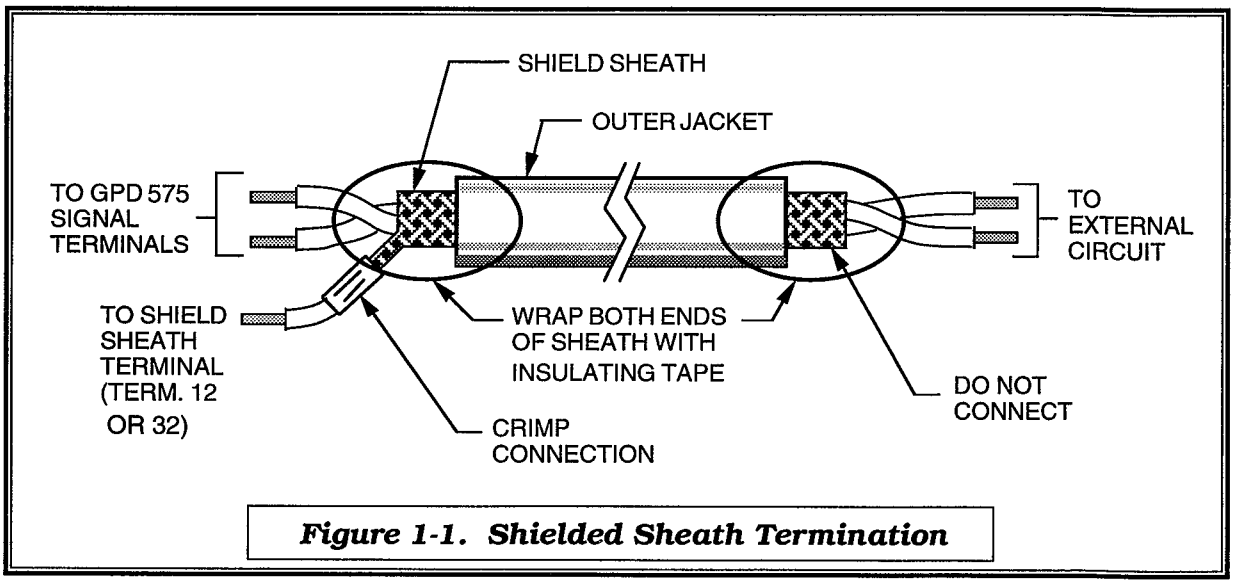


Figure 1-1. Shielded Sheath Termination

Table 1-3. Terminal Functions and Signals of Control Circuit

TERMINAL	FUNCTIONS		LEVELS
1	Forward Run/Stop signal		Forward Run at closed, Stop at open (See NOTE 2)
2	Reverse Run/Stop signal		Reverse Run at closed, Stop at open (SeeNOTE 2)
3	External fault input		Fault at closed (See NOTE 2) When the External Fault input is applied, the GPD 575's Fault relay trips (shutdown) and the motor coasts to a stop. The Digital Operator displays "***EF3***" failure
4	Fault reset input (external)		Fault reset at closed (See NOTE 2). The Fault Reset input will reset the Fault relay, if the GPD 575 is in "stopped" condition. Both Forward Run/Stop signal and Reverse Run/Stop signal must be OPEN.
5 - 8	External signal inputs (See NOTE 2); functions as defined by settings of system constants Sn-15 thru Sn-18. See **MULTI-FUNCTION INPUT TERMINALS** in the PROGRAMMABLE FEATURES section of this manual.		
9, 10	Multi-function contact output. One of 18 functions are available, by setting of system constant Sn-20 (N.O.)		Contact capacity. 250 VAC at 1A or below 30 VDC at 1A or below
11	Sequence control input common for terminals(1 - 8)		Sequence control input 0 V
12	Connection for shield sheath of signal leads		– – – –
13	Auto frequency reference input		0 to +10V (20K ohms)
14			4-20 mA (250 ohms)
15	Manual frequency reference power supply		+15V (Control power supply for frequency setting max 20 mA)
16	Multi-function analog input, function of input signal is selected by setting of system constant Sn-19		0 to +10V/100% (20K ohms)
17	Multi-function analog input common		0 V
18	Fault contact output (N.O /N.C.)	Closed at fault	Contact capacity: 250 VAC at 1A or below 30 VDC at 1A or below
19		Open at fault	
20		Common	
21	Multi-function analog monitor (+)		Type of analog signal (operating parameter) to be output is selected by setting of constant bn-13 Monitor output 0 to +11V; 2 mA maximum
22	Multi-function analog monitor (-)		
23	Current monitor output (+)		Approx 5V at GPD 575 rated output current
24	Current monitor output (-)		

Table 1-3. Terminal Functions and Signals of Control Circuit (Continued)

TERMINAL	FUNCTIONS		LEVELS
25	Multi-function open collector output 1	One of 18 functions are available, by setting of system constants Sn-21 and Sn-22.	Photocoupler insulation output: +48V, 50mA or less
26	Multi-function open collector output 2		
27	Multi-function open collector output common		0V
28	Multi-function open collector output 3	One of 18 functions are available, by setting of system constants Sn-23 and Sn-24.	Photocoupler insulation output: +48V, 50mA or less
29	Multi-function open collector output 4		
30	NOT USED		
31	Sequence control input common		Sequence control input 0 V
32	Connection for shield sheath of signal leads		Internally connected to terminal 12

NOTES:

1. When Forward Run and Reverse Run inputs are both closed for more than 500 ms, the Digital Operator flashes "***EF***" and the motor (if rotating) is decelerated by the GPD 575 to a stop. This stop condition is not stored by the GPD 575 (on Digital Operator, red lamp at STOP does not light); **IF ONE OF THE INPUTS IS OPENED, THE MOTOR WILL IMMEDIATELY START UP AGAIN.**

2. When using relays for input to terminals 1-8, use relays with highly reliable contacts (for very small current) with a capacity of 30VDC or more and rated current of 100mA or higher. When using transistor (open collector) input, use transistors with rated voltage of 35VDC or more and rated current of 100mA or more.

1.4.3 Grounding

The GPD 575 must be solidly grounded using main circuit ground terminal G(E).

- Ground resistance should be 100 ohms or less.
- NEVER ground the GPD 575 in common with welding machines, motors, or other large-current electrical equipment. Run the ground lead in a separate conduit from leads for large-current electrical equipment.
- Use ground lead size listed in Table 1-1, and make the length as short as possible.
- Where several GPD 575s are used side by side, all should be grounded directly or daisy-chain to the ground pole(s) (see Figure 1-2). DO NOT FORM A LOOP WITH THE GROUND LEADS.

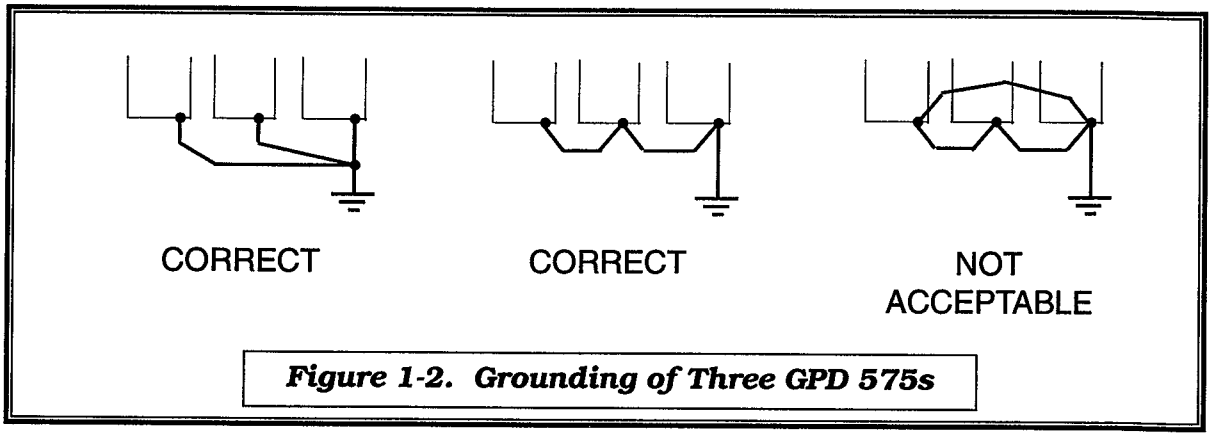


Figure 1-2. Grounding of Three GPD 575s

Figure 1-2 illustrates the two correct methods of grounding.

NOTES FOR FIGURE 1-3

✱ - INDICATES COMPONENTS NOT SUPPLIED.

☐ - INDICATES CUSTOMER CONNECTION TERMINAL. WIRE ONLY TO TERMINALS SHOWN.

( ) - INDICATES ALTERNATE TERMINAL MARKING, I.E., (R) AND L1.

▲ - FUNCTION LABELS SHOWN FOR THESE TERMINALS ARE DETERMINED BY FACTORY SETTINGS OF SYSTEM CONSTANTS Sn-15 THROUGH Sn-18.

● - FUNCTION LABELS SHOWN FOR THESE TERMINALS ARE DETERMINED BY FACTORY SETTINGS OF SYSTEM CONSTANTS Sn-20 THROUGH Sn-24.

■ - FUNCTION LABELS SHOWN FOR THESE TERMINALS ARE DETERMINED BY FACTORY SETTING OF CONSTANT bn-13.

◆ - FUNCTION LABEL SHOWN FOR THIS TERMINAL IS DETERMINED BY FACTORY SETTING OF SYSTEM CONSTANT Sn-19.

1. IF ONLY A REMOTE MANUAL SPEED POT (1RH) IS USED, 3SS IS NOT NEEDED. JUMPER MUST BE ADDED BETWEEN TERMINALS 5 AND 11. THIS WILL OVERRIDE BOTH THE AUTO AND DIGITAL OPERATOR FREQUENCY REFERENCES, REGARDLESS OF THE PROGRAMMING OF Sn-04 X X X X.

2. THE GPD 575 DOES NOT INCLUDE OVERLOAD 1OL; IT IS A SEPARATE ITEM. THE CONTACTS FROM THE SEPARATELY SUPPLIED OVERLOAD RELAY SHOULD BE INTERLOCKED WITH THE GPD 575 AS SHOWN. IT SHOULD BE THE MANUAL RESET TYPE TO PREVENT AUTOMATIC RESTART FOLLOWING A MOTOR FAULT AND SUBSEQUENT CONTACT RECLOSURE AFTER COOL DOWN.

3. INSULATED TWISTED SHIELDED WIRE IS REQUIRED.
   2-CONDUCTOR #18 GA. (BELDON #8760 OR EQUIVALENT).
   3-CONDUCTOR #18 GA. (BELDON #8770 OR EQUIVALENT).
   CONNECT SHIELD ONLY AT GPD 575 END. STUB AND ISOLATE OTHER END.

4. DIGITAL OPERATOR IS STANDARD ON EVERY GPD 575. REMOTE OPERATORS, AS SHOWN, MAY NOT BE REQUIRED.

5. CUSTOMER TO CONNECT TERMINAL G(E) TO EARTH GROUND.

6. WIRE ONLY ONE AUTO REFERENCE INPUT.

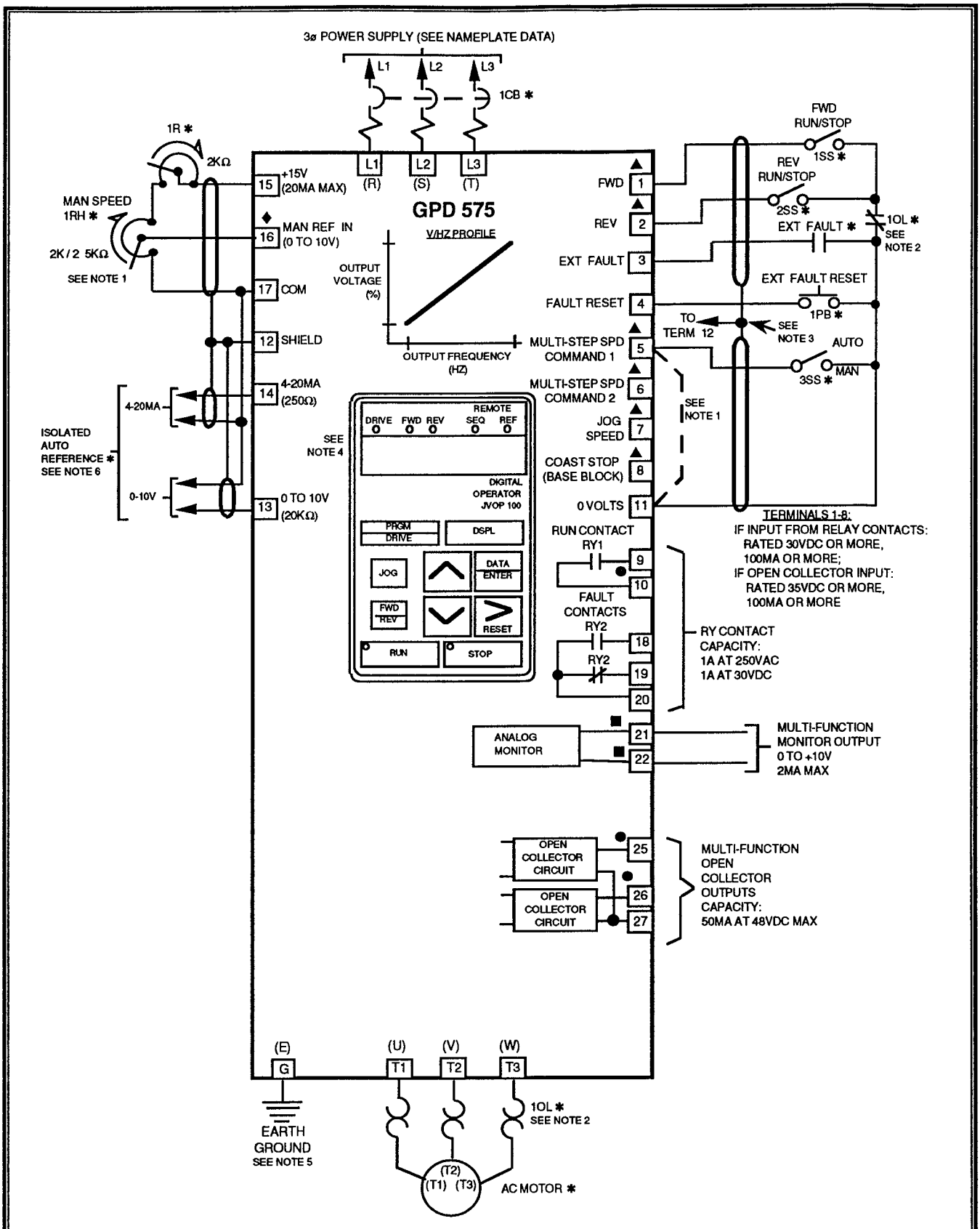


Figure 1-3. Interconnection - 2-Wire Control (with constant Sn-04 set to 0000)

NOTES FOR FIGURE 1-4

✱ - INDICATES COMPONENTS NOT SUPPLIED.

☐ - INDICATES CUSTOMER CONNECTION TERMINAL. WIRE ONLY TO TERMINALS SHOWN.

( ) - INDICATES ALTERNATE TERMINAL MARKING, I.E., (R) AND L1.

▲ - FUNCTION LABELS SHOWN FOR THESE TERMINALS ARE DETERMINED BY 3-WIRE CONTROL SETTINGS OF SYSTEM CONSTANTS Sn-16 THROUGH Sn-18: Sn-16 = ***03***, Sn-17 = ***04***, Sn-18 = ***06***.

● - FUNCTION LABELS SHOWN FOR THESE TERMINALS ARE DETERMINED BY FACTORY SETTINGS OF SYSTEM CONSTANTS Sn-20 THROUGH Sn-24.

■ - FUNCTION LABELS SHOWN FOR THESE TERMINALS ARE DETERMINED BY FACTORY SETTING OF CONSTANT bn-13.

◆ - FUNCTION LABEL SHOWN FOR THIS TERMINAL IS DETERMINED BY FACTORY SETTING OF SYSTEM CONSTANT Sn-19.

1. IF ONLY A REMOTE MANUAL SPEED POT (1RH) IS USED, 2SS IS NOT NEEDED. JUMPER MUST BE ADDED BETWEEN TERMINALS 6 AND 11. THIS WILL OVERRIDE BOTH THE AUTO AND DIGITAL OPERATOR FREQUENCY REFERENCES, REGARDLESS OF THE PROGRAMMING OF Sn-04 X X X X.

2. THE GPD 575 DOES NOT INCLUDE OVERLOAD 1OL; IT IS A SEPARATE ITEM. THE CONTACTS FROM THE SEPARATELY SUPPLIED OVERLOAD RELAY SHOULD BE INTERLOCKED WITH THE GPD 575 AS SHOWN. IT SHOULD BE THE MANUAL RESET TYPE TO PREVENT AUTOMATIC RESTART FOLLOWING A MOTOR FAULT AND SUBSEQUENT CONTACT RECLOSURE AFTER COOL DOWN.

3. INSULATED TWISTED SHIELDED WIRE IS REQUIRED.
   2-CONDUCTOR #18 GA. (BELDON #8760 OR EQUIVALENT).
   3-CONDUCTOR #18 GA. (BELDON #8770 OR EQUIVALENT).
   CONNECT SHIELD ONLY AT GPD 503 END. STUB AND ISOLATE OTHER END.

4. DIGITAL OPERATOR IS STANDARD ON EVERY GPD 575. REMOTE OPERATORS, AS SHOWN, MAY NOT BE REQUIRED.

5. CUSTOMER TO CONNECT TERMINAL G(E) TO EARTH GROUND.

6. WIRE ONLY ONE AUTO REFERENCE INPUT.

CAUTION

BEFORE RUNNUNG, Sn-03 MUST BE SET TO "0000". RESETTING DRIVE CONSTANT Sn-03 TO "1110" MAY CAUSE THE MOTOR TO RUN IN THE REVERSE DIRECTION WITHOUT A RUN COMMAND, AND POSSIBLY RESULT IN DAMAGE TO THE EQUIPMENT OR PERSONAL INJURY.

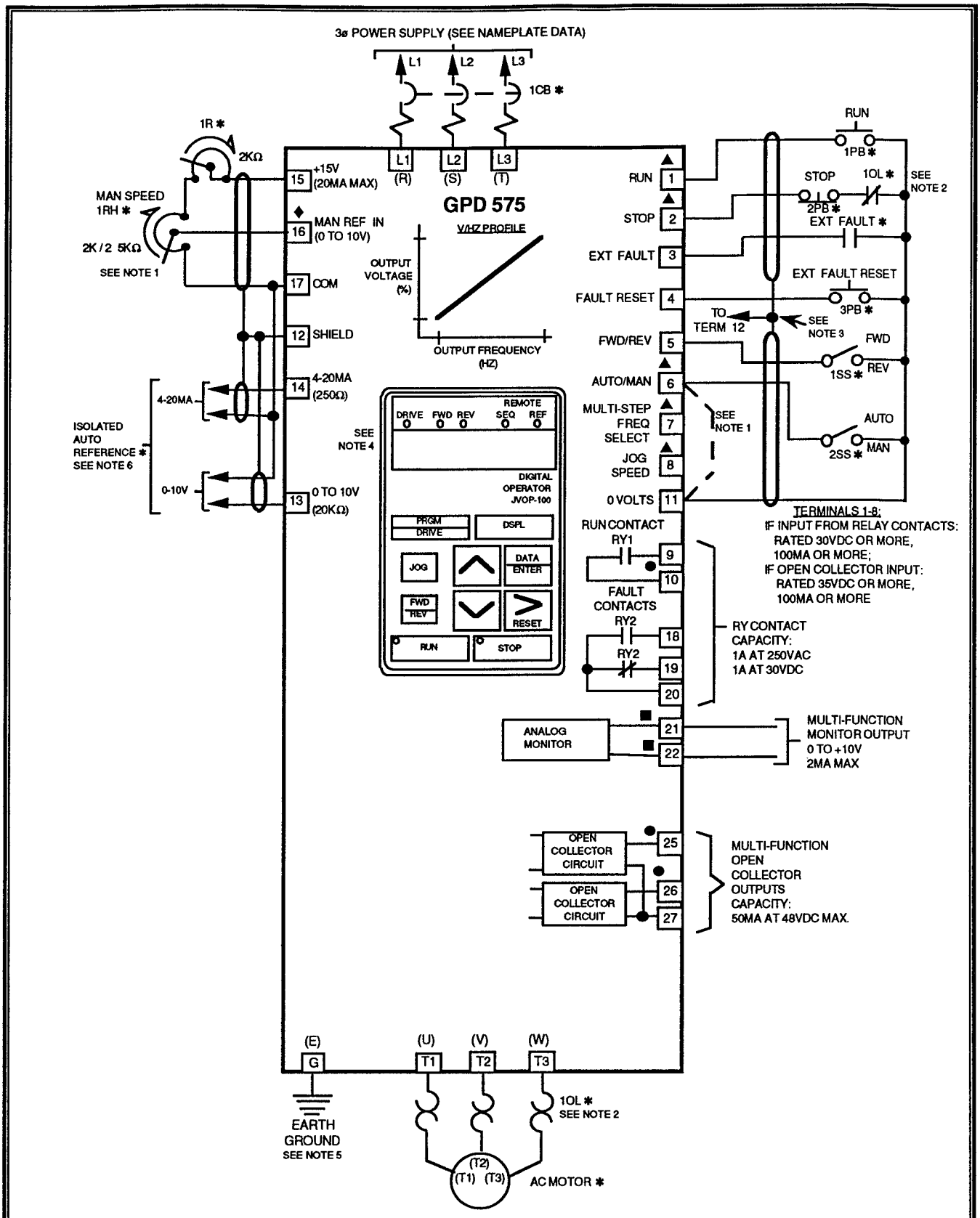


Figure 1-4. Interconnections - 3-Wire Control (with constant Sn-04 set to 0000, and Sn-15 set to 00)

Section 2. PROGRAMMABLE FEATURES

2.1 GENERAL

Each paragraph in this section provides a description of one of the features of the GPD 575 which is defined by programmed settings in the various constants in memory. Since most features use more than one constant, the descriptions appear in alphabetical order by the function name, as listed in Table 2-1. To cross reference a particular constant to the features to which it applies, see the listings in Appendix 1.

NOTE

Some of the constants have clearly defined functions, and therefore do not appear in any of the descriptions of features in this section.

Table 2-1. List of Features Defined By Constants

Table 2-1. List of Features Defined By Constants - Continued

FEATURE NAME	PARA.	PAGE
Momentary Power Ride-thru	2.16	2-21
Monitor Display (Digital Operator)	2.17	2-21
Multi-function Analog Input	2.18	2-22
Multi-function Analog Monitor Output	2.20	2-29
Multi-function Input Terminals	2.19	2-24
Multi-function Output Terminals	2.21	2-30
Multi-step Speed (see Remote/Local and Reference Selection)	2.24	2-35
Overtorque Detection	2.22	2-31
Remote/Local and Reference Selection	2.24	2-35
Reset Codes	2.25	2-40
Slip Compensation	2.26	2-41
Soft Start Characteristics	2.27	2-42
Speed Coincidence	2.23	2-34
Speed Search	2.28	2-43
Stall Prevention	2.29	2-44
Thermal Motor Overload Protection	2.30	2-46
Torque Compensation	2.31	2-47
V/f Pattern - Standard	2.32	2-48
V/f Pattern - Custom	2.33	2-50

2.2 ACCEL/DECEL TIME

A. bn-01: Accel Time 1
bn-02: Decel Time 1
bn-03: Accel Time 2
bn-04: Decel Time 2

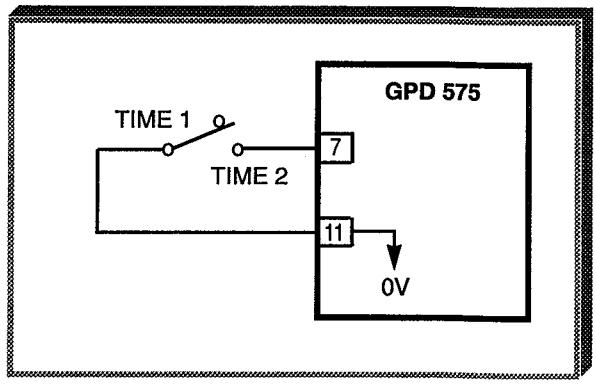
Factory setting (each): ***10.0*** seconds
Range (each): 0.0 to 6000.0 seconds

The GPD 575 incorporates two sets of individually programmable acceleration and deceleration times.

B. Sn-15 thru Sn-18: Multi-function Inputs (Term. 5 thru 8)

Data ***07*** : Accel/Decel Time Selection

By programming data 07 into one of the multi-function system constants (Sn-15 thru Sn-18), one of the multi-function input terminals (5 thru 8) becomes a time selection input. When the input terminal (i.e. external contact) is open, Time 1 (bn-01/bn-02) is selected. When the input terminal is closed, Time 2 (bn-03/bn-04) is selected.

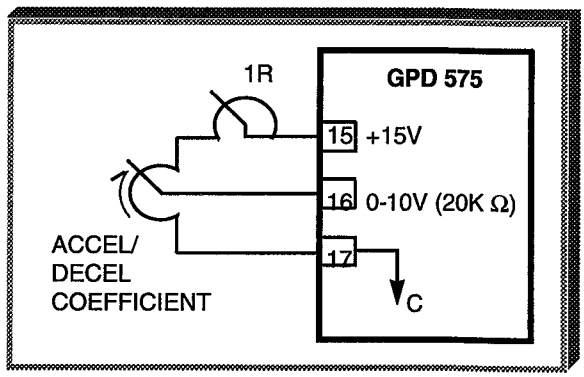


C. Sn-19: Multi-function Input (Term. 16)

Data ***06*** : Accel/Decel Time Coefficient

The multi-function analog input at terminal 16 may be configured to allow analog control of the Accel/Decel time. The input voltage, in the range of 1 to 10V, determines the coefficient by which the Accel/Decel time is reduced:

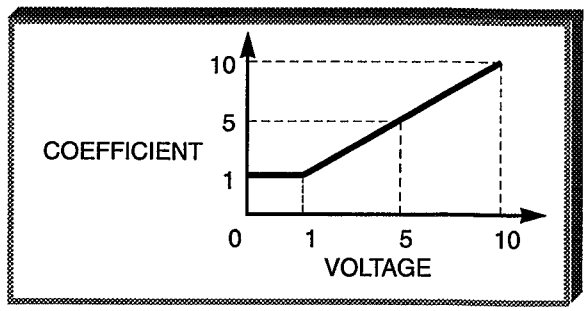
$$\text{Actual Accel/Decel Time} = \frac{\text{Accel/Decel Time}}{\text{Coefficient}}$$



EXAMPLE:

Accel/Decel Time = 10 sec
Voltage Ref. at Term. 16 = 5V

$$\text{Actual Accel/Decel Time} = \frac{10 \text{ sec}}{5 \text{ (coefficient)}} = 2 \text{ sec}$$



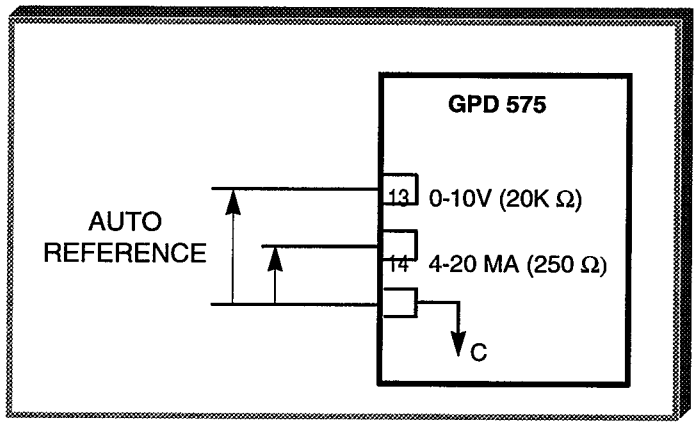
2.3 AUTO REFERENCE CHARACTERISTICS

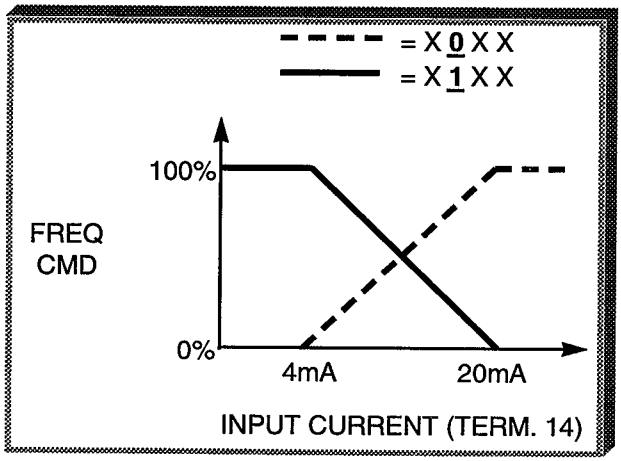
Sn-06: Operation Mode Select 3

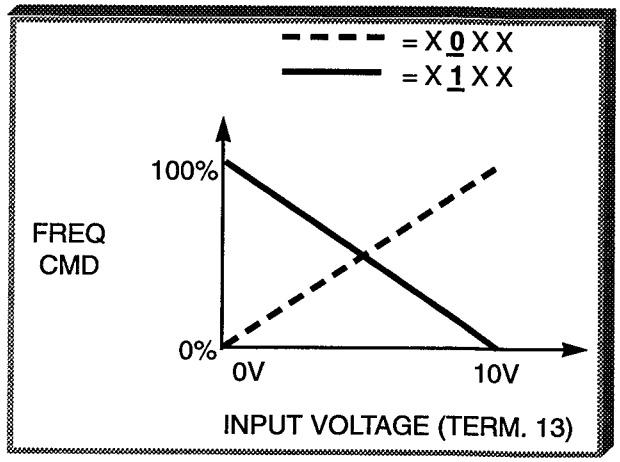
Digit 3 [X **X** X X] : Auto Reference Characteristics
Factory setting: X ***0*** X X (0 - 100%)

Auto Reference inputs: terminals 13 & 17 – 0-10 VDC
terminals 14 & 17 – 4-20 mA

The setting of this digit determines how the frequency command varies with respect to changes in the Auto Reference command input signal.





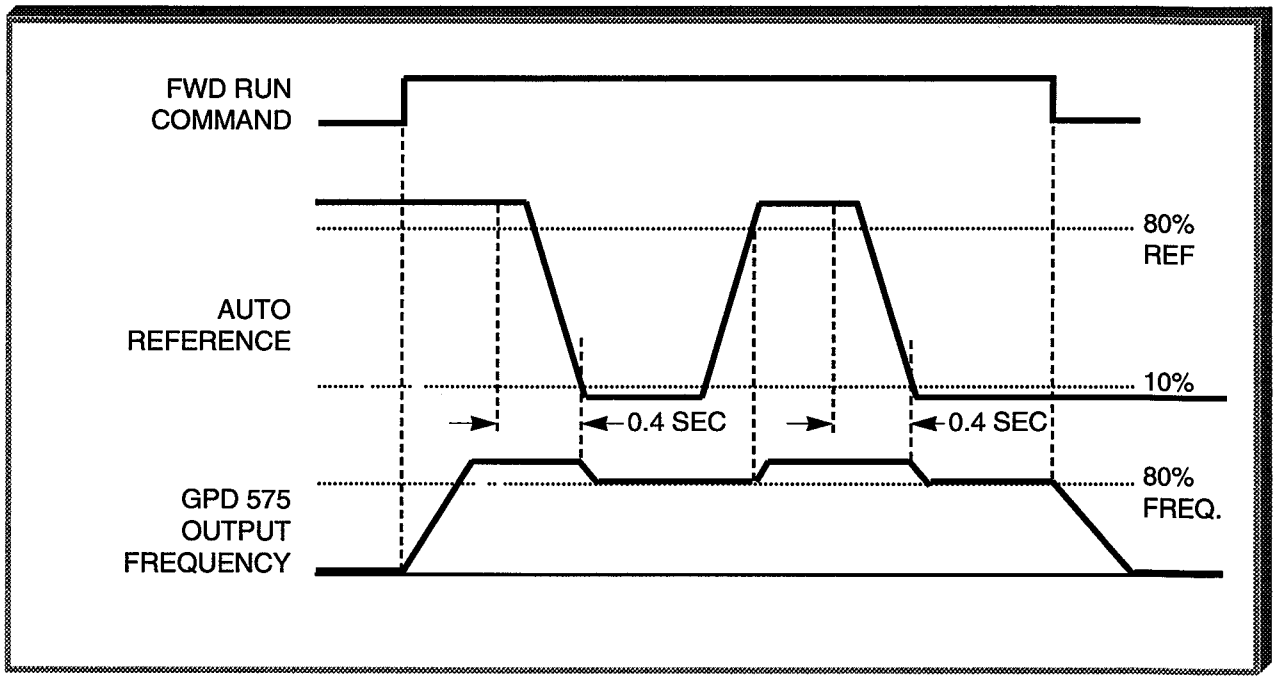


2.4 AUTO REFERENCE - LOSS DETECTION

Sn-06: Operation Mode Select 3

Digit 4 [**X X X X**] : Auto Reference Loss Detection
Factory setting: ***0*** X X X (disabled)

The reference loss detection function is either enabled or disabled, based on the setting of Sn-06 X X X X. When enabled (***1*** X X X), the reference loss detection compares the change in reference with respect to time (0.4 seconds). If longer than 0.4 seconds, the GPD 575 will decelerate to the set reference; if shorter than 0.4 seconds, the GPD 575 will continue to operate at 80% of the output frequency. To regain control of output frequency, either exceed the set reference (80% of reference) or initiate a STOP command. (If Auto Reference is less than Fmax (Cn-02) x .05, then this function is not performed.)



Time Chart

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2.5 AUTO-RESTART

A. Cn-36: Number of Auto-Restart Attempts

Factory setting: *0*
Range: 0 - 10

When a fault occurs during operation, the GPD 575 can be programmed to carry out auto-restart operation to automatically reset the fault. Auto-restart operation will use the number of reset attempts set in this constant, up to the maximum of 10. When set to 0, no auto-restarts will be attempted.

- The following faults can be automatically reset:

oC:	Overcurrent	oL3:	Overtorque
oU:	Overvoltage	oH:	Overheat
oL1:	Motor overload	Uu1:	Undervoltage
oL2:	Inverter overload		

- The following conditions WILL NOT initiate auto-restart:

1. EF_ , FU or CPF_ _ fault.
2. When OC or UV occurs during deceleration.
3. When Sn-11, digit 3 (X **0** X X) is programmed not to reset during momentary power failure. (See **MOMENTARY POWER RIDE-THRU** for further details.)

- The number of restart attempts available will be reset to the Cn-36 setting when:

1. 10 minutes has elapsed without a fault occuring.
2. The **RESET** key, or external RESET pushbutton, is pressed.

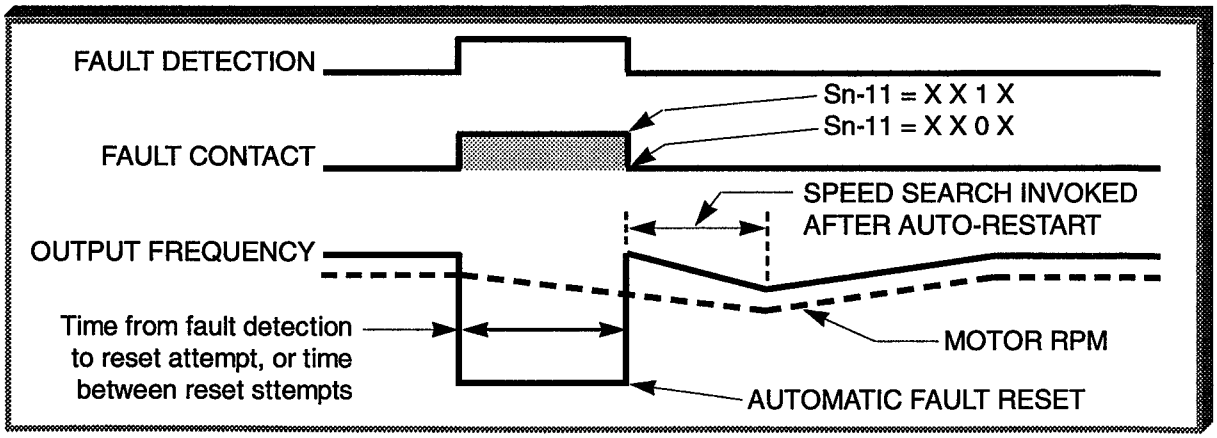
B. Sn-11: Protective Characteristics Select 2

Digit 2 **[X X X X]:** Fault Contact Status During Auto-Restart

This digit controls how the fault contact responds to a GPD 575 fault during the auto-restart operation.

0: Fault contact will not actuate during auto-restart attempts

1: Fault contact actuates during auto-restart attempts



Auto Restart Operation Timing

2.6 Intentionally Deleted

2.7 CRITICAL FREQUENCY REJECTION

A. Cn-16: Prohibited Frequency 1
Cn-17: Prohibited Frequency 2
Cn-18: Prohibited Frequency 3

Factory setting (each): ***0.0***
Range (each): 0.0 to 400.0 Hz

These three constants allow programming of up to three prohibited frequency points for eliminating problems with resonant vibration of the motor/machine. This feature does not actually eliminate the selected frequency values, but will accelerate and decelerate the motor through the prohibited bandwidth.

B. Cn-19: Prohibited Frequency Deadband

Factory setting: ***1.0***
Range: 0.0 to 25.5 Hz

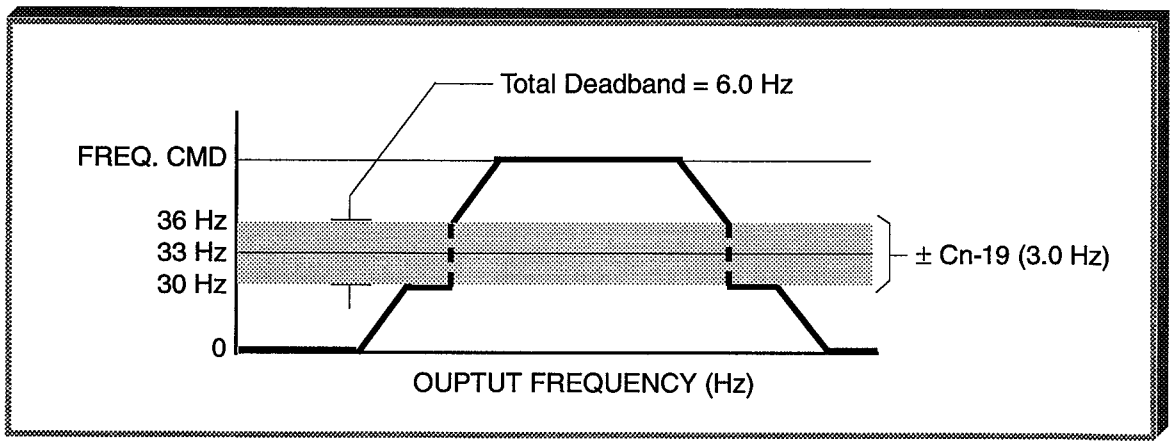
This constant determines the width of the deadband around each selected prohibited frequency point. The factory setting is ***1.0***, which establishes a deadband of ±1.0 Hz.

EXAMPLE:

Vibration encountered between 30.0 and 36.0 Hz.

SOLUTION: Set Cn-16 to ***33.0***. This is the center of the problem frequency band.
Set Cn-19 to ***3.0***. This will cause the GPD 575 to reject all frequency command values between 30.0 and 36.0 Hz.

A frequency command in the deadband will be converted to the bottom value of the deadband, e.g. a command of 33 Hz would result in a run frequency of 30 Hz.



2.8 DC INJECTION BRAKING

A. Sn-04: Operation Mode Select 1

Digits 3 & 4 **[X X X X]** : DC Injection Braking During Coast to Stop
Factory setting: ***0 0*** X X

Cn-12: DC Braking Time at Stop

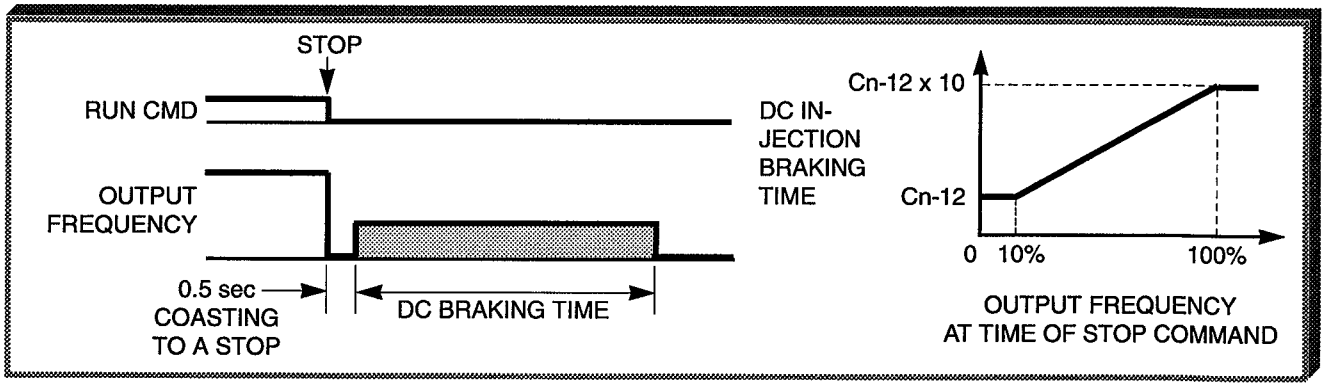
Factory setting: ***0.5*** sec
Range: 0.0 - 25.5 sec

When enabled (***1 0*** X X), DC injection braking during coast-to-stop is used to stop a motor without using braking resistors. When a STOP command is issued, DC injection voltage is applied, and the time is set by Cn-12 (at 10% output frequency) and varies with output frequency.

EXAMPLE:

Cn-12 = 0.5 sec (at 10% output)

Braking time at 100% output frequency = 10 x 0.5 = 5 sec



DC Braking Sequence at Coast-to-Stop

2.8 DC INJECTION BRAKING Continued

B. Cn-10: DC Braking Start Frequency

Range: 0.0 to 10.0 Hz

Cn-11: DC Braking Current (% of Drive Current Rating)

Factory setting: ***50*** %

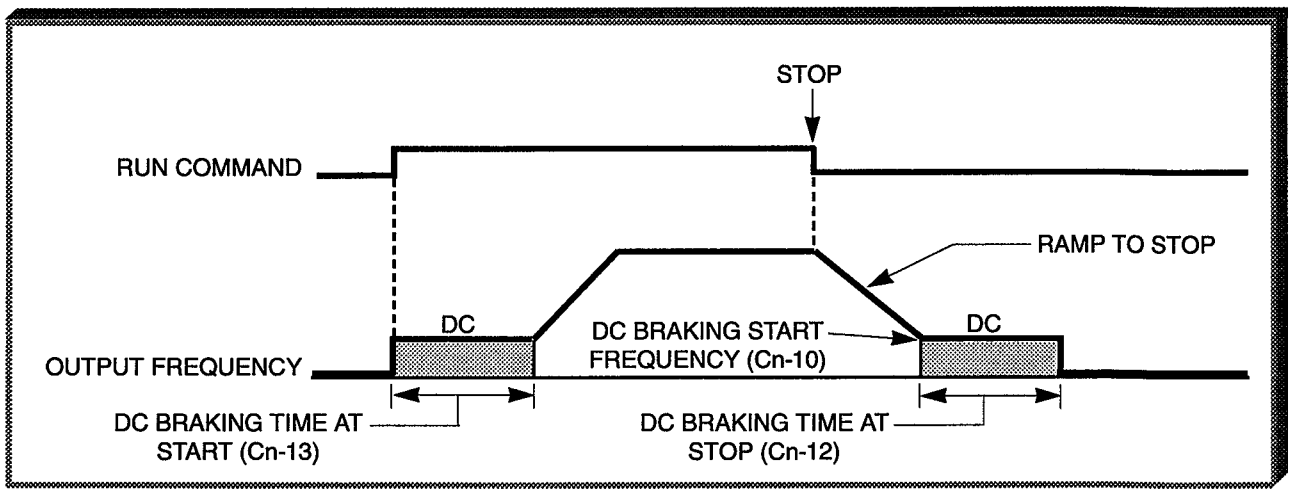
Range: 0 to 100 %

Cn-13: DC Braking Time at Start

Factory setting: ***0.5*** sec

Range: 0.0 to 25.5 sec

DC injection braking is used to stop a motor after the GPD 575 has received a Ramp-to-Stop command. DC injection can be used to stop a motor whose rotational direction is uncertain upon start-up. The effective DC injection time and voltage should be set to provide adequate stopping without excessive motor heating. The voltage is determined by the DC braking current and motor impedance.

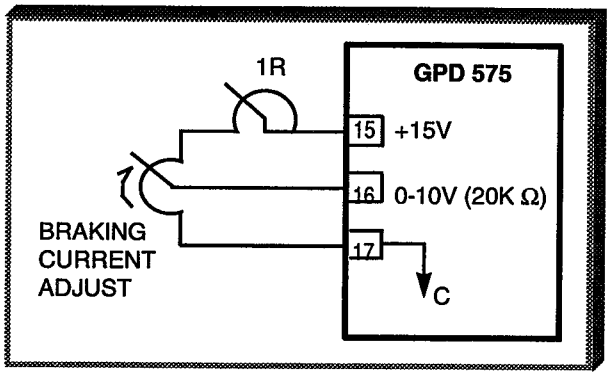


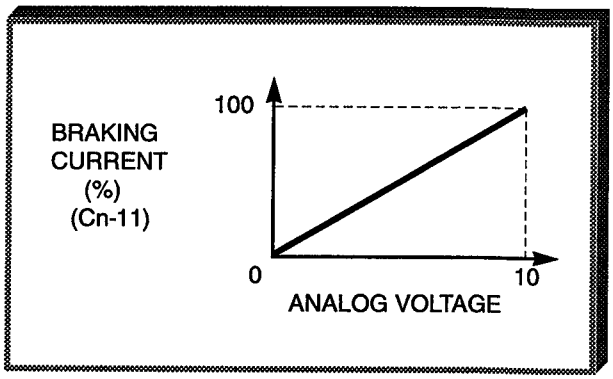
DC Braking Sequence

C. Sn-19: Multi-function Analog Input (Term. 16)

Data ***07*** : Adjustable DC Braking Current

The multi-function analog input at terminal 16 may be configured to allow analog control of the amount of DC injection braking current, which directly controls the amount of DC injection voltage applied to the motor.

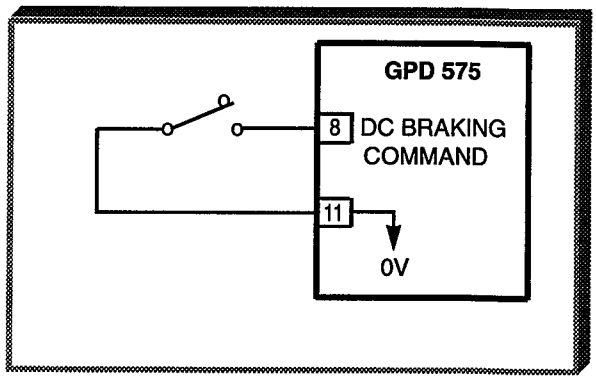




D. Sn-15 thru Sn-18: Multi-function Inputs (Term. 5 thru 8)

Data ***60*** : DC Injection Braking Command

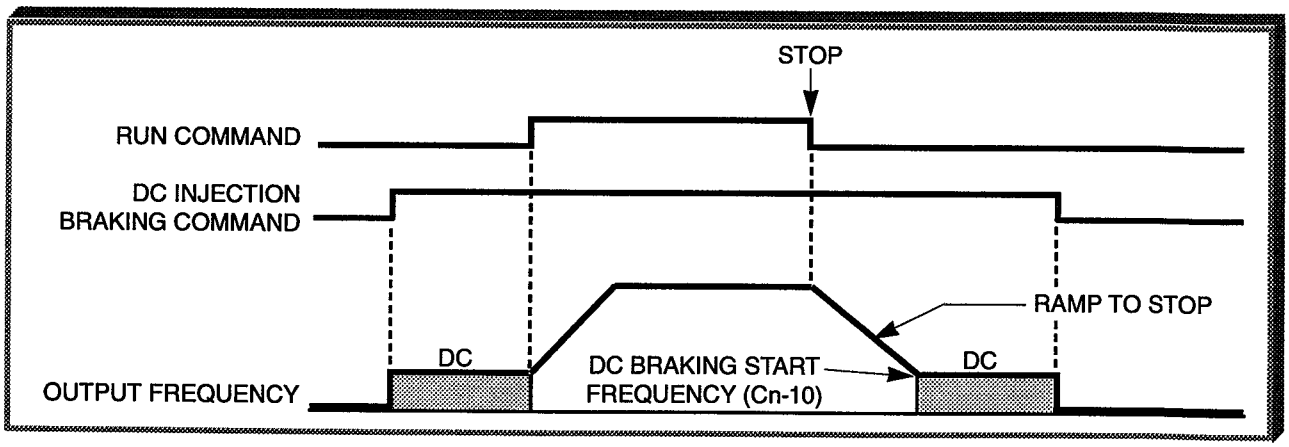
Any multi-function input terminal can be utilized to control DC injection braking. When used, DC injection voltage will be applied until the input is removed, provided that the GPD 575 output frequency is <u>below</u> the DC Braking Start Frequency (Cn-10).



<u>EXAMPLE:</u>

Sn-18 = ***60***

Contact input at Terminal 8 is the DC Injection Braking Command



DC Braking Sequence

2.9 DIGITAL DISPLAY SELECTION

Cn-20: Operator Display Mode Reference and Indication

Factory setting: ***0***
Range: 0 to 39999

This constant designates what Drive parameter will be displayed on the Digital Operator when the GPD 575 is in the Drive mode. It will be displayed where "OUTPUT FREQUENCY" was previously displayed.

DATA	PARAMETER DISPLAY
0 (factory setting)	Output frequency, in increments of 0.1 Hz.
1	Same as ***0***
2 to ***39*** (no. of motor poles)	Motor synchronous speed ($N_S = \frac{120F}{P}$) in increments of 1 RPM (39999 max). NOTE: When motor synchronous speed exceeds 39999 RPM, display holds at ***39999***.
00040 to ***39999***	Line speed or other parameter. Setting must be 5 digits. X X X X X Parameter value at maximum frequency (include leading zeroes if necessary) Location of decimal point: ***0*** = XXXX ***1*** = XXX.X ***2*** = XX.XX ***3*** = X.XXX (See **CAUTION** on next page) EXAMPLE: To display Line Speed, based on 54.32 FPM at 60 Hz: Cn-20 setting = ***25432***

CAUTION

WHEN SETTING A 5 DIGIT VALUE IN Cn-20, THE DECIMAL POINT POSITION SELECTED WILL ALSO AUTOMATICALLY AFFECT ALL OF THE FREQUENCY REFERENCE MEMORY SETTINGS (An-XX CONSTANTS; SEE TABLE A1-1).

Example:

Cn-20 factory setting: ***00000***
An-09 (Jog) factory setting: ***006.00*** (6 Hz)

Cn-20 changed to ***10600***
└— Decimal point at X X X.X
An-09 setting becomes ***0060.0***

Therefore An-09 must be reprogrammed to ***0006.0*** for 6 Hz Jog frequency.

2.10 DISPLAY - MODE (POWER-UP) SELECTION

bn-10: Monitor Number After Power-up

Factory setting: *1*
Range: 1 to 3

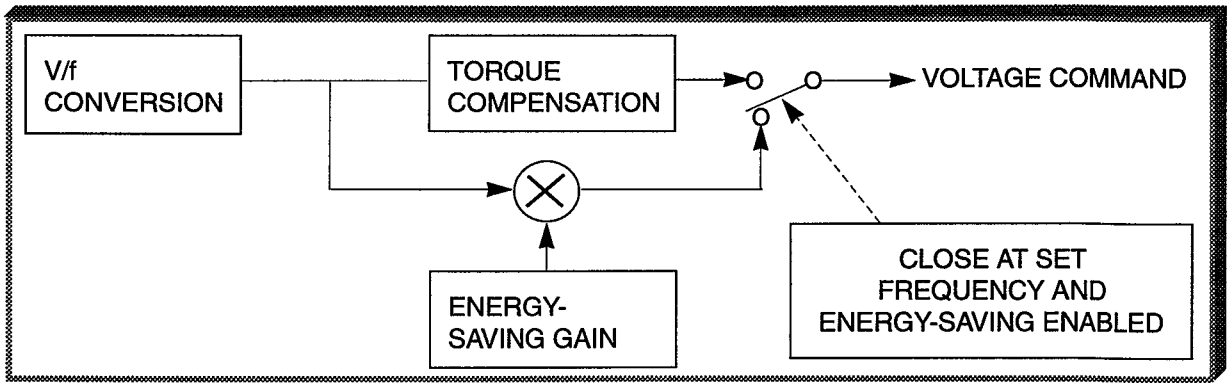
This function determines which mode will be displayed when the GPD 575 is powered up. The number programmed into bn-10 corresponds to the appropriate Un constant, Un-XX (01-03), which determines monitor status.

bn-10 Setting	Monitor Selection
1	Un-01 — Frequency Reference
2	Un-02 — Output Frequency
3	Un-03 — Output Current

bn-09: Energy Saving Gain

Factory setting: ***80*** %
Range: 0 to 200%

This function sets, in increments of 1%, the level to which the output voltage is reduced during the energy-saving operation.

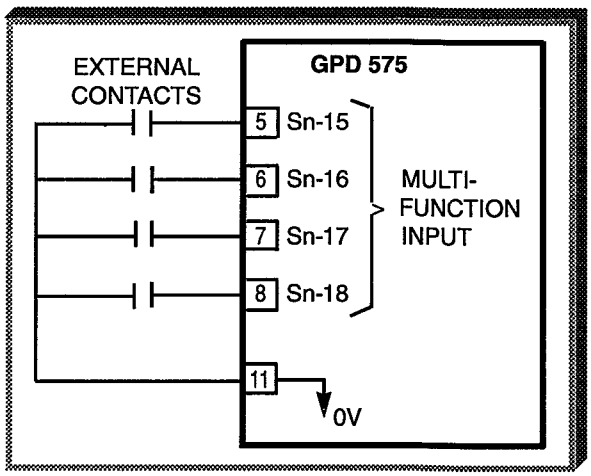


Output Voltage During Energy-Saving Operation

Sn-15 thru Sn-18: Multi-function Inputs (Term. 5 thru 8)

Data ***63*** : Energy Saving Operation

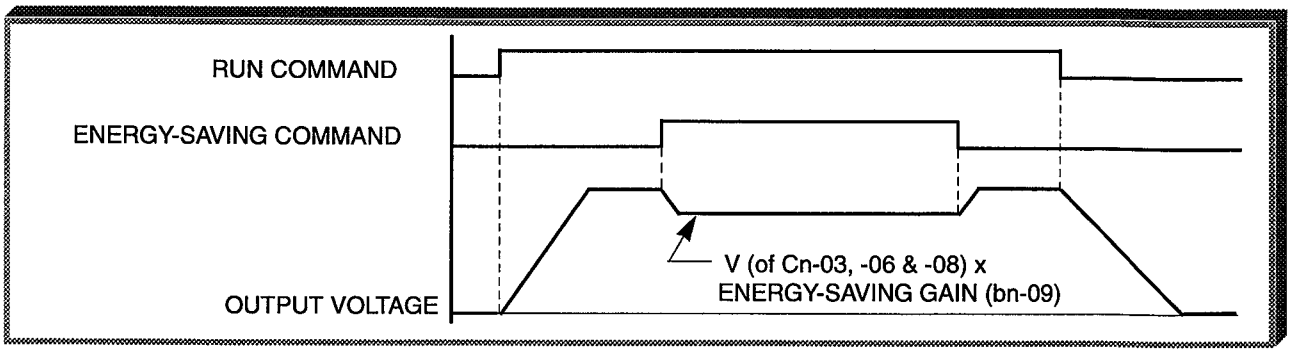
A multi-function input may be utilized to command energy saving operation.



When the external Energy-Saving Operation command is closed at set frequency, the energy-saving operation shown below is enabled. In the energy saving operation, the output voltage is the value of the energy saving gain (bn-09, factory set at 80%) multiplied by the V constants defined by Cn-03, -06 and -08.

NOTE

If energy saving operation is enabled before accel time is complete, the output V/Hz is not affected until set frequency is reached; then output voltage is reduced by energy-saving gain (bn-09) setting.



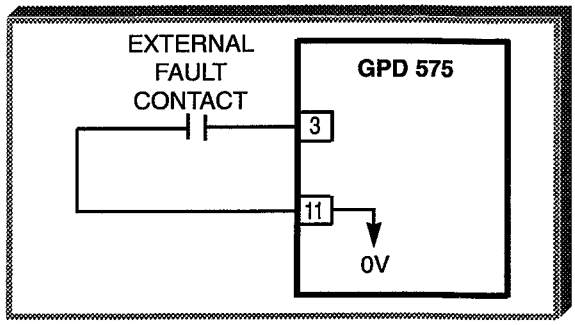
Energy-Saving Run Timing

2.12 EXTERNAL FAULT TERMINAL

Sn-12: External Fault Signal Input (Terminal 3)

Factory setting: ***0100***

This function determines how the GPD 575 responds to an external input on terminal 3. The chart below lists the possible settings, and indicates how the GPD 575 will interpret the input signal.



Sn-12 Data	Term. 3 (Note 1) N.O.	Term. 3 (Note 1) N.C.	Always Detected	During Operation	Mode (Note 2) 0	Mode (Note 2) 1	Mode (Note 2) 2	Mode (Note 2) 3
0000	X		X		X			
0001		X	X		X			
0010	X			X	X			
0011		X		X	X			
0100 Factory Setting	X		X			X		
0101		X	X			X		
0110	X			X		X		
0111		X		X		X		
1000	X		X				X	
1001		X	X				X	
1010	X			X			X	
1011		X		X			X	
1100	X		X					X
1101		X	X					X
1110	X			X				X
1111		X		X				X

NOTES

1. N.O. = normally open contact; N.C. = normally closed contact.
2. Mode 0 = Controlled Stop (bn-02); Mode 1 = Coast Stop;
   Mode 2 = Emergency Stop (bn-12);
   Mode 3 = Continuous operation (minor fault situation).

2.12 EXTERNAL FAULT TERMINAL

Continued

Sn-15 thru Sn-18: Multi-function Inputs (Term. 5 thru 8)

Data ***20 - 2F***:	External Fault 1 (terminal 5)
Data ***30 - 3F***:	External Fault 2 (terminal 6)
Data ***40 - 4F***:	External Fault 3 (terminal 7)
Data ***50 - 5F***:	External Fault 4 (terminal 8)

The multi-function input terminals can be used to define various modes of external faults. When the External Faults 1-4 are inputted, ***EF5*** to ***EF8*** are displayed on the Digital Operator (steady for a major fault situation, blinking for a minor fault situation). The second digit of the Sn-15 thru Sn-18 setting is entered as a hexadecimal value; when converted to its binary equivalent, it defines what type of external fault contact is used and how the GPD 575 will react to the fault input.

Binary — 0 0 0 0

- 0 = N.O.contact, 1 = N.C. contact
- 0 = always detected, 1 = during operation
- 00 = ramp to stop, 01 = coast to stop, 10 = emergency stop, 11 = continue operation (minor fault)

BINARY TO HEX CONVERSION

BINARY	HEX
0 0 0 0	0
0 0 0 1	1
0 0 1 0	2
0 0 1 1	3
0 1 0 0	4
0 1 0 1	5
0 1 1 0	6
0 1 1 1	7
1 0 0 0	8
1 0 0 1	9
1 0 1 0	A
1 0 1 1	B
1 1 0 0	C
1 1 0 1	D
1 1 1 0	E
1 1 1 1	F

EXAMPLE:

To program External Fault 1 (terminal 5) for a N.C. contact, always detected, and GPD 575 to continue operation, solve for X:

Sn-15 data = ***2*** X

X = 1 1 0 1

- 1 = N.C. contact
- 1 = always detected
- 1 = continue operation

= 1 1 0 1 (binary) = D (hex)

Sn-15 data = ***2D***

For the same type of input at External Fault 2 (terminal 6):

Sn-16 data = ***3D***

2.13 FREQUENCY (AUTO) COMMAND BIAS/GAIN

bn-05: Frequency Command Gain

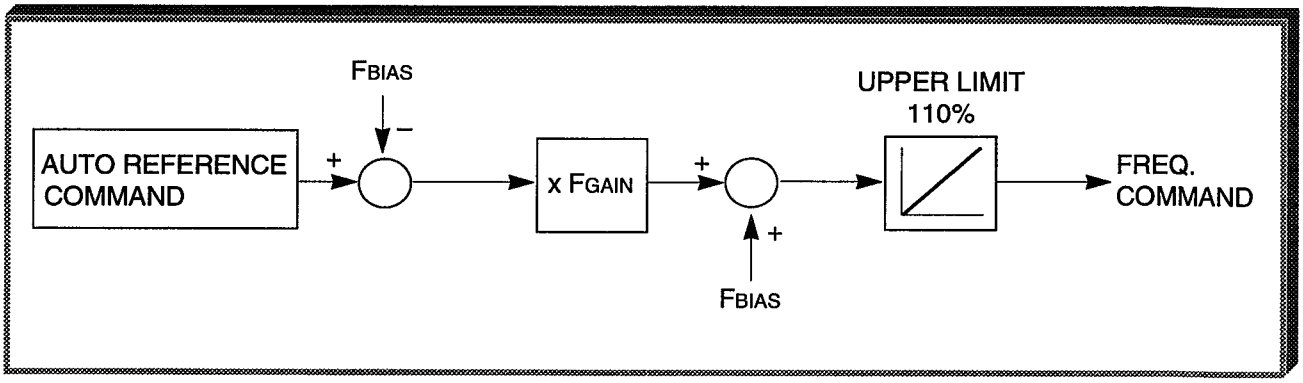
Factory setting: ***100.0*** %
Range: 0.0 to 1000.0%

bn-06: Frequency Command Bias

Factory setting: ***0*** %
Range: -100 to 100%

Frequency Command Gain sets the auto-speed frequency command gain, in increments of 0.1%.

Frequency Command Bias sets the auto-speed frequency command bias, in increments of 1%.



Adjustment Procedure:

A. For 0-10 VDC

1. With no input, adjust Bias (bn-06 setting) until an output of 0.00 Hz is obtained.

2. With full scale input, adjust Gain (bn-05 setting) until an output of 6.00 Hz (or other desired max. output frequency) is obtained.

B. For 4-20mA

1. With 4mA input, adjust Bias (bn-06 setting) until an output of 0.00 Hz is obtained.

2. With 20mA input, adjust Gain (bn-05 setting) until an output of 60.00 Hz (or other desired max. output frequency) is obtained.

NOTE

Follow the same adjustment procedure for other desired frequency setpoints.

2.14 FREQUENCY COMMAND UPPER & LOWER LIMITS

Cn-14: Frequency Command Upper Limit

Factory setting: ***100*** %
Range: 0 to 109%

Cn-15: Frequency Command Lower Limit

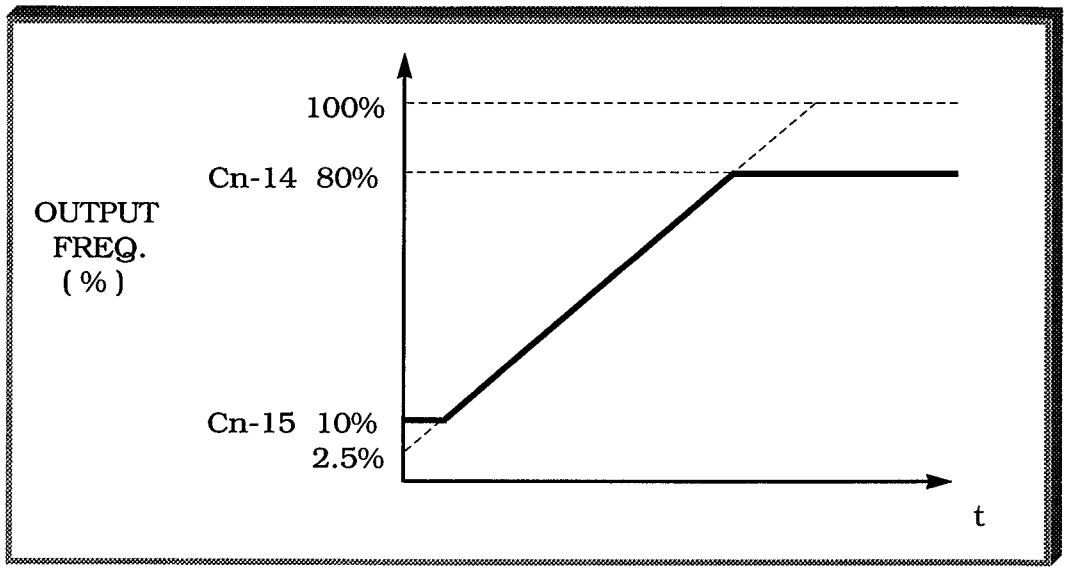
Factory setting: ***0*** %
Range: 0 to 109%

These two constants set the range for the frequency command signal. Each is set, in increments of 1%, as a percentage of maximum frequency (Fmax) as established by either the selected standard V/f pattern or custom V/f pattern.

NOTE: All references are affected by the upper and lower limit points.

EXAMPLE:

Cn-02 = ***60*** Hz (100%)
Cn-14 = ***80*** % = 48Hz
Cn-15 = ***10*** % = 6Hz



2.15 JOG REFERENCE

An-09: Jog Reference

Factory setting: ***6.00*** Hz
Range: 0.00 to 400.00 Hz

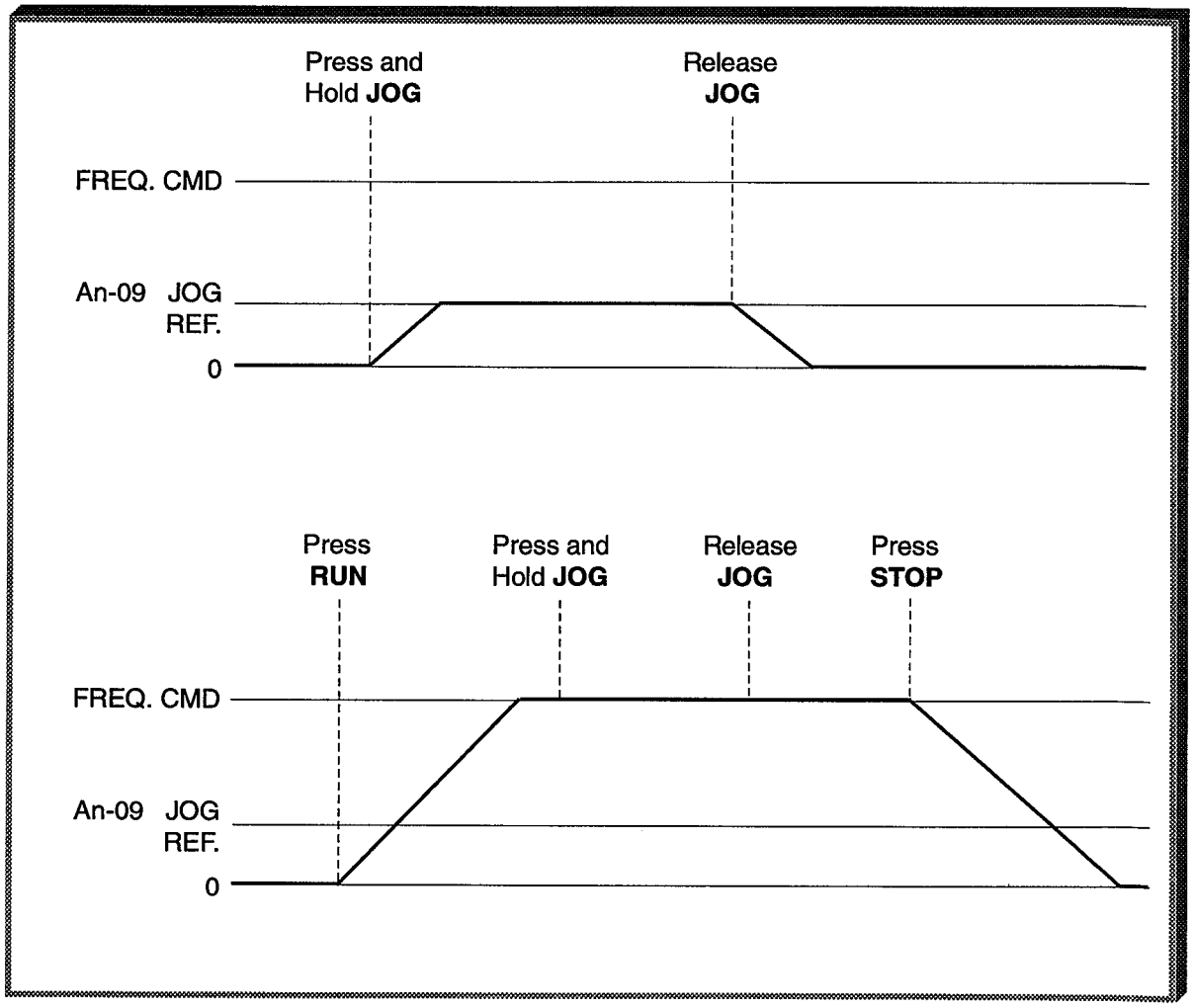
When jog operation is selected (either by the Digital Operator **JOG** key, or by external Jog and Run signals), the GPD 575 output will ramp to the output level set by this constant.

When the Digital Operator is used, Jog can only be initiated from the stopped condition. When the drive is running, the **JOG** key will have no effect on GPD 575 output.

When an external Jog signal is present, it will override the existing operation mode and the GPD 575 will ramp to the level set by this constant.

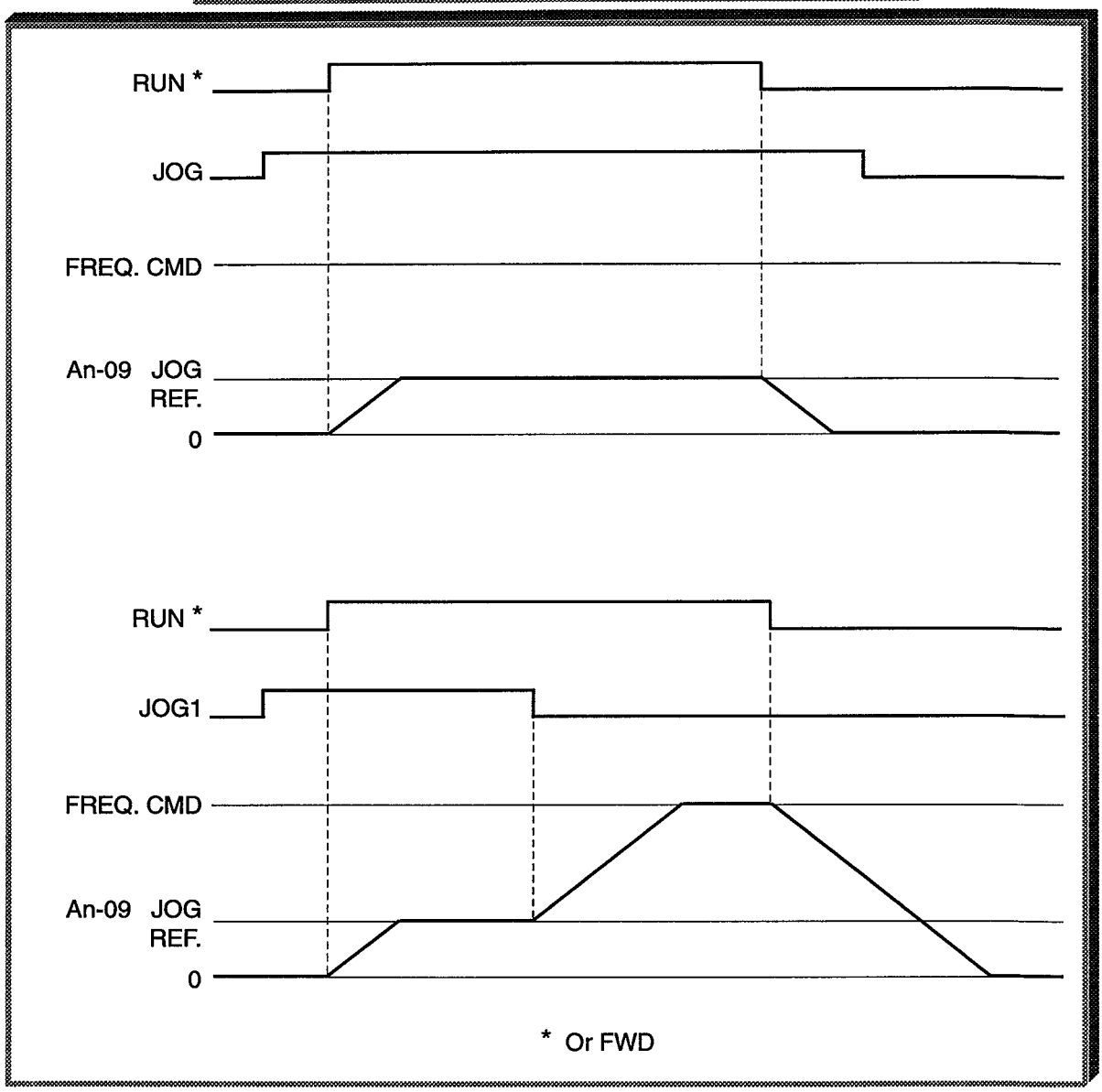
EXAMPLES:

OPERATION FROM DIGITAL OPERATOR



EXAMPLES: (Continued)

OPERATION BY REMOTE SIGNAL INPUT (RUN & JOG)



NOTE

Use of external Jog input is selected by setting data ***06*** in one of the constants Sn-15 thru Sn-18.

- The factory configuration (for two-wire control) is Sn-17 = ***06***, for JOG input at terminal 7.
- In the three-wire control configuration, Sn-18 = ***06***, for JOG input at terminal 8.

Also see descriptions of **MULTI-FUNCTION TERMINALS** and **RESET CODES**.

2.16 MOMENTARY POWER RIDE-THRU

Sn-11: Protective Characteristics Select 2

Digit 3 [X X X X] : Power Ride-thru Detection
X *0* X X = Disabled (Factory setting) X *1* X X = Enabled

This function either enables or disables the ride-thru feature of the GPD 575. If disabled, the unit will stop whenever a power loss occurs. If enabled, the GPD 575 will continue to operate during a momentary power loss of up to 80%, for the length of time identified by Cn-37. If the loss exceeds this time period, the GPD 575 will stop.

Cn-37: Power Loss Ride-Thru Deactivation Time

Range: 0.0 to 2.0 seconds

The factory setting of this constant, in 0.1 second increments, is related to the Drive's HP rating, as set by Sn-01.

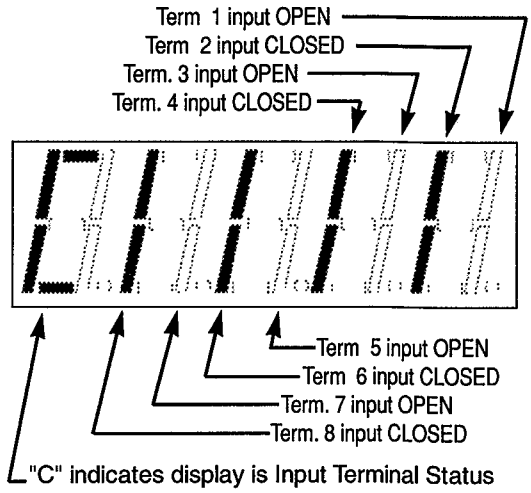
2.17 MONITOR DISPLAY (DIGITAL OPERATOR)

While in the Drive mode, different information will appear on the Digital Operator display when each of the Un constants is selected (see page 3-7).

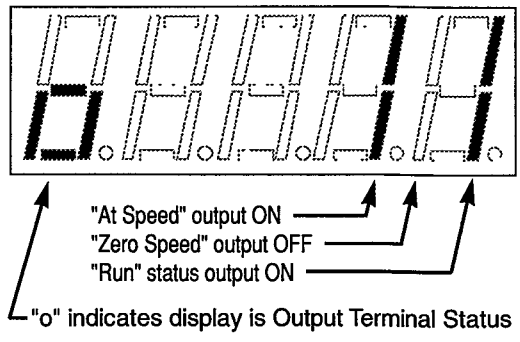
CONSTANT Un-	MONITORED ITEM	DISPLAY EXAMPLE
01	Frequency reference	*60.0*
02	Output frequency	*60.0*
03	Output current	*I2.5A*
04	Voltage reference	*575 v*
05	DC Bus voltage (VPN)	*Pn775*
06	Output power (KW)	(±) *.75*
07	Input terminal status	*C1111* *
08	Output terminal status	*0 11* **
09	LED lamp check	*8.8.8.8.8.*
10	Control Section PROM (last 5 digits of PROM Part No. NSH 6XXXXX)	*I5030*
11	Optional Section PROM for Dig. Ref. option card (last 5 digits of PROM Part No. NST 6XXXXX)	***
12 thru 21	Displays only active when option cards are present in the GPD 575	***

*** Each of these Un constants will display " - - - - " if the appropriate option card is not present.

* Actual display appearance:



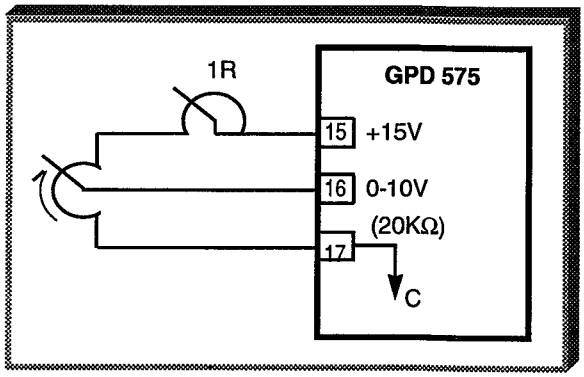
** Actual display appearance:



2.18 MULTI-FUNCTION ANALOG INPUT

Sn-19: Multi-function Analog Input (Term. 16)

Programming Sn-19 per the chart below configures terminal 16 for analog control. The figures on the next page show how each setting configures the analog input.



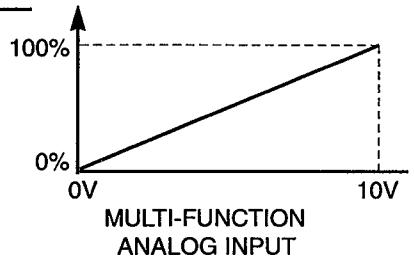
SET VALUE	FUNCTION	REMARKS
00	Manual reference	External reference input
01	Frequency reference gain (FGAINE)	Total gain = Internal gain (bn-05) x FGAINE
02	Frequency reference bias 1 (FBIAS1) *	Total bias = Internal bias (bn-06) + FBIAS1
03	Frequency reference bias 2 (FBIAS2) * (+/-)	Total bias = Internal bias (bn-06) + FBIAS2
04	Overtorque detection level	Internal overtorque detection level (Cn-26) disabled
05	VBIAS	VBIAS addition after V/f conversion
06	Accel/decel time coefficient	Accel/decel time varied by analog input
07	DC braking current	DC injection braking current varied by analog input
08 - 0F	Not Used	

* FBIAS1 and FBIAS2 are based on Fmax (Cn-02).

2.18 MULTI-FUNCTION ANALOG INPUT Continued

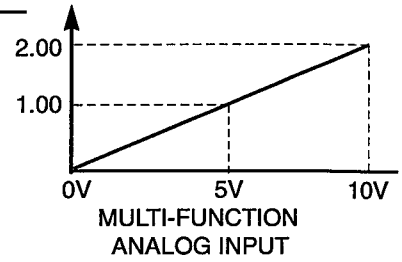
Sn-19 = 00

FREQUENCY REF.



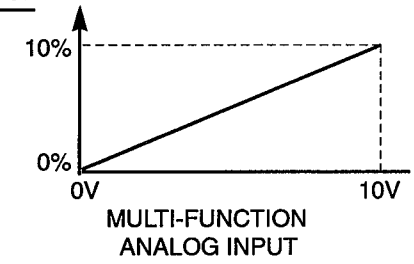
Sn-19 = 01

FGAINE



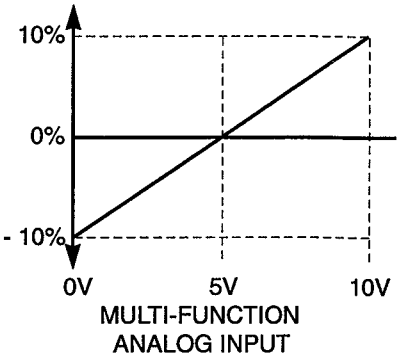
Sn-19 = 02

FBIAS1



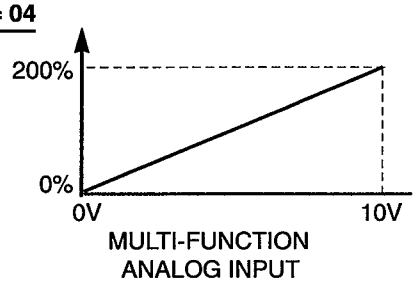
Sn-19 = 03

FBIAS2



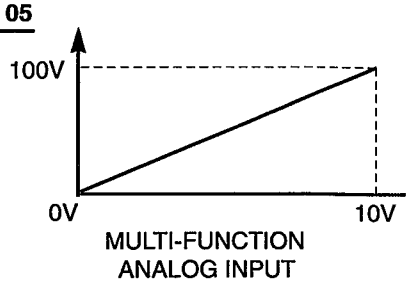
Sn-19 = 04

OVER-TORQUE DETECTION LEVEL



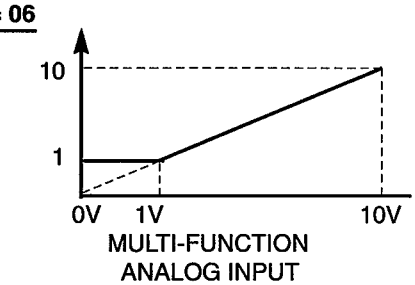
Sn-19 = 05

VBIAS



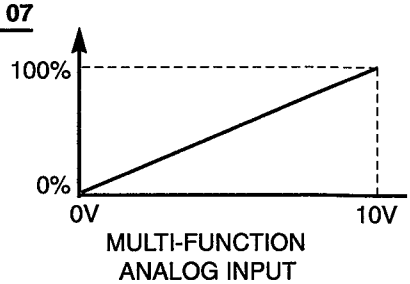
Sn-19 = 06

REDUCTION COEFFI-CIENT



Sn-19 = 07

DC IN-JECTION BRAKING CURRENT



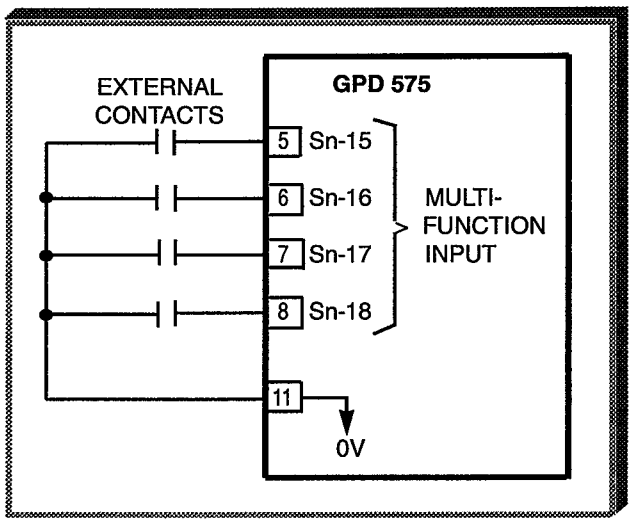
$$\text{Actual Accel/decel time} = \frac{\text{Accel/decel time}}{\text{Coefficient}}$$

2.19 MULTI-FUNCTION INPUT TERMINALS

Sn-15: Terminal 5 Function
Sn-16: Terminal 6 Function
Sn-17: Terminal 7 Function
Sn-18: Terminal 8 Function

Factory settings (for 2-wire control):
Sn-15 = ***03***
Sn-16 = ***04***
Sn-17 = ***06***
Sn-18 = ***08***

These four constants select the input signal functions for terminals 5 thru 8. Although these constants can be independently set, NOT selecting values ***00*** thru ***03***, inclusive, establishes that GPD 575 operation will be controlled by the Auto Reference input.



System constant settings are checked whenever power is applied to the GPD 575, or each time GPD 575 operation is switched from Program mode to Drive mode. A constant set value failure (***OPE03***) will occur if any of the following conditions are detected among these four system constants:

(1) Set values are not arranged in sequence, with the smallest value in Sn-15 and the largest value in Sn-18.

(2) Both speed search functions (values ***61*** and ***62***) have been selected.

(3) When the UP and DOWN functions are not selected simultaneously.

Table 2-2 lists the possible data setting values for these constants, with the function and a brief description for each one.

For a few of the data settings, a more detailed description is given on the following pages; for others, the description is given in other PROGRAMMABLE FEATURES paragraphs.

Table 2-2. Sn-15 thru Sn-18 Data Settings

DATA	FUNCTION	DESCRIPTION Signal Levels: **0** = maintained; **1** = momentary
00	FWD/REV selection (for 3-wire control)	MUST BE SET IN Sn-15. Redefines terminals: 1 = Run; 2 = Stop; 5 = FWD/REV select
01	Operation signal selection (Remote/Local)	Open 0 = Operates according to setting of Sn-04, digits 1 & 2 [X X ***0 0***] Closed 0 = Operates from keys of the Digital Operator **See Data description following this table**
02	Option/GPD 575 reference selection	Open 0 = Operates from installed option Closed 0 = Operates from Digital Operator and/or external terminals
03	Multi-step speed ref. 1	**See paragraph 2.24**
04	Multi-step speed ref. 2	
05	Multi-step speed ref. 3	
06	JOG1 selection	Closed 0 = Jog selected **See paragraph 2.15**
07	Accel/decel time	Open 0 = Accel/decel by bn-01/bn-02 Closed 0 = Accel/decel by bn-03/bn-04 **See paragraph 2.2**
08	External baseblock (N.O. contact input)	Closed 0 = Shuts off GPD 575 output (frequency command is held) **See Data description following this table**
09	External baseblock (N.C. contact input)	Open 0 = Shuts off GPD 575 output (frequency reference is held) **See Data description following this table**
0A	Accel/decel speed prohibit (HOLD command)	**See Data description following this table**
0B	External overheat	Closed 0 = ***OH2*** blinks on the Digital Operator, and operation continues (minor fault)
0C	Multi-function analog input selection	Closed 0 = Analog input (term. 16) is enabled Open 0 = Analog input (term. 16) is disabled
0D to ***0F***	Not Used	
10 to ***1F***	Not Used	

Table 2-2. Sn-15 thru Sn-18 Data Settings - Continued

DATA	FUNCTION	DESCRIPTION Signal Levels: **0** = maintained; **1** = momentary
20 to ***2F***	External fault 1	Second digit of setting is a hexadecimal value; its four-place binary equivalent defines what type of external contact is used and how the GPD 575 will react when the signal input is active **See paragraph 2.12**
30 to ***3F***	External fault 2	
40 to ***4F***	External fault 3	
50 to ***5F***	External fault 4	
60	DC injection braking command (RUN and JOG have priority)	Closed 0 = DC injection braking active **See paragraph 2.8**
61	Speed Search 1	Closed 1 = Speed Search operation from maximum frequency **See paragraph 2.28**
62	Speed Search 2	Closed 1 = Speed Search operation from set frequency **See paragraph 2.28**
63	Energy-saving operation	Closed 0 = Energy saving **See paragraph 2.11**
64 to ***6F***	Not Used	

Data *01*: Remote/Local

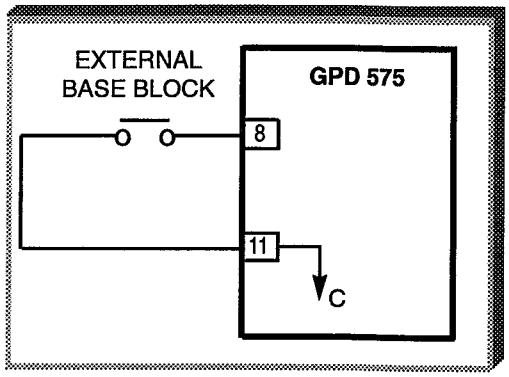
Set digits of Sn-04 to X X 0 0 to select external inputs as the source for frequency reference and operation commands. The use of a Remote/Local command input allows switching between the Digital Operator control and the external terminal input signals, without the need of re-programming Sn-04. If the status of the Remote/Local command input is changed while the drive is running, the Remote/Local operation selection is not completed until the next time the GPD 575 is stopped.

Closed = Controlled locally (Digital Operator)

Open = Controlled remotely (external terminal inputs, and Auto reference)

NOTE: If manual speed is selected, the GPD 575 speed reference will be controlled by manual speed reference regardless of the state of the Remote/Local input.

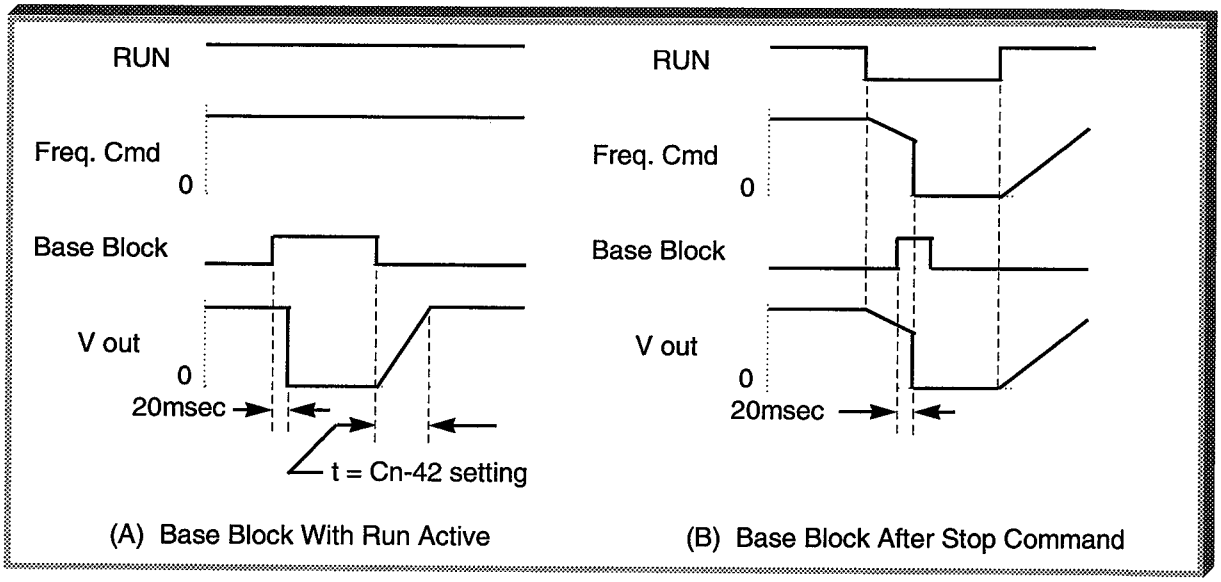
Data *08*: External Base Block by N.O. Contact



- When either the Forward Run command or Reverse Run command is closed, and the external Base Block command is also active (i.e. contact closed), coast stop is accomplished (after a 20 msec delay), while the frequency command is maintained. When the Base Block command is removed, the drive will recover in a manner similar to that of Speed Search operation.

- When both the Forward Run command and Reverse Run command are open, and the the external Base Block command is active (i.e. contact closed), coast stop is accomplished and after a 20 msec delay the frequency command is changed to 0Hz. When the Base Block command is removed, the drive will remain in stopped condition until Forward Run command or Reverse Run command is again closed.

- When external Base Block command is active, " ***b b*** " will flash in the Digital Operator display.

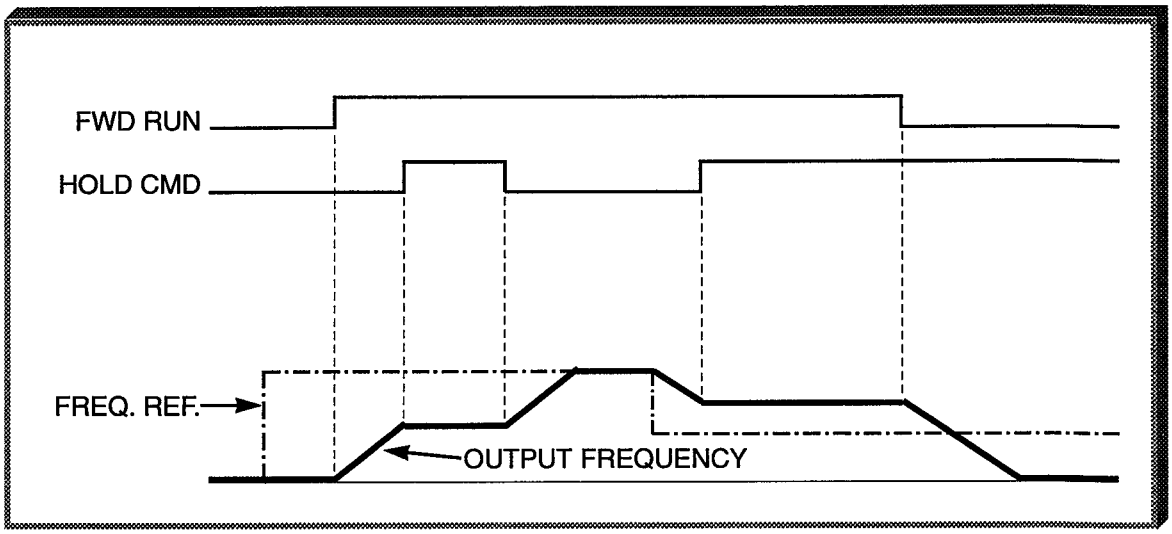


Data *09*: External Base Block by N.C. Contact

Base Block operation is the same as described above, except that the Base Block contact must be <u>open</u> to be recognized as active.

Data *0A*: Accel/Decel Speed Prohibit (HOLD Command)

As long as the HOLD command is present, accel and decel are in a prohibit state, and the output frequency is held at the level it was at the time the HOLD command was input. When the HOLD command is removed while the system is still in Run condition, accel or decel will again become active to allow output to reach set frequency. If Stop is initiated while the HOLD command is present, the prohibit state is cancelled and the system enters stop operation.



HOLD Function Timimg

2.20 MULTI-FUNCTION ANALOG MONITOR OUTPUT

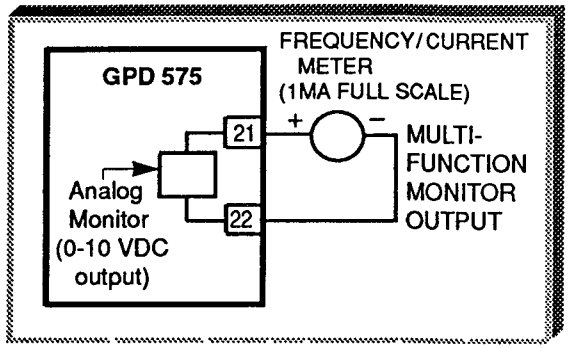
Sn-05: Operation Mode Select 2

Digit 4 [**X X X X**] : Multi-function Analog Output
Factory setting: ***0*** X X X

The monitor output provides a 0-10 VDC signal proprotional to either output frequency or output current between terminals 21 & 22.

0 X X X = 0-10 Vdc proportional to ouptut frequency

1 X X X = 0-10 Vdc proportional to ouptut current



bn-11: Analog Monitor Channel 1 Gain

Factory Setting: ***1.00***
Range: 0.01 to 2.55

This constant is used to calibrate, in increments of 0.01, either the frequency meter or current meter connected to terminals 21 & 22. This function is also used to calibrate Channel 1 of one of the analog output options.

NOTE: When an analog output option is connected, bn-11 setting affects both terminals 21 & 22 *and* the option terminals for Channel 1.

2.21 MULTI-FUNCTION OUTPUT TERMINALS

Sn-20: Contact Output (external terminals 9 & 10)
Sn-21: Open Collector Output (external terminals 25 & 27)
Sn-22: Open Collector Output (external terminals 26 & 27)

A contact, or two different open collector outputs, can be programmed to change states during any of the conditions indicated in Table 2-3.

If an open collector output is applied to a DC relay, the relay MUST be diode protected, as shown in the recommended configuration.

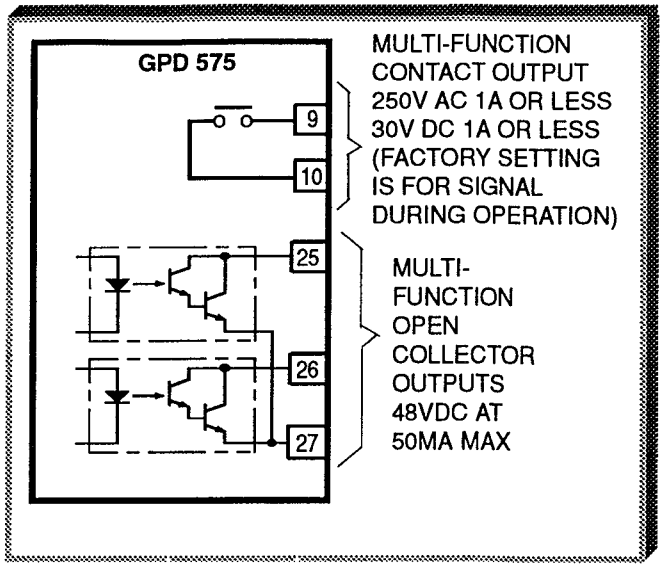
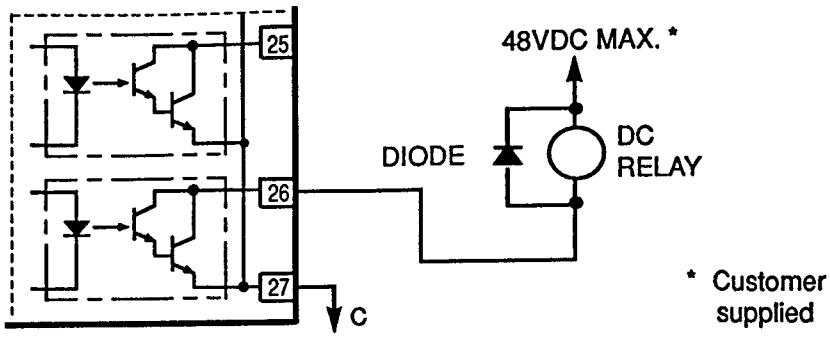


Table 2-3. Multi-function Output Terminals

Set Value	Description	
	Condition	Signal Level
00	During operation	Closed = GPD 575 is operating
01	Zero speed	Closed = GPD 575 output is at 0Hz
02	Speed at set frequency	Closed = Freq. Ref. - Cn-22 ≤ output freq ≤ Freq Ref + Cn-22
03	Speed coincidence	Closed = Speed at set frequency and Cn-21 - Cn-22 ≤ output freq. ≤ Cn-21 + Cn-22
04	Frequency detection - low	Closed = Output frequency ≤ Cn-21
05	Frequency detection - high	Closed = Output frequency ≥ Cn-21
06	Operation ready	Closed = GPD 575 is ready for operation
07	During undervoltage detection	Closed = Undervoltage detected
08	During coast to stop	Closed = GPD 575 output base block is active; motor is coasting
09	Frequency reference mode	Open = Cmd by ext. input; Closed = Cmd by Digital Operator
0A	Run reference mode	Open = Run by ext. input; Closed = Run by Digital Operator
0b	Overtorque detection	Closed = Overtorque detected
0C	Frequency reference missing	Closed = Frequency reference is missing
0d	Braking resistor fault	Closed = Braking resistor is overheating or has faulted
0E	Fault	Closed = GPD 575 fault has occurred (except CPF00, CPF01)
0F	Not Used	

2.21 MULTI-FUNCTION OUTPUT TERMINALS Continued

Recommended Configuration for DC Relays



2.22 OVERTORQUE DETECTION

Overtorque detection is used to compare GPD 575 rated output current with the overtorque detection level. When the output current is equal to or greater than the defined level, an overtorque condition exists. This will be indicated as an ***OL3*** fault on the Digital Operator. This feature can be selected to operate over a wide range of conditions. (Refer to Appendix 3, Table A3-1.)

Cn-26: Overtorque Detection Level

Factory setting: ***160*** %
Range: 30 to 200%

Overtorque detection level determines the point at which the GPD 575 determines that an overtorque condition exists.

Cn-27: Overtorque Detection Time

Factory setting: ***0.1*** sec.
Range: 0.0 to 25.5 seconds

Overtorque detection time determines how long an overtorque condition must exist before another event will occur, e.g. coast to stop, or continue operation when overtorque is detected.

Sn-07: Overtorque Detection Mode Select

X X X ***0*** = Overtorque detection disabled
X X X ***1*** = Overtorque detection is enabled

The setting of this digit either enables or disables overtorque detection.

X ***0*** X ***1*** = Operation continues
X ***1*** X ***1*** = Coast stop

Once overtorque detection is selected, the setting of this digit determines GPD 575 operation after the overtorque condition is recognized. The GPD 575 either continues to operate, or coasts to stop when overtorque is detected.

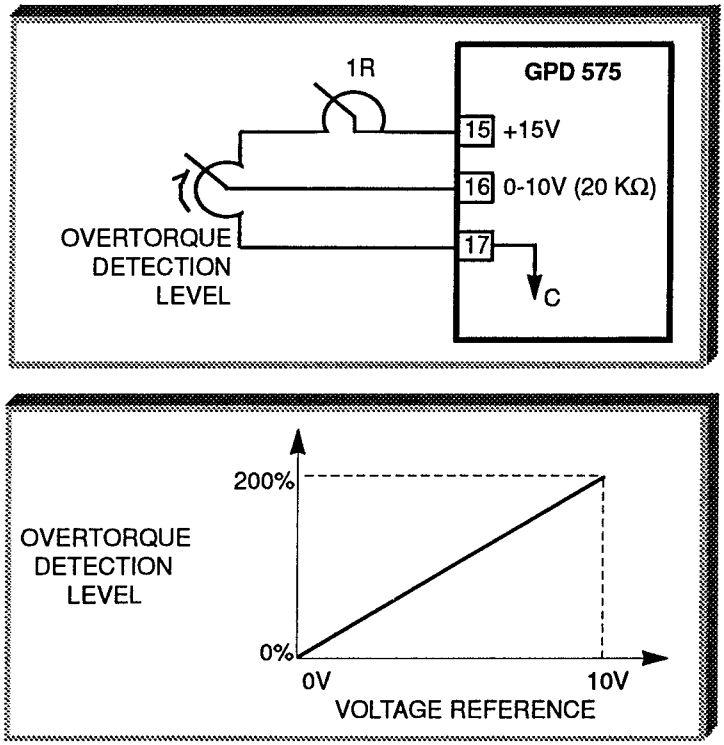
X X ***0 1*** = Overtorque detection at set frequency
X X ***1 1*** = Overtorque detection always detected

The setting of this digit selects when overtorque condition is considered, either only at set frequency, or always detected (except during stopping and Dynamic Braking).

Sn-19: Multi-function Analog Input (Term. 16)

Data *04*: External Overtorque Detection Level Adjustment

The multi-function analog input at terminal 16 may be configured to allow analog control of the overtorque detection level. When this function is programmed into Sn-19, the internal overtorque detection level (Cn-26) is disabled.



Sn-20: Multi-function Output 1 – Contact (terminals 9 & 10)
Sn-21: Multi-function Output 2 – Open Collector (terminals 25 & 27)
Sn-22: Multi-function Output 3 – Open Collector (terminals 26 & 27)

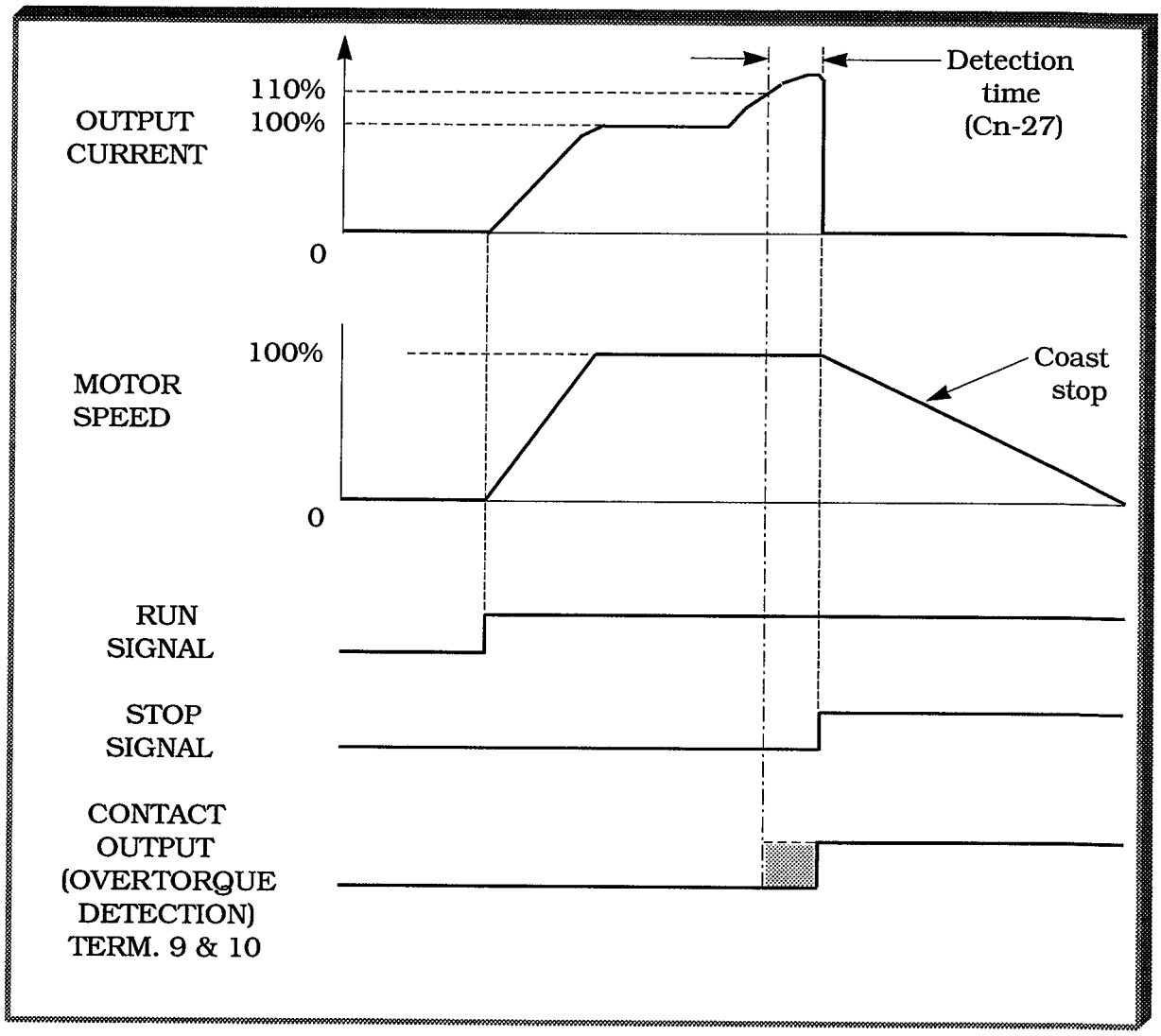
Data *0b*

A contact, or two open collector outputs, can be programmed to change states during an overtorque detection condition.

See the overtorque detection example that follows.

EXAMPLE OF OVERTORQUE DETECTION

Sn-07 setting: ***0101*** — Overtorque enabled, and only at set frequency
Sn-19 setting: ***00*** — Cn-26 value is overtorque detection level
Sn-20 setting: ***0b*** — Output contact programmed for overtorque detection
Cn-26 setting: ***110*** % — Level at which overtorque is sensed
Cn-27 setting: ***1.0*** (s) — Time delay before overtorque event occurs



Overtorque Detection Timing Diagram

2.23 SPEED COINCIDENCE

Cn-21: Speed Coincidence Frequency

Factory setting: ***0.0*** Hz
Range: 0.0 to 400.0Hz

Cn-22: Speed Coincidence Bandwidth

Factory setting: ***2.0*** Hz
Range: 0.0 to 25.5Hz

Speed coincidence is used to control an output contact at terminals 9 & 10, or one of the open collector outputs at terminals 25 or 26 (with respect to terminal 27), when selected by Sn-20 thru Sn-22.

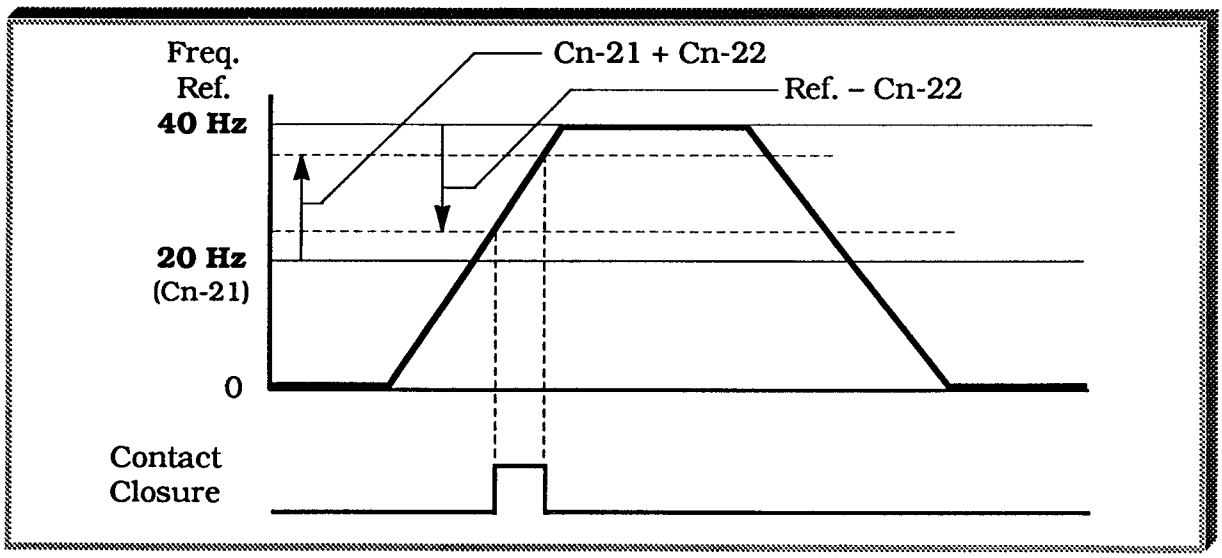
Sn-20: Multi-function Output 1 – Contact (terminals 9 & 10)
Sn-21: Multi-function Output 2 – Open Collector (terminals 25 & 27)
Sn-22: Multi-function Output 3 – Open Collector (terminals 26 & 27)

Data ***02***, ***03***, ***04*** or ***05*** (See paragraph 2.21, **MULTI-FUNCTION OUTPUT**)

The output contact will close, or the open collector output will go low, when the selected condition is met.

EXAMPLE:

If Cn-21 = ***20*** Hz, Cn-22 = ***15.0*** Hz and Sn-20 = ***03*** , then the contact at terminals 9 & 10 will be closed from 25 Hz to 35 Hz.



An-01: Memory 1 **An-02:** Memory 2 **An-03:** Memory 3
An-04: Memory 4 **An-05:** Memory 5 **An-06:** Memory 6
An-07: Memory 7 **An-08:** Memory 8 **An-09:** Jog Reference (See paragraph 2.15)

Sn-19: Multi-function Analog Input Select (see paragraph 2.18)
Sn-04: Operation Mode
Sn-15 thru Sn-18: Multi-function Input Terminals; data ***03***, ***04***, ***05*** and ***06*** [or ***0C***], respectively, for Reference Select 1, 2, 3 and Jog [or Multi-function Analog Input at Term. 16; see paragraph 2.18].
For Remote/Local select, see paragraph 2.19, **Data *01*** description.
Sn-08: Option Reference Select (See separate Option Instruction Sheet)

The GPD 575 allows selection of one of twelve references. Two are analog inputs, nine are stored in memory, and one can be from an option card, either analog or digital. In most configurations either the local reference (An-01) or the remote AUTO reference will be utilized.

2.24.1 Local Reference Selection

Sn-04 data: X X X ***0*** = Remote; X X X ***1*** = Local

By programming Sn-04 to X X X ***0*** , the Auto reference will be used. If Sn-04 is programmed to X X X ***1*** , the value in An-01 will be used as a frequency command. One point to remember about An-01 is that it will change each time the operator enters a new frequency command from the Digital Operator's " ***F XXX. X*** " prompt. Another way to think about this is that when the GPD 575 is first powered up, the Digital Operator display requests a run frequency by displaying " ***F XXX. X***". The value displayed is the current setting of An-01. If the operator changes the display, then An-01 will also be changed.

2.24.2 Multiple Reference Configuration

In a multiple reference configuration, five modes may be selected, as described on the following pages.

NOTE

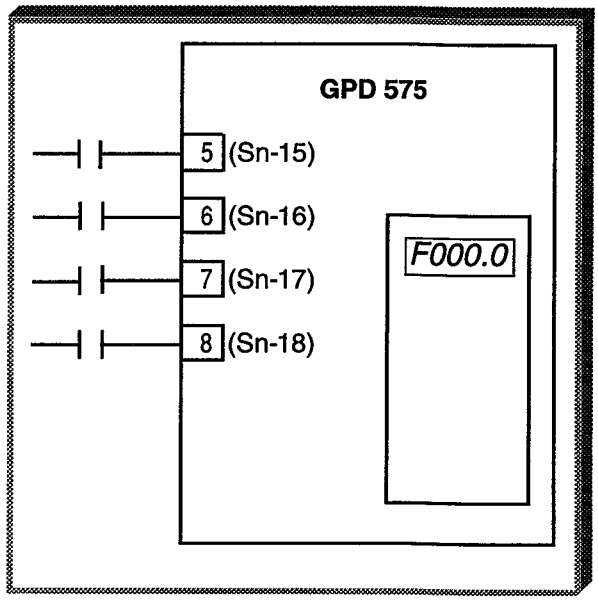
In the descriptions of Mode 1 thru Mode 4, the external terminal listings differ depending on whether the drive is set for 2-wire or 3-wire control. For 3-wire control, terminal 5 is dedicated to FWD/REV selection; therefore, multiple reference operation will use fewer of the memory settings and is a more limited function.

Mode 1 (Memory Data Only)

2-WIRE CONTROL	3-WIRE CONTROL
Sn-04 = X X X ***1***	Sn-04 = X X X ***1***
Sn-15 = ***03***	Sn-15 = ***00***
Sn-16 = ***04***	Sn-16 = ***03***
Sn-17 = ***05***	Sn-17 = ***04***
Sn-18 = ***06***	Sn-18 = ***06***
Sn-19 = ***00*** *	Sn-19 = ***00*** *

Mode 1 uses only memory locations An-01 thru An-09.

Sn-04 = local operation.
Sn-15 = frequency reference select 1 at terminal 5.
Sn-16 = frequency reference select 2 at terminal 6.
Sn 17 = frequency reference select 3 at terminal 7.
Sn-18 = JOG reference select at terminal 8.
Sn-19 = manual reference at terminal 16.



The input commands at terminals 5 thru 8 are binary coded to select the appropriate reference command, where An-01 is selected by binary zero and An-09 (Jog) is selected by binary 8. For example, if the value in An-04 is the desired frequency reference, enter 0011 at terminals 5 thru 8. As a standard, the right-most bit and terminal 5 are the.least significant bit (LSB).

3-WIRE CONTROL

Freq. Ref.	External Terminal 8	7	6	5
An-01	0	0	0	■
An-02 *	0	0	1	■
An-03	0	1	0	■
An-04	0	1	1	■
An-09	1	X	X	■

1 = Closed; 0 = Open;
X = No effect; ■ = FWD/REV

2-WIRE CONTROL

Freq. Ref.	External Terminal 8	7	6	5
An-01	0	0	0	0
An-02 *	0	0	0	1
An-03	0	0	1	0
An-04	0	0	1	1
An-05	0	1	0	0
An-06	0	1	0	1
An-07	0	1	1	0
An-08	0	1	1	1
An-09	1	X	X	X

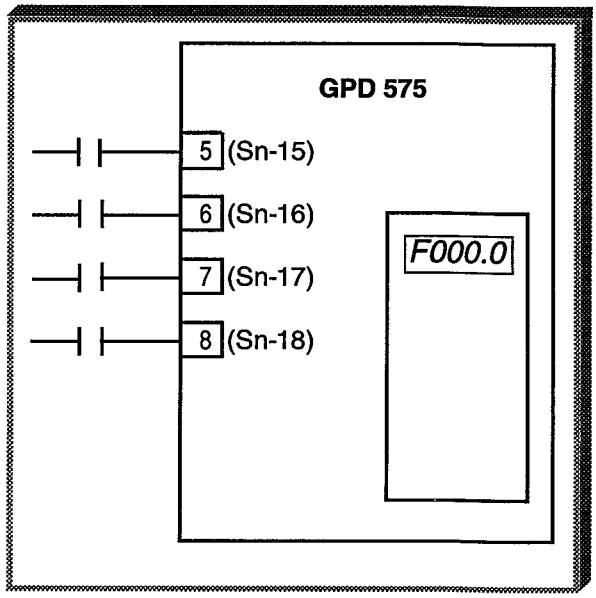
* Sn-19 selects the function of the multi-function analog input. If data value ***00*** is entered, the analog input represents manual reference. If An-02 is to be utilized, then Sn-19 MUST NOT be set to ***00***.

Mode 2 (Memory, Auto, Manual)

2-WIRE CONTROL	3-WIRE CONTROL
Sn-04 = X X X ***0***	Sn-04 = X X X ***0***
Sn-15 = ***03***	Sn-15 = ***00***
Sn-16 = ***04***	Sn-16 = ***03***
Sn-17 = ***05***	Sn-17 = ***04***
Sn-18 = ***06***	Sn-18 = ***06***
Sn-19 = ***00***	Sn-19 = ***00***

Mode 2 uses Auto, Manual and An-03 thru An-09.

Sn-04 = remote operation.
Sn-15 = frequency reference select 1 at terminal 5 (Auto/Manual).
Sn-16 = frequency reference select 2 at terminal 6.
Sn 17 = frequency reference select 3 at terminal 7.
Sn-18 = JOG reference select at terminal 8.
Sn-19 = manual reference at terminal 16.



The input commands at terminals 5 thru 8 are binary coded to select the appropriate reference command, where Auto is selected by binary zero and An-09 (Jog) is selected by binary 8. For example, if the value in An-04 is the desired frequency reference, enter 0011 at terminals 5 thru 8. As a standard, the right-most bit and terminal 5 are the LSB.

3-WIRE CONTROL

Freq. Ref.	External Terminal 8	7	6	5
Auto	0	0	0	■
Manual (Multi-func.)	0	0	1	■
An-03	0	1	0	■
An-04	0	1	1	■
An-09	1	X	X	■

1 = Closed; 0 = Open;
X = No effect; ■ = FWD/REV

2-WIRE CONTROL

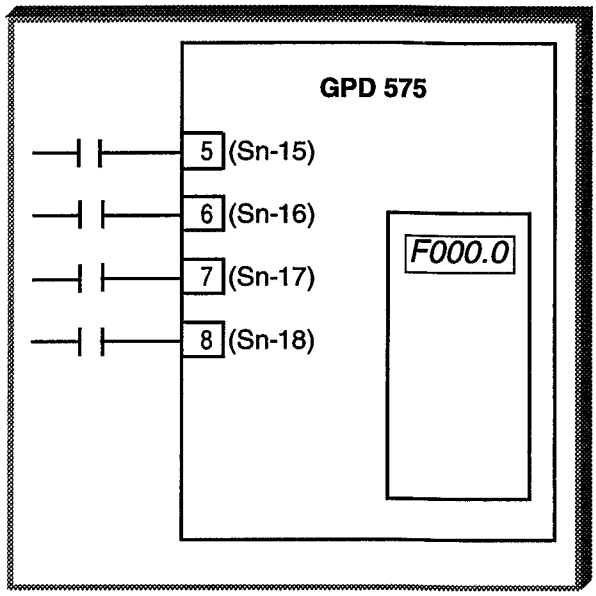
Freq. Ref.	External Terminal 8	7	6	5
Auto	0	0	0	0
Manual (Multi-func.)	0	0	0	1
An-03	0	0	1	0
An-04	0	0	1	1
An-05	0	1	0	0
An-06	0	1	0	1
An-07	0	1	1	0
An-08	0	1	1	1
An-09	1	X	X	X

Mode 3 (An-01, Manual, An-03 thru An-09)

2-WIRE CONTROL	3-WIRE CONTROL
Sn-04 = X X X ***1***	Sn-04 = X X X ***1***
Sn-15 = ***03***	Sn-15 = ***00***
Sn-16 = ***04***	Sn-16 = ***03***
Sn-17 = ***05***	Sn-17 = ***04***
Sn-18 = ***06***	Sn-18 = ***06***
Sn-19 = ***00***	Sn-19 = ***00***

Mode 3 uses An-01, Manual and An-03 thru An-09.

Sn-04 = local operation.
Sn-15 = frequency reference select 1 at terminal 5 (Auto/Manual).
Sn-16 = frequency reference select 2 at terminal 6.
Sn 17 = frequency reference select 3 at terminal 7.
Sn-18 = JOG reference select at terminal 8.
Sn-19 = manual reference at terminal 16.



The input commands at terminals 5 thru 8 are binary coded to select the appropriate reference command, where An-01 is selected by binary zero and An-09 (Jog) is selected by binary 8. For example, if the value in An-04 is the desired frequency reference, enter 0011 at terminals 5 thru 8. As a standard, the right-most bit and terminal 5 are the LSB.

3-WIRE CONTROL

Freq. Ref.	External Terminal 8	7	6	5
An-01	0	0	0	■
Manual (Multi-func.)	0	0	1	■
An-03	0	1	0	■
An-04	0	1	1	■
An-09	1	X	X	■

1 = Closed; 0 = Open;
X = No effect; ■ = FWD/REV

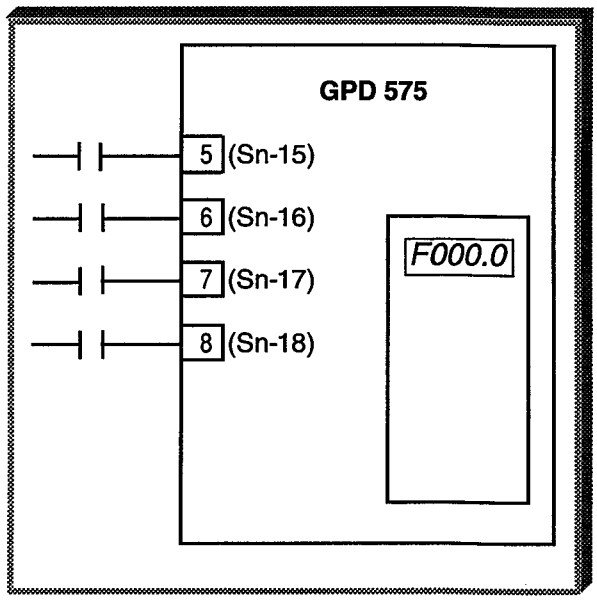
2-WIRE CONTROL

Freq. Ref.	External Terminal 8	7	6	5
An-01	0	0	0	0
Manual (Multi-func.)	0	0	0	1
An-03	0	0	1	0
An-04	0	0	1	1
An-05	0	1	0	0
An-06	0	1	0	1
An-07	0	1	1	0
An-08	0	1	1	1
An-09	1	X	X	X

Mode 4

2-WIRE CONTROL	3-WIRE CONTROL
Sn-04 = X X X ***0***	Sn-04 = X X X ***0***
Sn-15 = ***03***	Sn-15 = ***00***
Sn-16 = ***04***	Sn-16 = ***03***
Sn-17 = ***05***	Sn-17 = ***04***
Sn-18 = ***0C***	Sn-18 = ***0C***
Sn-19 = ***00*** *	Sn-19 = ***00*** *

In this mode, use of multiple reference selection allows use of An-01 thru An-08 and Analog Manual.



Sn-04 = remote operation.
Sn-15 = frequency reference select 1 at terminal 5 (Auto/Manual).
Sn-16 = frequency reference select 2 at terminal 6.
Sn 17 = frequency reference select 3 at terminal 7.
Sn-18 = the multi-function analog input reference select at terminal 8.
Sn-19 = manual reference at terminal 16.

The input commands at terminals 5 thru 8 are binary coded to select the appropriate reference command, where An-01 is selected by binary zero and Analog Manual is selected by binary 8. For example, if the value in An-04 is the desired frequency reference, enter 0011 at terminals 5 thru 8. As a standard, the right-most bit and terminal 5 are the LSB.

3-WIRE CONTROL

Freq. Ref.	External Terminal 8	7	6	5
An-01	0	0	0	■
An-02 *	0	0	1	■
An-03	0	1	0	■
An-04	0	1	1	■
Analog - Manual	1	X	X	■

1 = Closed; 0 = Open;
X = No effect; ■ = FWD/REV

2-WIRE CONTROL

Freq. Ref.	External Terminal 8	7	6	5
An-01	0	0	0	0
An-02 *	0	0	0	1
An-03	0	0	1	0
An-04	0	0	1	1
An-05	0	1	0	0
An-06	0	1	0	1
An-07	0	1	1	0
An-08	0	1	1	1
Analog - Manual	1	X	X	X

* Sn-19 selects the function of the multi-function analog input. If data value ***00*** is entered, the analog input represents manual reference. If An-02 is to be utilized, then Sn-19 MUST NOT be set to ***00***.

Mode 5

The final consideration for multiple frequency command configuration modes is that any combination of binary weighted values may be configured for operation. As an example, if only three speed references are required, then the following example will work.

Sn-04 = X X X ***1***
Sn-15 = ***03***
Sn-16 = ***04***
Sn-19 = ***00***

Sn-04 = local operation.
Sn-15 = frequency reference select 1 at terminal 5.
Sn-16 = frequency reference select 2 at terminal 6.
Sn-19 = manual reference at terminal 16.

Freq. Ref.	External Terminal 8	7	6	5
An-01	0	0	0	0
Manual (Multi-func.)	0	0	0	1
An-03	0	0	1	0

2.25 RESET CODES

Sn-03: Operator Status

Data ***1110*** = 2-Wire Reset
Data ***1111*** = 3-Wire Reset

By entering either of these two codes into this constant, a reset to factory configuration is accomplished. The constants which are **NOT** affected are:

Sn-01: GPD 575 Capacity
Sn-02: V/f

Factory configuration for 2-wire control:

Sn-15 = ***03*** – Reference Select 1
Sn-16 = ***04*** – Reference Select 2
Sn-17 = ***06*** – JOG
Sn-18 = ***08*** – Coast to Stop/Base Block

Factory configuration for 3-wire control:

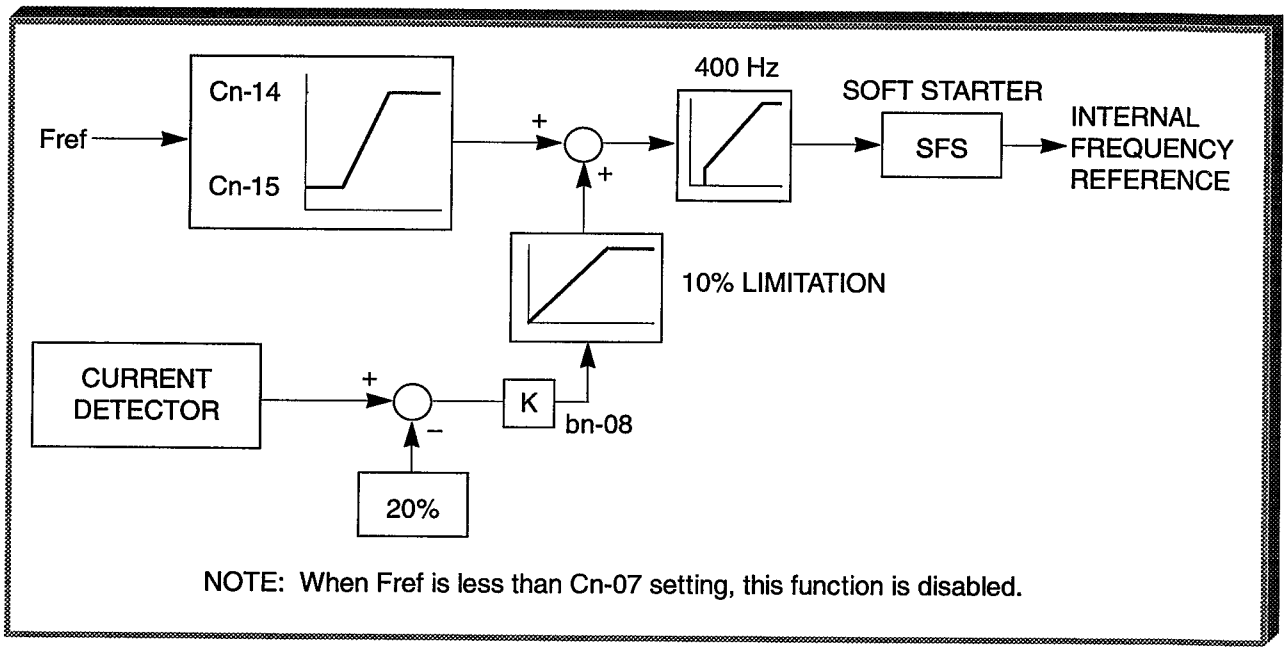
Sn-15 = ***00*** – FWD/REV Select
Sn-16 = ***03*** – Reference Select 1
Sn-17 = ***04*** – Reference Select 2
Sn-18 = ***06*** – JOG

2.26 SLIP COMPENSATION

bn-08: Slip Compensation Gain

Factory setting: ***0.0*** %
Range: 0.0 to 9.9%

This function sets the slip compensation gain, in increments of 0.1%. When the gain is 1.0, the output frequency is increased by 1% of the Cn-04 setting at rated current. A setting of 0.0 results in no slip compensation.



Slip Compensation Block Diagram

2.27 SOFT START CHARACTERISTICS

Sn-06: Operation Mode Select 3

Digits 1 & 2 **[X X <u>X X</u>]** : Soft Start Characteristics

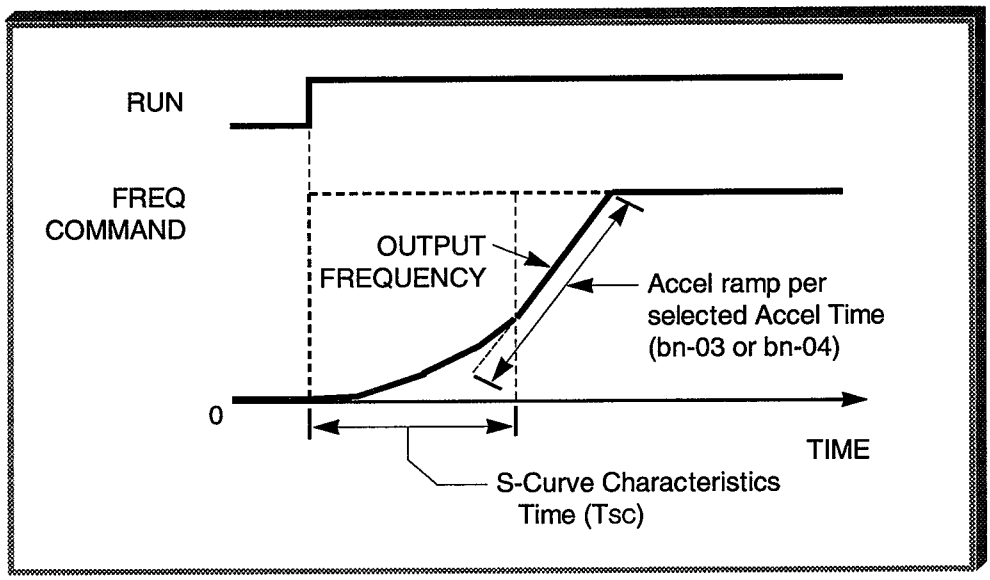
This function determines the starting characteristics of the acceleration ramp, or S-curve, function.

X X ***0 0*** = S-curve time of 0.2 seconds

X X ***0 1*** = S-curve disabled

X X ***1 0*** = S-curve time of 0.5 seconds

X X ***1 1*** = S-curve time of 1.0 seconds



2.28 SPEED SEARCH

Sn-15 thru Sn-18: Multi-function Input Terminals

Data ***61***: Speed Search From Max Frequency
Data ***62***: Speed Search From Set Frequency

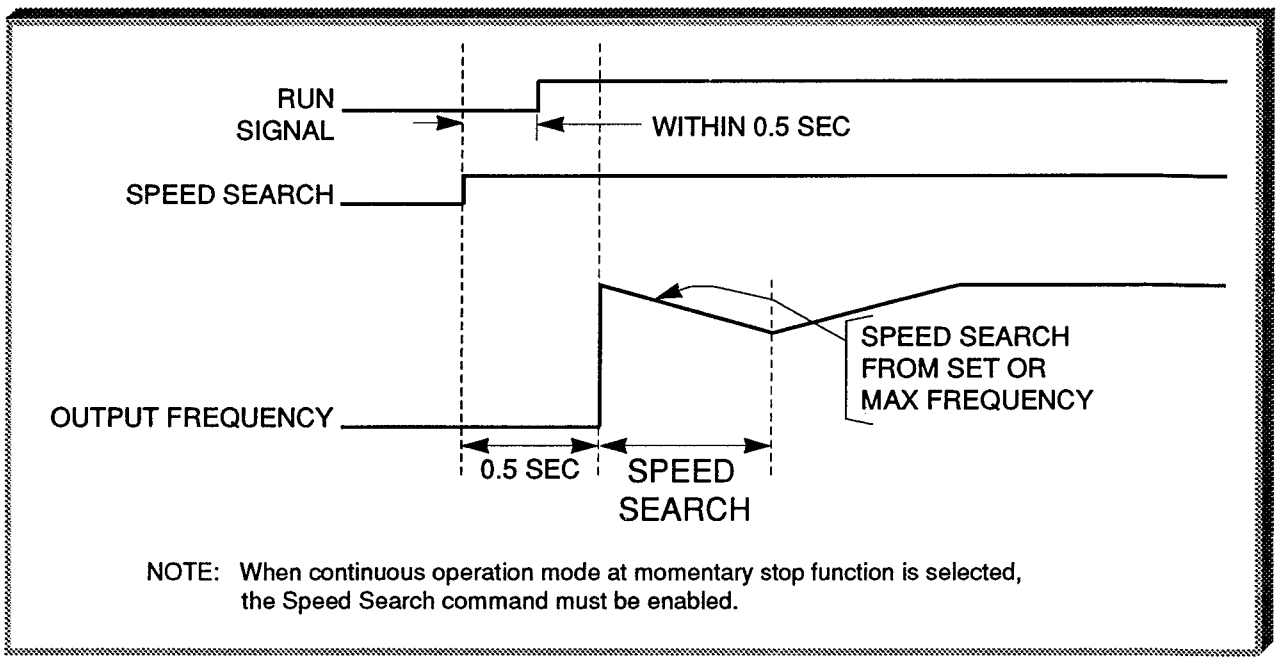
A multi-function input terminal is utilized to activate speed search.

When the external speed search command is closed, the base is blocked for 0.5 second, then the speed search is made. The operation depends on the set value.

IMPORTANT

Set values ***61*** and ***62*** CANNOT be selected in combination.

- When ***61*** is set, the speed search begins with the maximum frequency.
- When ***62*** is set, the speed search begins with the frequency command that has been set after the search command was input.



NOTE: When continuous operation mode at momentary stop function is selected, the Speed Search command must be enabled.

Speed Search Operation Timing

Sn-10: Protective Characteristics

Data: —	X X X ***0***	= Stall prevention enabled during acceleration
—	X X X ***1***	= Stall prevention disabled during acceleration
—	X X ***0*** X	= Stall prevention enabled during deceleration
—	X X ***1*** X	= Stall prevention disabled during deceleration
—	X ***0*** X X	= Stall prevention enabled during operation (at set frequency)
—	X ***1*** X X	= Stall prevention disabled during operation (at set frequency)
—	***0*** X X X	= Decel time during stall prevention set by bn-02
—	***1*** X X X	= Decel time during stall prevention set by bn-04

The stall prevention characteristics determine whether stall prevention is enabled or disabled during the various operating modes, as well as selecting the decel rate during stall prevention.

Cn-28: Stall Prevention Level During Acceleration (Constant Torque Region)

Factory setting: ***170*** %
Range: 30 to 200%

Cn-29: Stall Prevention Limit During Acceleration (Constant HP Region)

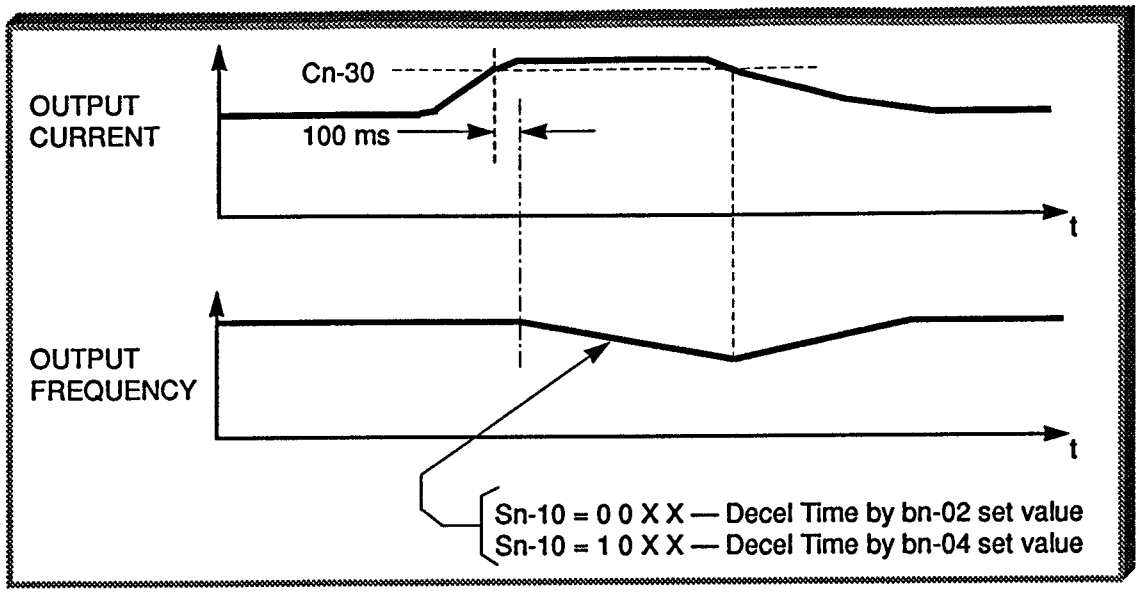
Factory setting: ***50*** %
Range: 30 to 200%

The stall prevention during acceleration extends the acceleration rate according to the load status with respect to the level programmed into Cn-28 (based on GPD 575 rated current) and protects the motor from stalling during acceleration.

Cn-30: Stall Prevention Level During Operation (at set frequency)

Factory setting: ***160*** %
Range: 30 to 200%

During operation while the speed is constant, if the GPD 575 output current exceeds the stall prevention level set into Cn-30, the output frequency is reduced to a level to prevent motor stalling. If the output current returns to a value lower than Cn-30, the output frequency returns to its previous level.

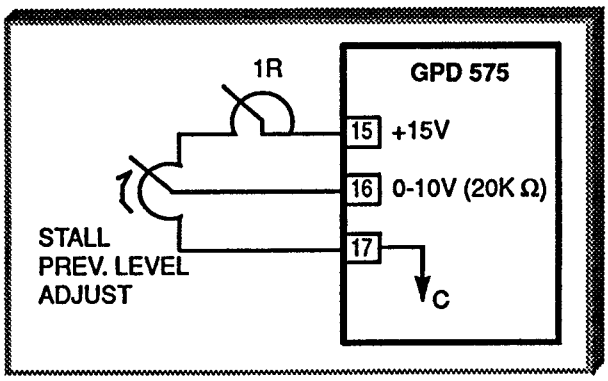


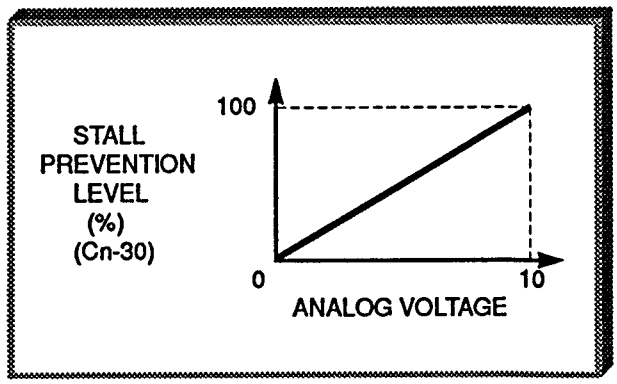
Stall Prevention Sequence at Set Frequency

Sn-19: Multi-function Analog Input (Term. 16)

Data *09*: Stall Prevention Level During Running

The multi-function analog input at terminal 16 may be configured to allow analog control of the stall prevention level for operation at set frequency (from 0% to 100% of the level set in Cn-30).





2.30 THERMAL MOTOR OVERLOAD PROTECTION

Sn-14: Protective Characteristics Select 5 (Motor Protection)

Factory Setting : ***0000***

Data:— X X X ***0*** = Electronic thermal motor protection enabled
— X X X ***1*** = Electronic thermal motor protection disabled

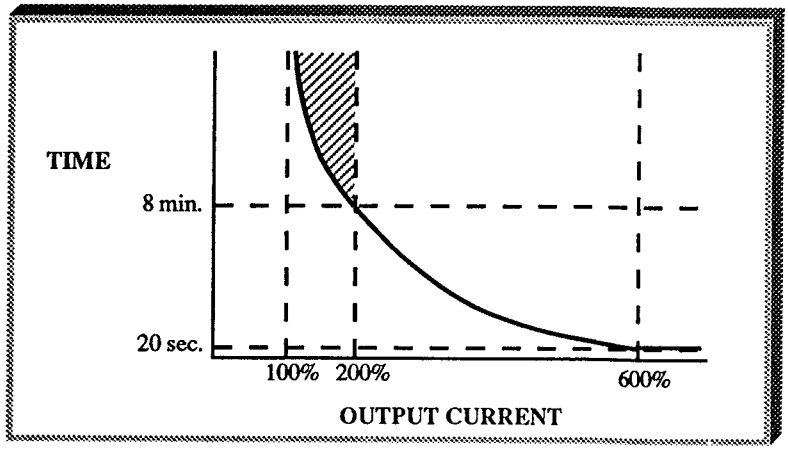
— X X ***0*** X = Electronic thermal protection for variable torque
— X X ***1*** X = Electronic thermal protection for constant torque

— XXXX = 00 = Short time rating disabled
01 = Electronic thermal protection - short time rating enabled
10, 11 = Not Used

The motor protection characteristics determine whether electronic thermal motor protection is enabled or disabled, and what type of load it is for. The thermal overload trip point is the motor rated current value in Cn-09; see Table A3-1 for factory setting.

Electronic thermal overload is a software routine which monitors and protects the motor from an overtemperature condition over time.

The two considerations of the electronic overload routine are drive output current and time. If the drive is running at 100% output or less, electronic overload will never trip. When producing 200% output, the electronic overload will trip after 8 minutes. In theory, if output goes to 600%, the electronic overload will trip after 20 seconds. Thus, the electronic overload trip curve is as shown at left.



There are in fact two overload fault conditions which the GPD 575 can detect, electronic thermal overload (OL1) and output overload (OL2). In reality, the GPD 575 will never output more than 200% rated outpt current without the output overload (OL2) tripping. Thus, electronic thermal overload (OL1) should seldom trip.

2.31 TORQUE COMPENSATION

bn-07: Torque Compensation Gain (KT)

Factory setting: *1.0*
Range: 0.0 to 9.9

This function sets the torque compensation, in increments of 0.1. When the motor has the same capacity as that of the GPD 575, the gain is 1.0. When a smaller motor is used, the gain should be set to 1.5 (typical).

2.32 V/f PATTERN - STANDARD

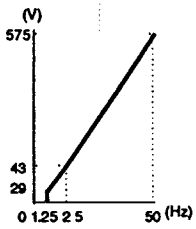
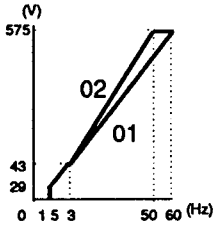
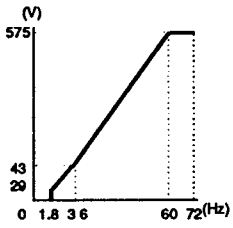
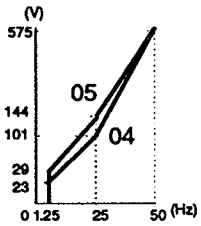
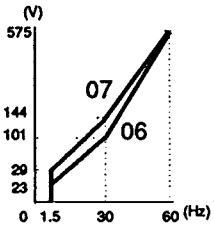
Sn-02: V/f Pattern

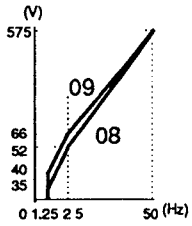
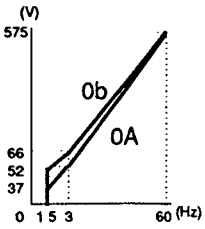
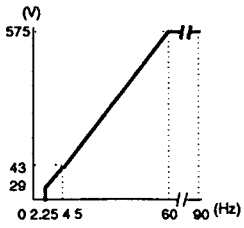
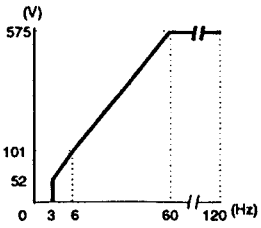
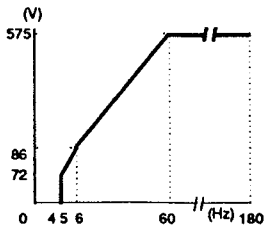
This system constant is factory preset to ***01***. Table 2-4 describes 14 other preset patterns, one of which may be better suited for your specific application and load characteristics. However, if none of these patterns are suitable, this constant can be set to ***0F*** (V/f pattern - custom). The exact pattern is then defined by the settings of Cn-02 thru Cn-08, described in paragraph 2.33.

NOTE

Also see the description of Cn-01 in paragraph 2.33.

Table 2-4. Standard (Preset) V/f Patterns

APPLICATION	SPECIFICATION		Sn-02 DATA	V/f PATTERN
GENERAL PURPOSE	50Hz		00	
	60Hz	60Hz Saturation	01	
		50Hz Saturation	02	
	72Hz		03	
VARIABLE TORQUE *	50Hz	Starting Torque Low	04	
		Starting Torque High	05	
	60Hz	Starting Torque Low	06	
		Starting Torque High	07	

APPLICATION	SPECIFICATION		Sn-02 DATA	V/f PATTERN
HIGH STARTING TORQUE	50Hz	Starting Torque Low	08	
		Starting Torque High	09	
	60Hz	Starting Torque Low	0A	
		Starting Torque High	0b	
CONSTANT OPERATION HORSEPOWER	90Hz		0C	
	120Hz		0d	
	180Hz		0E	

NOTES:

* Consult MagneTek for assistance when these settings are desired.

1. The following conditions must be considered when selecting a V/f pattern:
   - Pattern matches the voltage-frequency characteristics of the motor.
   - Maximum motor speed
2. V/f pattern for high starting torque should be selected for:
   - Wiring distance.
   - Large voltage drop at start.
   - AC reactor connected to GPD 575 input or output.
   - Use of motor rated below GPD 575 max. output.

2.33 V/f PATTERN - CUSTOM

A. Cn-01: Output Voltage Regulator

Factory Setting: ***575.0*** V
Range: 0.0 to 733.1

This constant sets the output voltage to be regulated. If Sn-02 is set to a value in the range ***00*** to ***0E***, then changing Cn-01 will automatically effect the voltage constants (Cn-03, Cn-06 and Cn-08; see section B of this feature description) proportionally. If Sn-02 is ***0F***, then Cn-01 has no effect on the voltage constants, and the output voltage would be determined by the voltages programmed into Cn-03, Cn-06 and Cn-08.

NOTE

Before changing Cn-01, refer to the conditions below.

EXAMPLES:

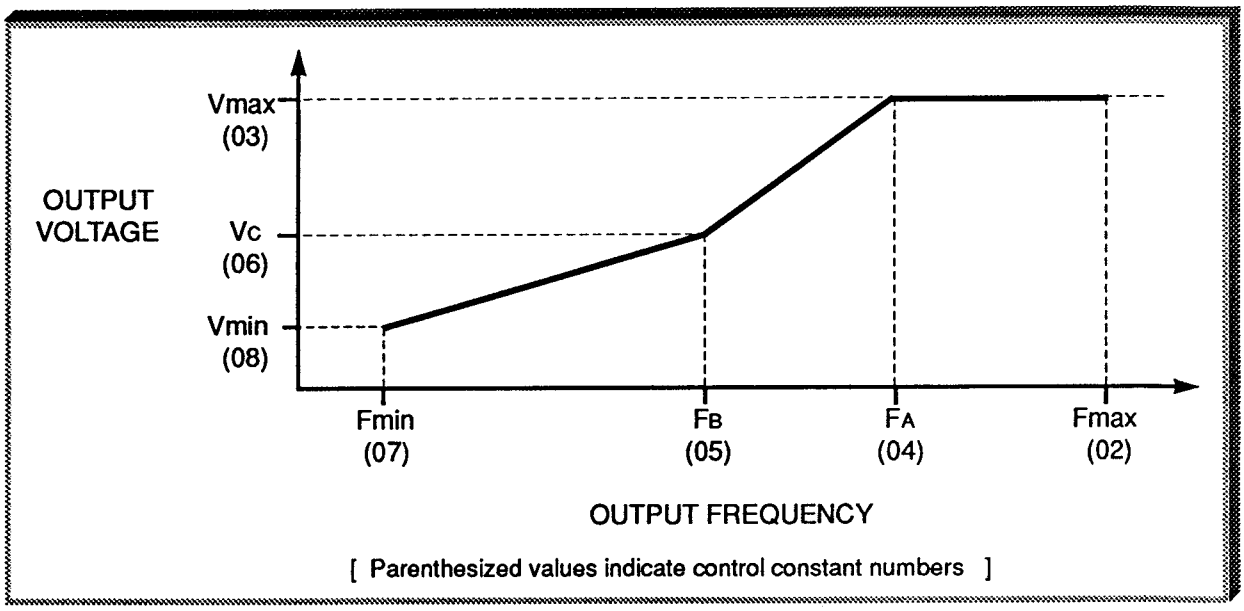
V_{IN}	V_{OUT}	Cn-01
575	575	***575*** ← Factory Setting
500	500	***500***
575	500	***575*** *

* For this condition, Custom V/Hz Pattern should be used (Sn-02 = ***0F***), and Cn-01 set to Input Voltage.

- If Cn-01 > 500, then overvoltage trip point = 1000 VDC
- If Cn-01 ≤ 500, then overvoltage trip point = 875 VDC.

B. **Cn-02:** Frequency – Max. (Fmax)
Cn-03: Voltage – Max. (Vmax)
Cn-04: Frequency – Max. Voltage point (FA)
Cn-05: Frequency – Midpoint (FB)
Cn-06: Voltage – Midpoint (Vc)
Cn-07: Frequency – Min. (Fmin)
Cn-08: Voltage – Min. (Vmin)

These seven control constants define the custom V/f pattern, **only if Sn-02 is set to *0F*.** The illustration below shows how these constants relate to each other in establishing the custom V/f pattern.



V/f Characteristics Set by Cn-02 thru Cn-08

NOTE

To establish a V/f pattern with a straight line from Fmin to FA, set FB = Fmin. The setting of Vc is then disregarded and does not affect the V/f pattern).

IMPORTANT

The constant settings are checked whenever power is applied to the GPD 575, or each time the **DATA/ENTER** key is pressed while in the Program (PRGM) mode. A constant set value failure (***OPE***) will occur if any part of the following relationships among Cn-02 thru Cn-08 is not TRUE:

(a) $Fmax \geq FA \geq FB \geq Fmin$

(b) $Vmax > Vc \geq Vmin$

Section 3. DIGITAL OPERATOR

3.1 GENERAL

The Digital Operator enables the GPD 575 to be operated in either the Drive (DRIVE) mode or the Program (PRGM) mode. The Program mode enables the operator to enter information into the GPD 575's memory to configure the GPD 575 to the application. In the Drive mode, the GPD 575 controls motor operation. Switching between the two modes can only be done when the GPD 575 is in a stopped condition.

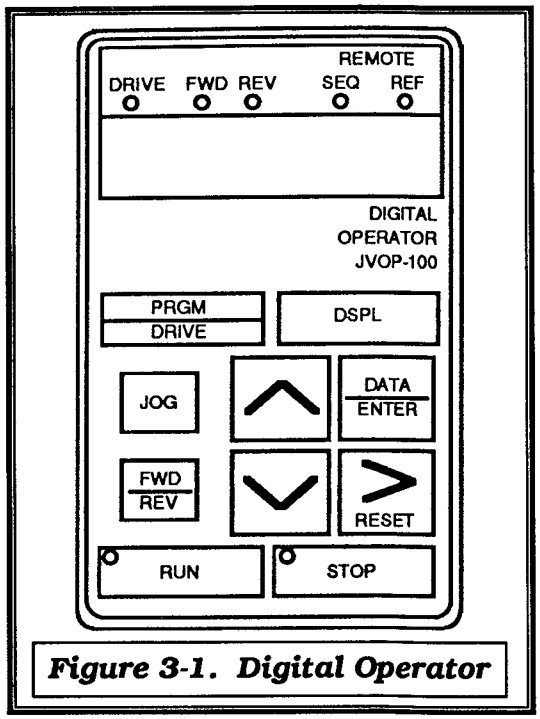


Figure 3-1. Digital Operator

3.2 DISPLAY AND KEYPAD

The Digital Operator has a 5 digit LED display. Both numeric and alphanumeric data can appear on the display, but because 7-segment LEDs are used, the number of alphabetic characters is limited.

Indicator lamps and keys on the Digital Operator are described in Table 3-1.

Table 3-1. Digital Operator Controls

A. INDICATOR LAMPS	
NAME	**FUNCTION**
DRIVE	Lights when the GPD 575 is in the Drive mode of operation.
FWD	Lights when Forward motor run has been selected.
REV	Lights when Reverse motor run has been selected.
REMOTE SEQ	Lights when the GPD 575 is programmed to operate from external RUN and STOP signals.
REMOTE REF	Lights when the GPD 575 is programmed to operate by an external frequency reference signal.
RUN	Off when GPD 575 is in stopped condition; lights steadily when Run signal is active; blinks after Stop signal has been received and GPD 575 output is ramping down. (See Figure 3-2.)
STOP	Lights steadily at initial power-up; blinks after Run signal becomes active but frequency reference is zero; off when GPD 575 output is controlling motor speed. (See Figure 3-2.)

Table 3-1. Digital Operator Controls - Continued

B. KEYPAD KEYS	
LABEL	**FUNCTION**
PRGM / DRIVE	Pressing this key toggles between the Drive and Program modes of operation. Active only when the GPD 575 is in stopped condition.
JOG	IN DRIVE MODE: Pressing and holding this key will initiate Jog function: GPD 575 output goes to programmed Jog Frequency to check motor operation, or to position machine. When key is released, output returns to zero and motor stops. If the motor is already running, pressing this key will have no effect. NOTE: Disabled if the GPD 575 is programmed to use an external JOG input.
FWD / REV	IN DRIVE MODE: Each press of this key will toggle between Forward and Reverse motor run direction. The selected direction is indicated by the **FWD** or **REV** lamp being lit. If the selection is made while the GPD 575 is stopped, it determines the direction the motor will run when started. If the selection is changed during running, the GPD 575 will ramp the motor to zero speed and then ramp it up to set speed in the opposite (i.e. newly selected) direction.
RUN	IN DRIVE MODE: If the GPD 575 is not programmed to operate by external RUN and STOP signals (as indicated by **REMOTE SEQ** lamp being lighted), pressing this key will produce a Run command to initiate GPD 575 output to the motor. However, output frequency will be zero if the frequency reference is zero at the time this key is pressed.
STOP	IN DRIVE MODE: Pressing this key will produce a Stop command. The GPD 575 will decelerate the motor in the programmed stopping manner, then GPD 575 output will be disconnected from the motor.
DSPL	IN DRIVE MODE: Each press of this key will change the display to the next displayable parameter type available for the Drive mode. IN PROGRAM MODE: Each press of this key will change the display to the first available constant number in the next set of constants (An-, bn-, Sn- or Cn-).
DATA / ENTER	IN DRIVE MODE **OR** PROGRAM MODE: When a changeable constant is being displayed, pressing this key will display the constant's set value presently in the GPD 575 memory. After the displayed set value has been changed as desired, pressing this key will write the new set value into GPD 575 memory to replace the old value.

Table 3-1. Digital Operator Controls - Continued

B. KEYPAD KEYS - Continued	
LABEL	**FUNCTION**
> **RESET**	IN DRIVE MODE **OR** PROGRAM MODE: When a changeable constant number or a changeable constant set value is being displayed, pressing this key moves the blinking (i.e. "changeable") position to the next digit to the right. If at the right-most position, this will wrap-around to the first "changeable" position on the left side of the display. IN DRIVE MODE ONLY: When a GPD 575 fault has occurred, pressing this key will reset the fault circuit in the GPD 575.
^	IN DRIVE MODE **OR** PROGRAM MODE: Pressing this key will increase the value of the blinking digit in the display by 1. Increasing stops at the value of ***9***, or ***F***.
v	IN DRIVE MODE **OR** PROGRAM MODE: Pressing this key will decrease the value of the blinking digit in the display by 1. Decreasing stops at the value of ***0***.

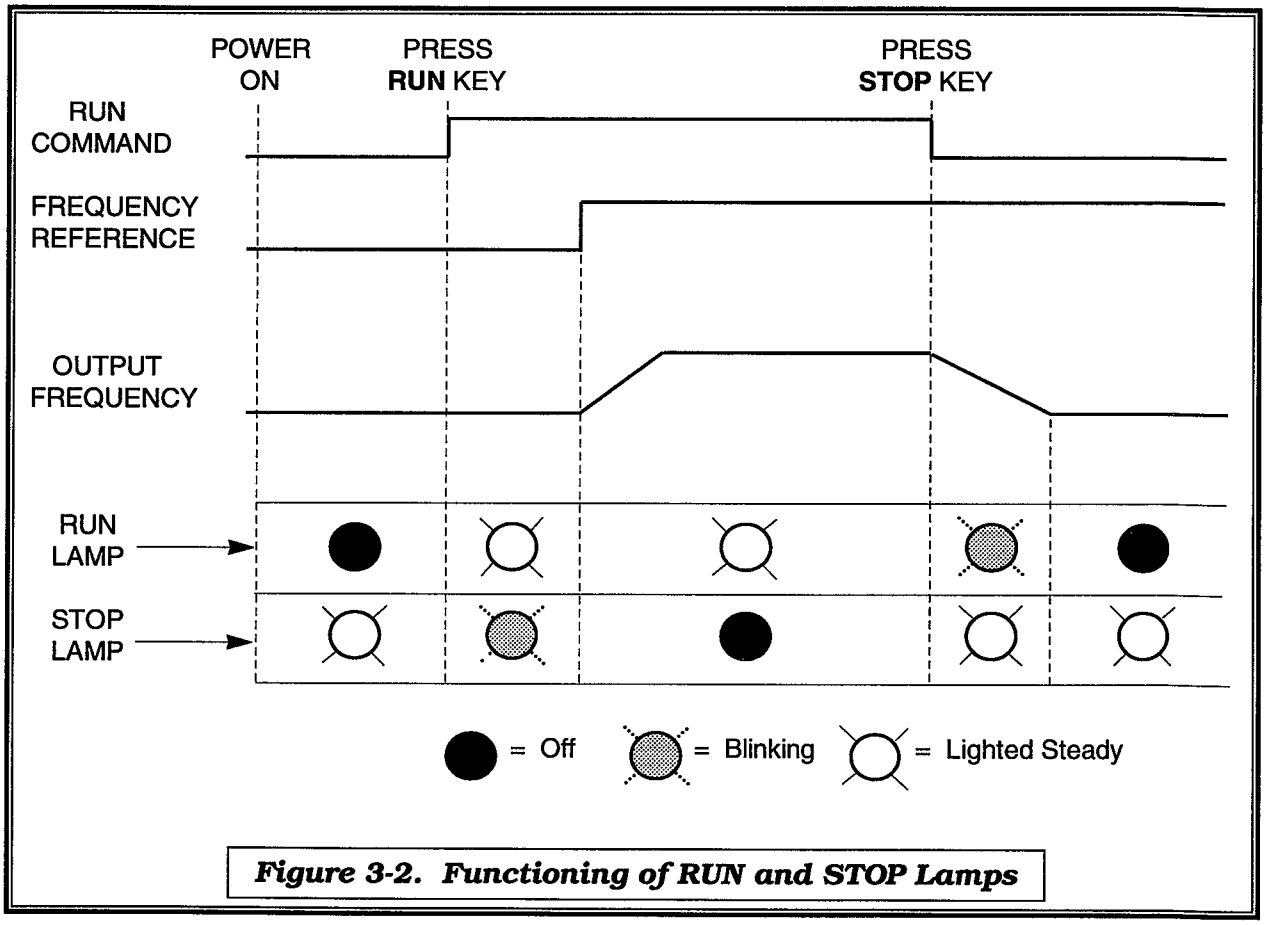
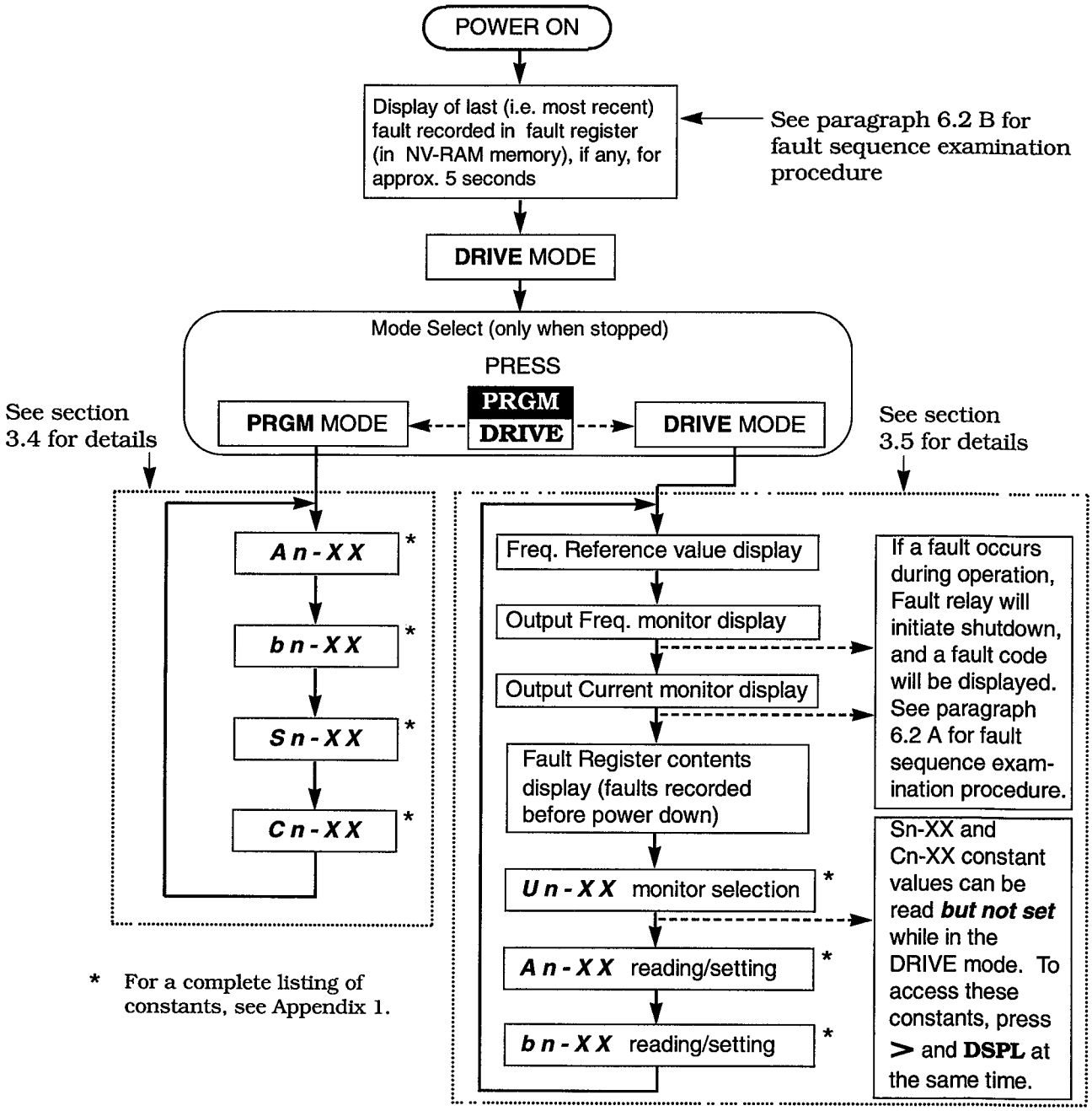


Figure 3-2. Functioning of RUN and STOP Lamps

3.3 COMPARISON OF PROGRAM MODE AND DRIVE MODE

Displays that appear on the Digital Operator differ according to the selected mode of operation. The **PRGM** (Program) mode is used to change constant settings in the Drive's memory to configure it to the requirements of the application. The **DRIVE** mode is used primarily to control (i.e. start and stop) Drive output for motor/machine operation. The only constants that can be changed while in the **DRIVE** mode (An- or bn- settings, or Un- display selection) are those that will not have a critical effect on operating characteristics.

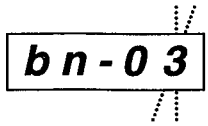
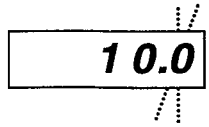
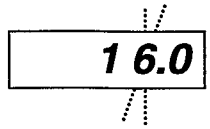
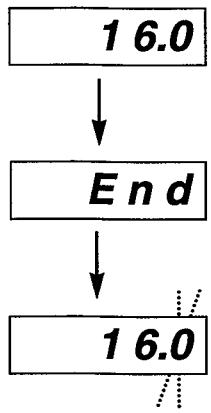
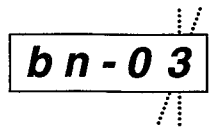
The constant group to be displayed, in either mode, is selected by pressing the **DSPL** key.



3.4 PROGRAM MODE OPERATION

ACTION	DESCRIPTION	DISPLAY
Apply Power	– If the GPD 575 fault circuit detects a fault, a blinking Fault code will be displayed for 5 seconds. – Then the Frequency Reference setting display appears.	F0 0.0 0
Press **PRGM / DRIVE** Key to Select Program Mode	**DRIVE** lamp turns off. Display changes to first Frequency Reference memory set number. (See next page for changing settings.)	A n - 0 1
Press **DSPL** Key	Display changes to first Run Operative set number. (See next page for changing settings.)	b n - 0 1
Press **DSPL** Key	Display changes to first System Constant set number. (See next page for changing settings.)	S n - 0 1
Press **DSPL** Key	Display changes to first Control Constant set number. (See next page for changing settings.)	C n - 0 1
Press **DSPL** Key	Cycle begins again with first Frequency Reference memory set number.	
After All Programming is Completed, Press **PRGM / DRIVE** Key to Return to Drive Mode	**DRIVE** lamp lights. Display shows the Frequency Reference setting.	F0 0.0 0

Procedure For Changing a Setting:

ACTION	DESCRIPTION	DISPLAY
Press >, ^ and v Keys as Necessary Until Display Shows Desired Number	Blinking position of display shifts to the left. Value of blinking digit increases or decreases when keys are pressed. EXAMPLE: Select bn-03, Accel. Time 2.	
Press **DATA ENTER** Key to Display Current Setting	Display shows the value currently stored in memory for the constant. NOTE: Factory setting for bn-03 is ***10.0*** sec.	
Press >, ^ and v Keys as Necessary Until Display Shows Desired Setting	Blinking position of display shifts to the left. Value of blinking digit increases or decreases when keys are pressed. EXAMPLE: Set bn-03 to ***16.0*** sec.	
Press **DATA ENTER** to Store New Setting	Display lights steady for a short time, then ***End*** is displayed for approx. 1 sec. Then setting is displayed again, with one digit blinking.	
Press **DSPL** Key to Return to Setting Number Selection	Display returns to beginning of cycle for selection of setting number to be programmed (see preceding page).	

A. Changing Display With DSPL Key

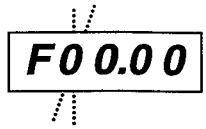
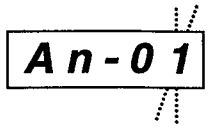
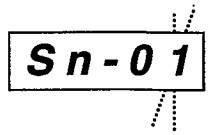
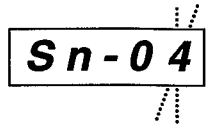
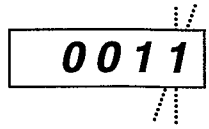
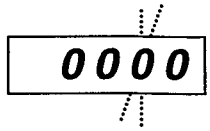
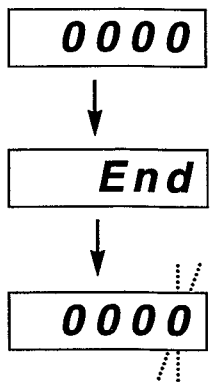
ACTION	DESCRIPTION	DISPLAY
Apply Power	— If the GPD 575 fault circuit detects a fault, a blinking Fault code will be displayed for 5 seconds. — Then the Frequency Reference value appears.	F0 0.0 0
Press **DSPL** Key	Display changes to present Output Frequency value.	0.0 0
Press **DSPL** Key	Display changes to present Output Current value.	0.0 A
Press **DSPL** Key	Display changes to last Fault code. (If no fault has occurred, cycle skips to next display).	U 1 U u 1 EXAMPLE: Main Circuit Undervoltage Trip
Press **DSPL** Key	Display changes to first Monitor Display number.	U n - 0 1 *
Press **DSPL** Key	Display changes to first Frequency Reference memory setting number.	A n - 0 1 *
Press **DSPL** Key	Display changes to first Run Operative setting number.	b n - 0 1 *
Press **DSPL** Key	Cycle begins again with Frequency Reference display.	

* Use ∧ key to step through the list of constants, and **DATA** key to display An or bn set value, or information called for by Un constant.

B. Drive Operation By Means of Digital Operator (Using Factory Settings)

ACTION	DESCRIPTION	DISPLAY
Apply Power	The Frequency Reference set value appears.	F0 0.0 0
Use ➤, ^, and ˅ Keys as Necessary Until Display Shows Desired Run Frequency	Blinking position of display shifts to the left. Value of blinking digit increases or decreases when keys are pressed.	F6 0.0 0
Press **DATA / ENTER** Key To Write New Value Into Memory	Displayed value stops blinking for approximately 2 seconds, then digit resumes blinking.	F6 0.0 0 ↓ F6 0.0 0
Press **FWD / REV** Key To Select Desired Direction of Motor Rotation	Observe **FWD** and **REV** indicate lamps on Digital Operator to see which direction motor will rotate when GPD 575 is started.	FWD ○ REV ● EXAMPLE: FWD Run selected
Press **DSPL** Key	Present Output Frequency is displayed.	0.0 0
Press **JOG** Key	Check motor operation at programmed Jog Frequency operating speed.	6.0 0
Press **RUN** Key	GPD 575 output increases to Frequency Reference level, at programmed Accel Rate. Motor speed increases accordingly.	6 0.0 0
Press **STOP** Key	Motor speed decreases under GPD 575 control, at preset deceleration rate, to zero. Motor remains stopped.	0.0 0

C. Drive Operation By Means of External Terminal Signals

ACTION	DESCRIPTION	DISPLAY
Apply Power	The Frequency Reference set value appears.	
Press **PRGM / DRIVE** Key to Select Program Mode	**DRIVE** lamp turns off. First Frequency Reference memory set number is displayed.	
Press **DSPL** Key Twice	First System Constant set number is displayed.	
Use >, ^, and v Keys as Necessary Until Display Shows ***Sn-04***	Blinking position of display shifts to the left. Value of blinking digit increases or decreases when keys are pressed.	
Press **DATA / ENTER** Key to Display Current Setting	The value currently stored in memory for the constant is displayed. NOTE: Factory setting for Sn-04 is *0011* .	
Press >, ^ and v Keys as Necessary Until Display Shows *0000*	Blinking position of display shifts to the left. Value of blinking digit increases or decreases when keys are pressed.	
Press **DATA / ENTER** Key To Write New Setting Into Memory	Displayed lights steady for a short time, then ***End*** is displayed for approx. 1 sec. Then setting is displayed again, with one digit blinking.	

C. Drive Operation By Means of External Terminal Signals - Continued

ACTION	DESCRIPTION	DISPLAY
Press **PRGM / DRIVE** Key to Return to Drive Mode	DRIVE lamp lights. Display shows the Frequency Reference value (as set by input at terminals 13 or 14).	F0 0.0 0
Adjust External Speed Reference To Desired Level	Observe display as speed reference is adjusted. Stop when display shows desired output frequency. EXAMPLE: Adjust for 60Hz output.	F6 0.0 0
Press **DSPL** Key to Show Output Frequency	Present Output Frequency is displayed.	0.0 0
Close Contact at Terminals 7 & 13 To Jog Motor	Check motor operation at programmed Jog Frequency operating speed.	6.0 0
Close Contact at Terminals 1 & 11 To Perform Forward Run	GPD 575 output increases to Frequency Reference level, at programmed Accel Rate. Motor speed increases accordingly.	6 0.0 0
Open Contact at Terminals 1 & 11 To Stop Drive	Motor speed decreases under GPD 575 control, at preset Decel Rate, to zero.	0.0 0

Section 4. INITIAL START-UP ("LOCAL" CONTROL)

4.1 PRE-POWER CHECKS

- Wires properly connected and no erroneous grounds exist.

- All debris removed from inside GPD 575 enclosure. Check especially for loose wire clippings.

- All mechanical connections inside GPD 575 are tight.

- Motor not connected to load.

- Verify that the power voltage select connector in the GPD 575 (see Figure 4-1) is positioned correctly for the input power line voltage. Voltage is preset to 575V at the factory. Reposition if required.

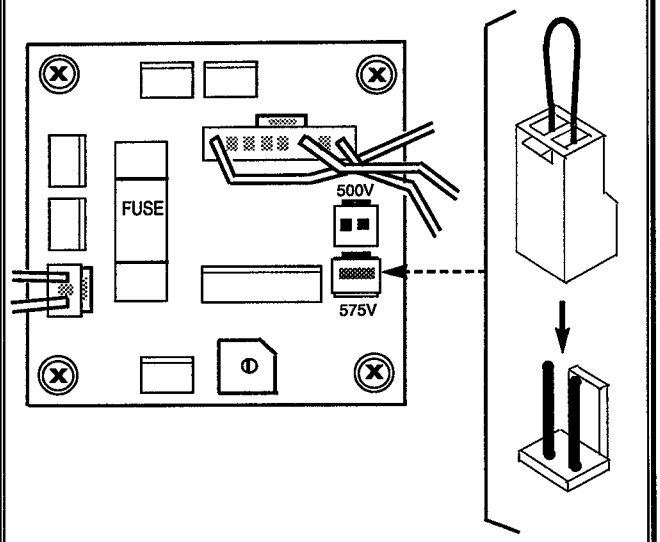


Figure 4-1. Power Voltage Selection in GPD 575

4.2 TEST RUN USING DIGITAL OPERATOR ("LOCAL" CONTROL)

The operation described in Table 4-1 and shown in Figure 4-2 is for a standard 60 Hz motor.

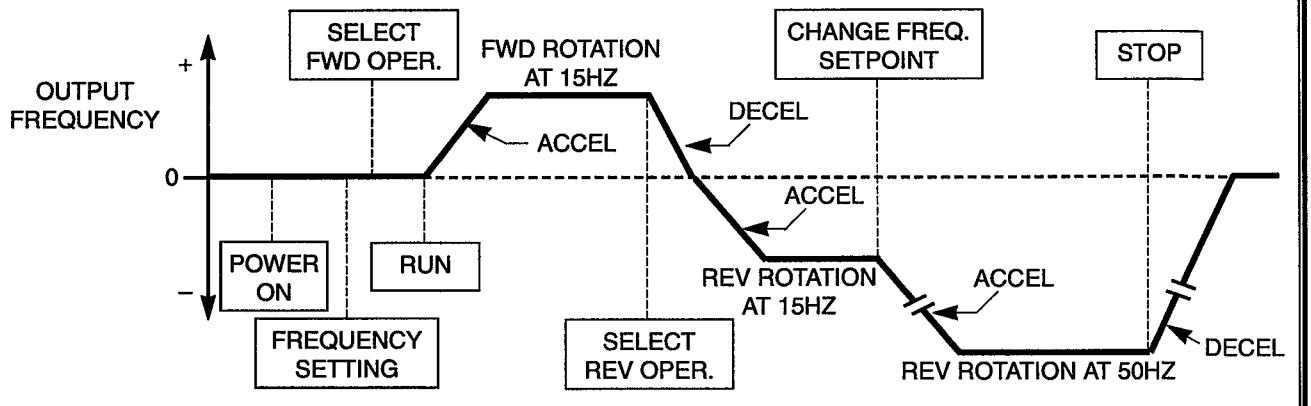


Figure 4-2. Example of Simple Operation

Table 4-1. Test Run With Digital Operator

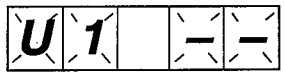
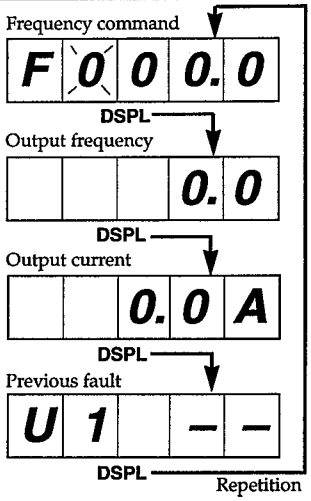
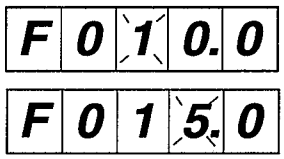
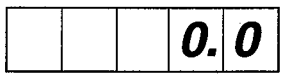
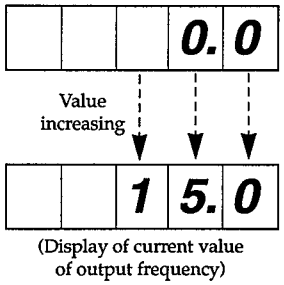
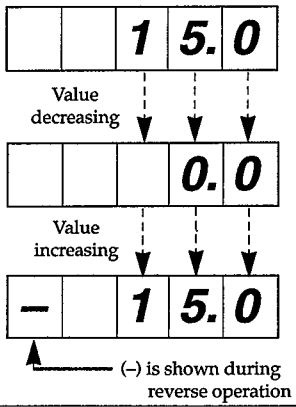
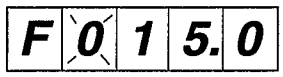
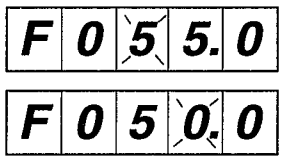
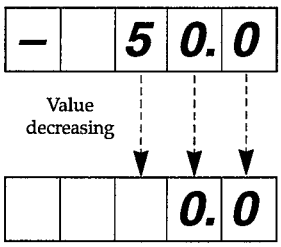
OPERATING PROCEDURE	OPERATION AT DIGITAL OPERATOR	DIGITAL DISPLAY	DESCRIPTION
Power On	Red lamp at **STOP** key lights. (**REMOTE** lamp remains off).	 blinking for 5 seconds, then last selected monitor display (see below).	When power is applied, the last display before power off is indicated.
Frequency Setting	Select Drive mode by using **PRGM/DRIVE** key Red **DRIVE** lamp lights. Press **DSPL** key, as necessary, until frequency command is displayed		GPD 575 is ready for controlling motor operation. Monitor function display selection. *See "DISPLAYING FAULT SEQUENCE" in Section 6.
	EXAMPLE: Set frequency command to 15 Hz: Move to the setting digit by using > and make the setting with ^ and v . Store the frequency command value with **DATA/ENTR key**. (This data is stored even when the power is off). Press **DSPL** key once to change display to monitor output frequency.		Initial setting becomes frequency command.
Select Forward Operation	Select the rotation of motor with **FWD/REV** key. (Red FWD lamp lights)		GPD 575 is set for forward motor operation, but is still in "stopped" condition.
Run	Press **RUN** key. (Red lamp lights Red lamp at **STOP** key goes off).		GPD 575 output and motor speed increase smoothly at preset acceleration rate, then hold steady at 15 Hz.

Table 4-1. Test Run With Digital Operator - Continued

OPERATING PROCEDURE	OPERATION AT DIGITAL OPERATOR	DIGITAL DISPLAY	DESCRIPTION
Select Reverse Operation	Press **FWD/REV** key. (Red **FWD** lamp goes off, and red **REV** lamp lights).		GPD 575 output (and motor speed) decreases smoothly, at preset deceleration rate, to zero. Then motor begins rotation in reverse direction, accelerating smoothly, then holds steady at 15 Hz
Change Frequency Setpoint	Press **DSPL** key repeatedly until frequency command is again displayed.		Motor continues running at 15 Hz
	Example: Set 50 Hz as new value of frequency command. Change the frequency set point by using **>** , **^** and **v** .		Motor continues running at 15 Hz
	Store frequency command value by **DATA/ENTR** key.		Motor immediately begins accelerating, then holds steady at 50 Hz
	Press **DSPL** key once to change display to monitor output frequency		
Stop	Press **STOP** key. (Red lamp lights. Red lamp at **RUN** key goes off). **REV** lamp stays lit **DRIVE** lamp stays lit		Motor speed decreases under GPD 575 control, at preset deceleration rate, to zero. (See NOTE 1) Motor remains stopped Lamps and display remain on as long as power is applied.

NOTES:

1. For coast-to-stop operation, refer to Appendix 1, Sn-04.

4.3 PRE-OPERATION CONSIDERATIONS

- After completing the start-up, connect the motor to the load.

- Additional control circuit wiring can be added, and constants in the GPD 575 can be programmed to configure the drive system to your specific application, including "Remote" (2-wire or 3-wire) Control. (See Section 5.)

4.4 STORAGE FUNCTION

The GPD 575 uses internal NV-RAM to store information when power is removed or in the event of a power failure. Therefore, when power is reapplied, operation will begin at the same state as when power was removed.

The following information is stored:

1. Last monitor display selection (in Drive mode).

2. Last frequency command setting and forward/reverse selection from Digital Operator.

3. The sequence of failure conditions that occurred before power was removed (including content of CPF failure).

Section 5. OPERATION AT LOAD

After completing the start-up, and programming of constants, turn off the AC main circuit power. Make additional wiring connections required for the external control functions selected by the constant programming. Connect the driven machine to the motor. Verify that the driven machine is in running condition, and that no dangerous conditions exist around the drive system.

OPERATING PRECAUTIONS

- Before applying a RUN command to the GPD 575, verify that the motor is stopped. If the application requires the capability of restarting a coasting motor, control constant 13 (Cn-13) must be set to give DC Braking Time at Start.

- The motor cooling effect lowers during low-speed running. The torque needs to be reduced in accordance with the frequency. For the reduction ratio, refer to the motor catalog or technical sheet.

- **NEVER** use a motor whose current exceeds the GPD 575 rating.

- When two or more motors are operated by one GPD 575, verify that the total motor current **DOES NOT EXCEED** the GPD 575 rating.

- When starting and stopping the motor, use the operation signals (RUN/STOP, FWD/REV), NOT the magnetic contactor on the power supply side.

Run the motor under load with control by the Digital Operator using the same procedure as for the Test Run (Table 4-1). If Digital Operator is used in combination with external commands or external commands only are used, the procedure must be altered accordingly.

For preset starting (one-touch operation after setting the frequency), perform the following:

1. Set the frequency and press **RUN**. Motor accelerates, at the rate corresponding to the preset accel time, to the preset frequency. The accel time is set too short relative to the load if the RPM of the accelerating motor does not increase smoothly (stall prevention during acceleration is functioning) or if a fault is displayed on the Digital Operator.

2. Press **STOP**. Motor decelerates, at the rate corresponding to the preset decel time, to a stop. The decel time is set too short relative to the load if the RPM of the decelerating motor does not decrease smoothly (stall prevention during deceleration is functioning) or if a fault is displayed on the Digital Operator.

Section 6. FAILURE INDICATION AND DETAILS

6.1 GENERAL

A failure in the GPD 575 can fall into one of two categories.

A blinking "Alarm" indication is a warning that a GPD 575 trouble condition will soon occur, or that a problem in the external circuitry exists. The GPD 575 will continue to operate during an "Alarm" indication.

A steady "Fault" indication is displayed when the GPD 575's Fault relay has tripped (GPD 575 shutdown). The motor coasts to a stop, and a fault signal output is present at control circuit terminals 18 - 20.

Table 6-1. Failure Indication and Details

INDICATION (DISPLAY)	FAULT	DESCRIPTION
bb (blinking)	External Base Block command	Base Block command at multi-function terminal is active, shutting off GPD 575 output (motor coasting). Temporary condition, cleared when input command is removed.
CPF02	Baseblock circuit failure	GPD 575 failure.
CPF03	NV-RAM (S-RAM) fault	
CPF04	NV-RAM (BCC, Access Code) fault	
CPF05	A/D converter failure in CPU	
CPF06	Optional connection failure	Improper installation or wiring of option card.
EF (blinking)	Simultaneous forward and reverse operation commands	Fwd Run and Rev Run commands are both closed for more than 500 ms. Removing one command will allow drive operation.
EF3	Ext. fault signal at term. 3	A fault condition has occurred in the external circuit(s) monitored by the contact providing input to the indicated terminal. If display is steady, GPD 575 is in Stop mode, if display is blinking, the terminal is programmed to allow continued operation after receiving fault iput.
EF5	Ext. fault signal at term. 5	
EF6	Ext. fault signal at term. 6	
EF7	Ext. fault signal at term. 7	
EF8	Ext. fault signal at term. 8	
Err	Constant write-in fault	Temporary display, in Program mode, indicating that constant setting was not written into EPROM memory.
FU	Fuse blown	DC Bus fuse has cleared. Check for short circuit in output
oC	Overcurrent	GPD 575 output current exceeds 200% of transistor rated current.

Table 6-1. Failure Indication and Details - Continued

INDICATION (DISPLAY)	FAULT	DESCRIPTION
oH	Heat sink overheated	Fin temperature exceeds 90° C (194° F)
oH2 (blinking)	External overheat	External temperature monitoring circuit(s) detected an overtemperature condition and produced a fault input.
oL1	Overload	Protect the motor. Motor thermal overload protection has tripped.
oL2	Overload	Protect the GPD 575. Drive overload protection has tripped.
oL3 (blinking)	Overload	GPD 575 output torque exceeds the set Overtorque Detection level, but the GPD 575 is programmed for continued operation at overtorque detection.
oL3	Overload	GPD 575 output torque exceeds the set Overtorque Detection level, and GPD 575 is programmed for coast to stop at overtorque detection.
oPE01*	kVA constant setting fault	Sn-01 setting is incorrect
oPE02*	Constant setting range fault	An-XX, bn-XX, Cn-XX, or Sn-XX setting fange fault.
oPE03*	Constant set value fault	Sn-15 to -18 (multi-function input) set value fault.
oPE04*	Constant set value fault	PG constant, number of poles, or PG division rate set incorrectly.
oPE10*	Constant set value fault	Cn-02 to -08 (V/f data) set incorrectly.
oPE11*	Constant set value fault	One of the following conditions was detected: • Cn-23 > 5 kHz and Cn-24 ≤ 5 kHz • Cn-25 > 6 and Cn-24 > Cn-23
ou (blinking)	Overvoltage	Internal monitor of DC Bus voltage indicates that input AC power is excessively high, while GPD 575 is in stopped condition.
ou	Overvoltage (OV)	Detection level: Approx. 1000V for 575V GPD 575; Approx 875V for 500V GPD 575
rr	Regenerative transistor failure	
rH	Braking resistor unit overheated	
Uu (blinking)	Low voltage (Power UV)	Internal monitor of DC Bus voltage indicates that input AC power is below Undervoltage detection level, while GPD 575 is in stopped condition.
Uu1	Low voltage (Power UV)	Occurs two seconds after detection of low voltage. (See "Undervoltage" specification (under "Protective Functions) in Appendix 2.)
Uu2	Low voltage (Control UV)	Control circuit becomes low voltage during operation.
Uu3	Low voltage (MC-ANS fault)	Main circuit magnetic contactor does not operate correctly.

* These fault displays occur only when in the Program mode, when changing back to Drive mode from Program mode, or when applying power to the GPD 575.

6.2 DISPLAYING FAULT SEQUENCE

Whenever the Fault relay trips (GPD 575 shutdown), the display code of the fault that caused the trip (except for Illegal Constant or Control Function Hardware) is entered into a register in NV-RAM memory. This register retains, in sequence, that fault code and those of up to three immediately preceding the shutdown failure.

The contents of this register can be displayed when the GPD 575 is in the Drive mode.

A. After GPD 503 Fault Shutdown (With Power Still Applied).

Table 6-2. Displaying Fault Sequence After Fault Shutdown

STEP	OPERATION PROCEDURE	DIGITAL DISPLAY
1	Before a RESET command is entered, the fault that caused Fault trip (shutdown) is displayed.	oC
2	Press ^. The display indicates that this is currently the first code in the memory register.	1 oC
3	Continue pressing ^ to display the other codes in the memory register. After the last register code is displayed, the sequence will return to the first code.	2 oU 3 oH 1 oC

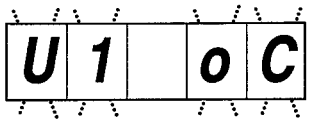
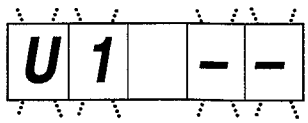
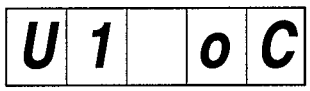
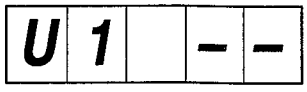
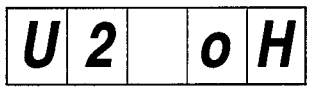
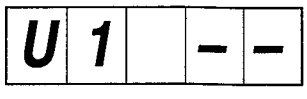
After the fault sequence has been examined, troubleshoot the most recent fault or enter a RESET command (from Digital Operator or external signal) to prepare the GPD 575 for restart of operation.

B. At Power-Up.

NOTE

In Table 6-3, digital display A occurs if there was a Fault trip (shutdown) before turning off power, and digital display B occurs if there was no shutdown.

Table 6-3. Displaying Fault Sequence After Power-up

STEP	OPERATION PROCEDURE	DIGITAL DISPLAY A	DIGITAL DISPLAY B
1	Turn on power.	 Blinking for 5 seconds, then last selected monitor display.	 Blinking for 5 seconds, then last selected monitor display.
2	Press ^ while holding **DSPL/ENTR** to select Previous Fault Display.		
3	Continue pressing ^ to display the other codes in the memory register. After the last code is displayed, the sequence will return to the first code.	 	 

After the fault sequence has been examined, refer to paragraph 3.4 B.

Section 7. TROUBLESHOOTING

If the GPD 575 malfunctions, locate the cause and take corrective action by following the flowcharts given in this section.

A. TROUBLESHOOTING MOTOR SYMPTOMS

B. TROUBLESHOOTING FOR FAULT CONDITIONS

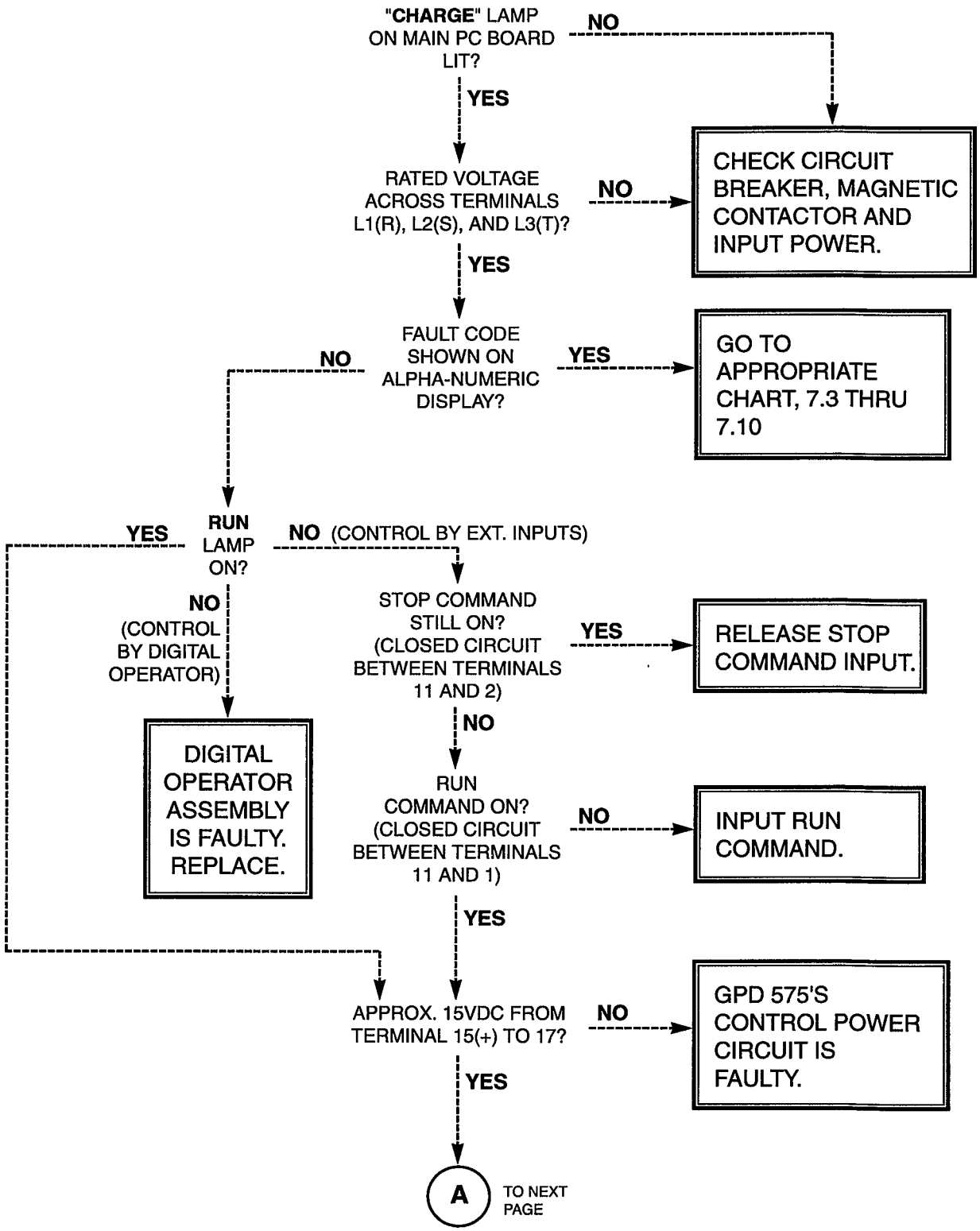
OSCILLOSCOPE CHASSIS MAY BE AT VOLTAGES POTENTIALLY HAZARDOUS TO LIFE IF NOT PROPERLY GROUNDED. IF OSCILLOSCOPE IS USED TO MEASURE HIGH VOLTAGE WAVEFORMS, USE ONLY A DUAL CHANNEL OSCILLOSCOPE IN THE DIFFERENTIAL MODE WITH X100 PROBES. ALWAYS CONNECT OSCILLOSCOPE CHASSIS TO EARTH GROUND.

VOLTAGES DANGEROUS TO LIFE EXIST WHEN EQUIPMENT IS OPEN AND ENERGIZED. DO NOT WORK ALONE.

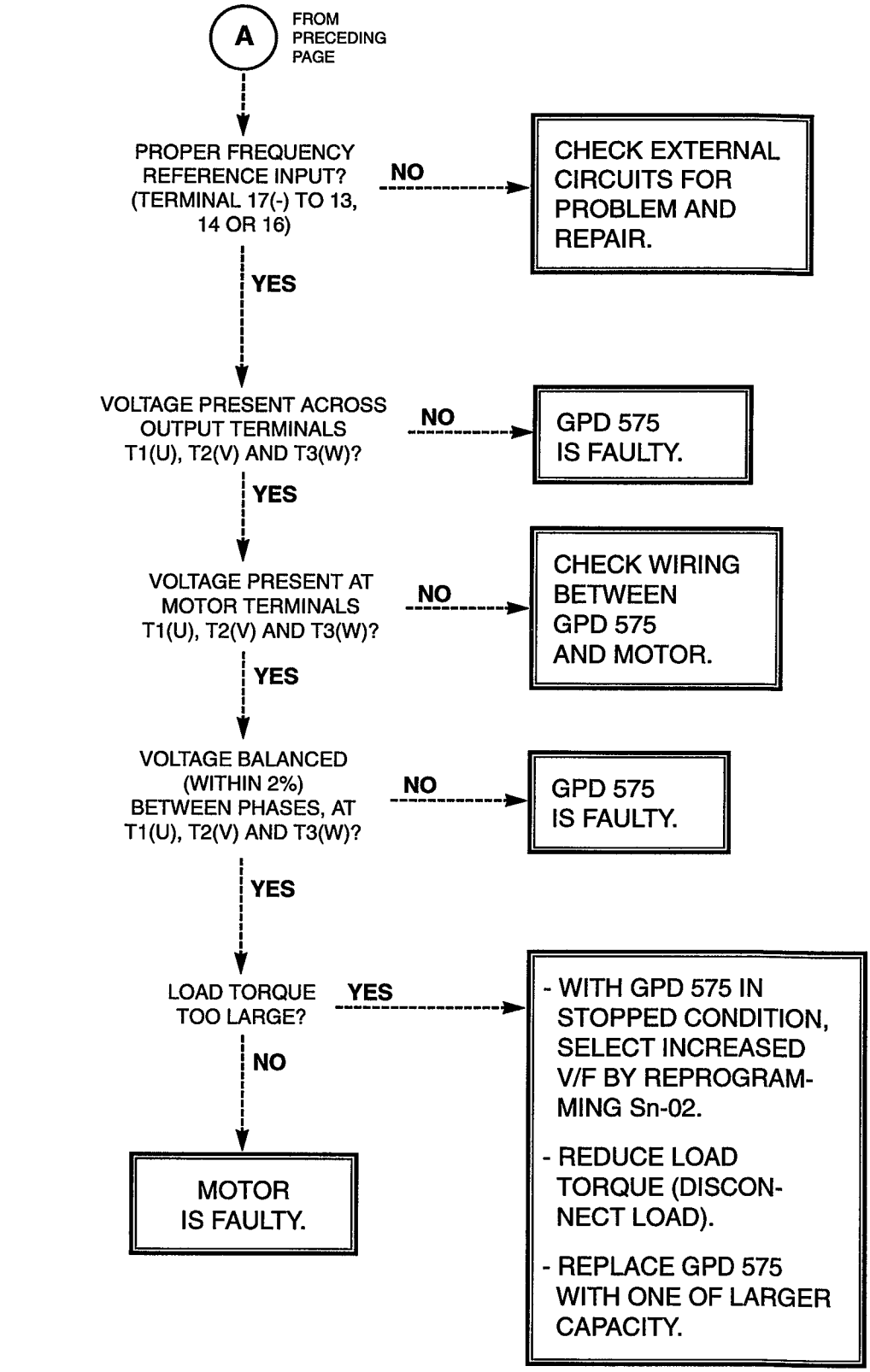
TO PREVENT EQUIPMENT DAMAGE ALWAYS REMOVE INCOMING THREE-PHASE POWER BEFORE TEST EQUIPMENT IS CONNECTED OR REMOVED.

TROUBLESHOOTING CHART 7.1

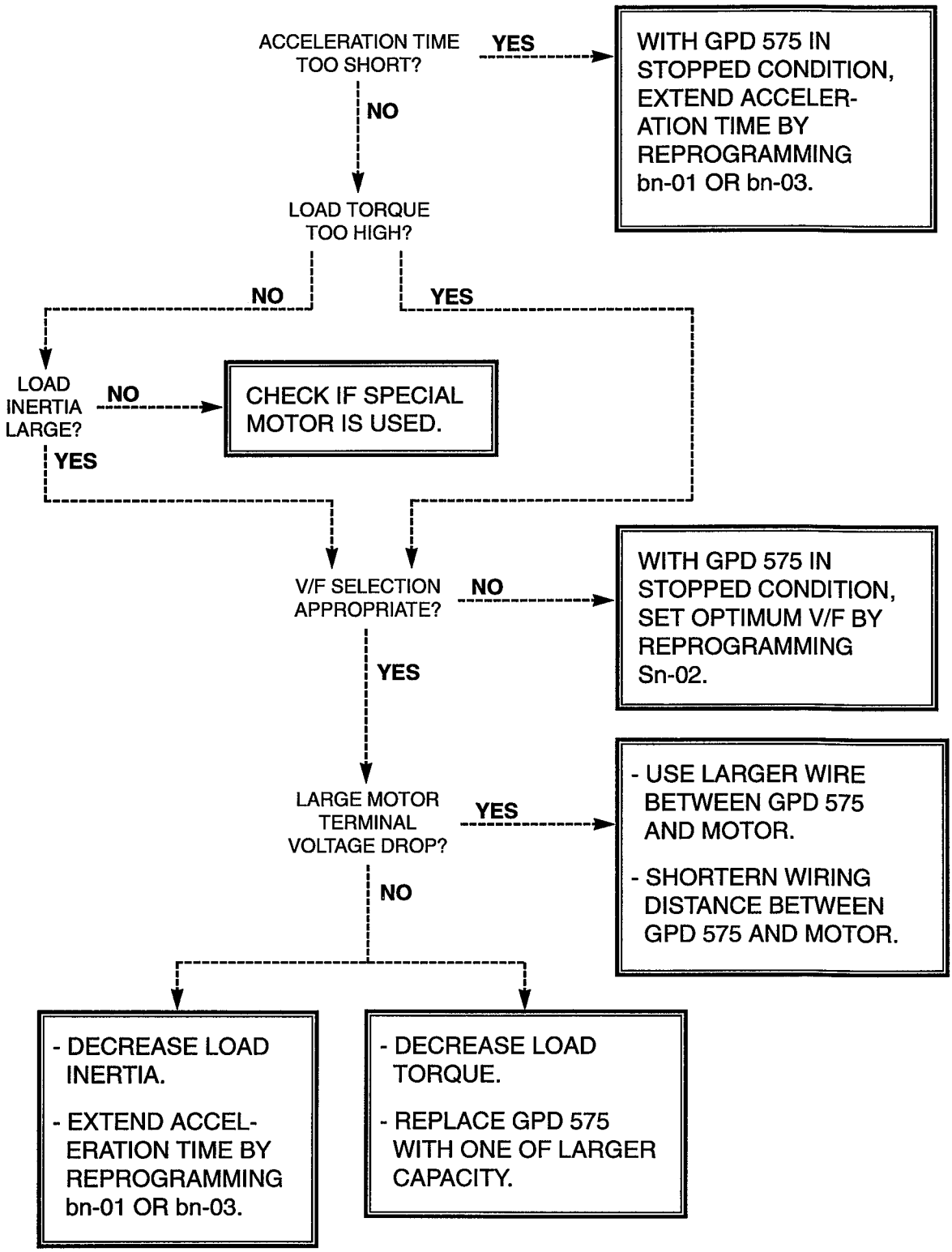
MOTOR WILL NOT RUN



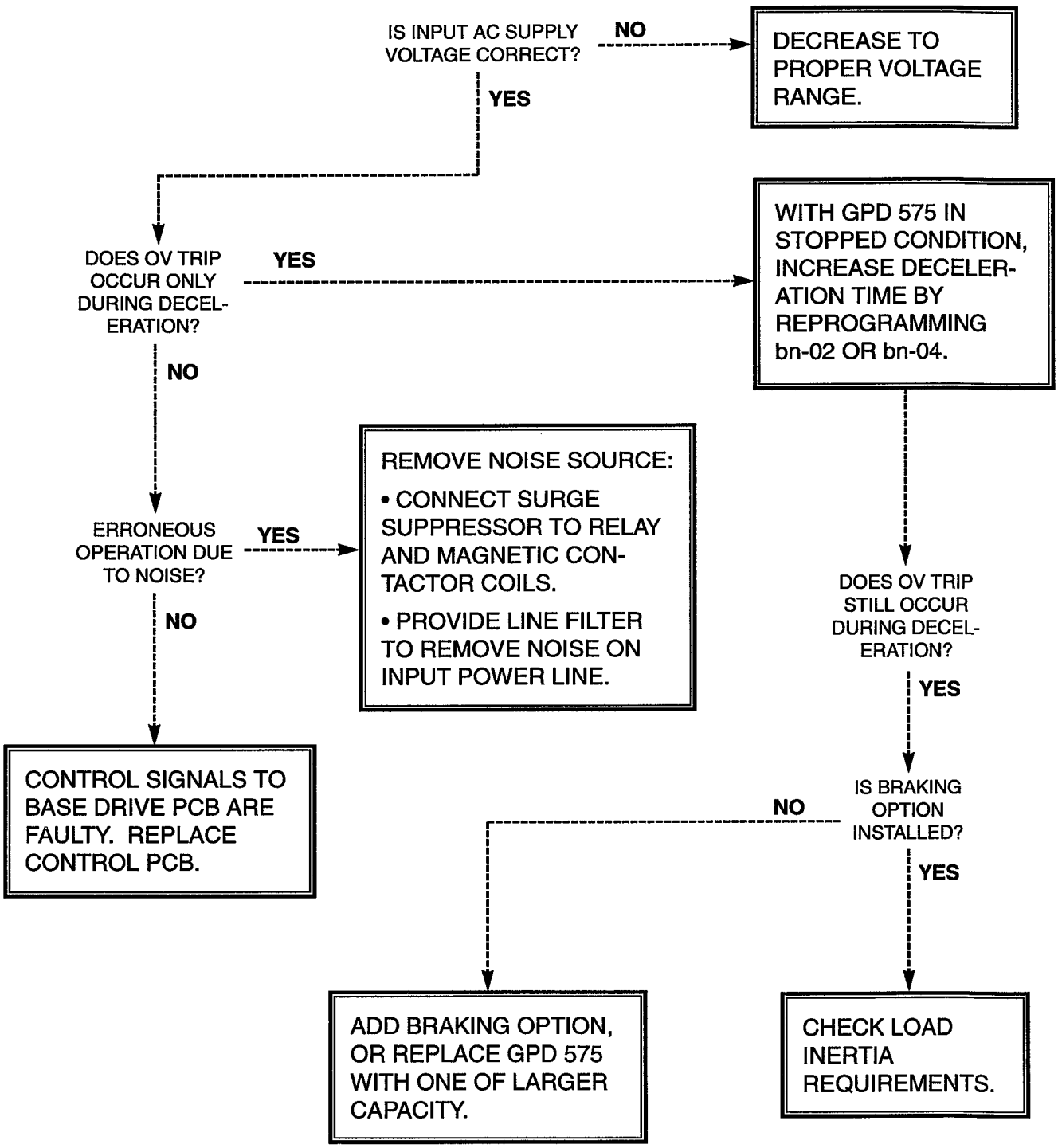
TROUBLESHOOTING CHART 7.1 (Continued)



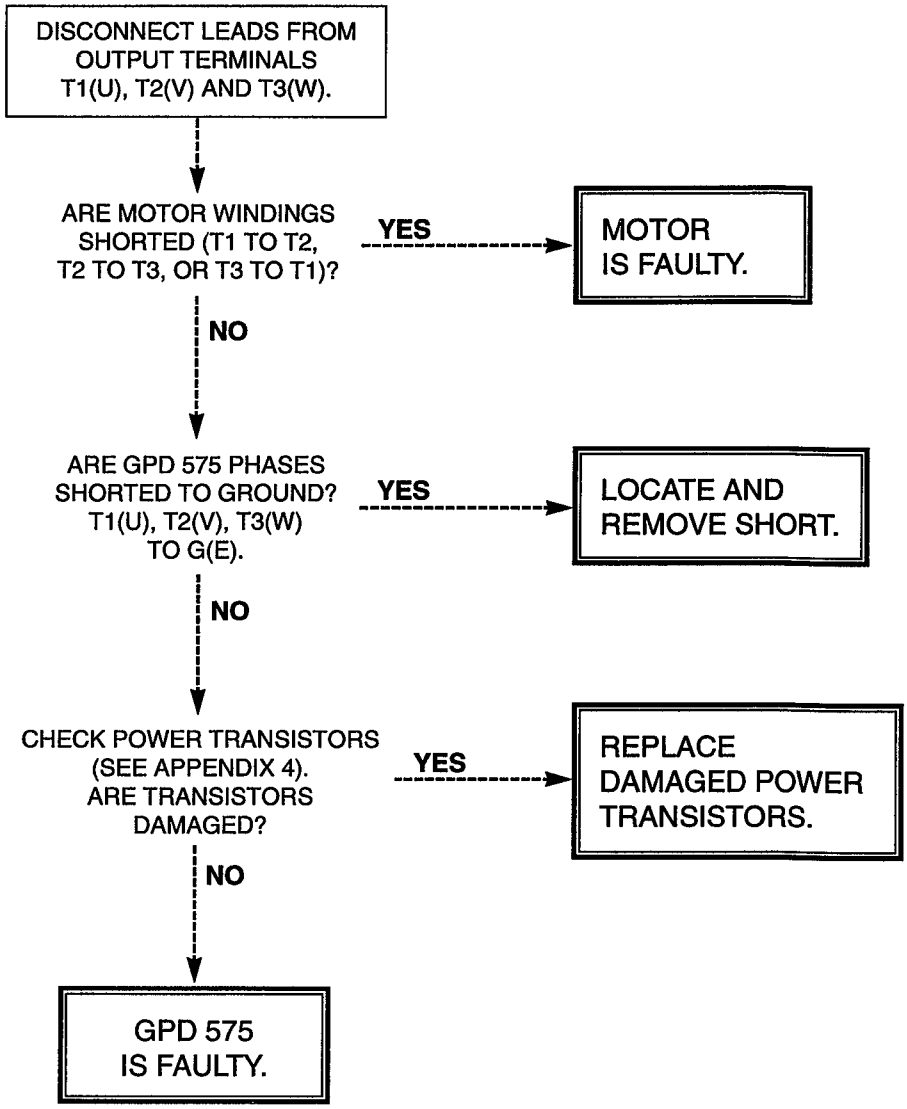
MOTOR STALLS DURING ACCELERATION



OVERVOLTAGE (ou) FAULT INDICATION



BLOWN FUSE (FU) FAULT INDICATION

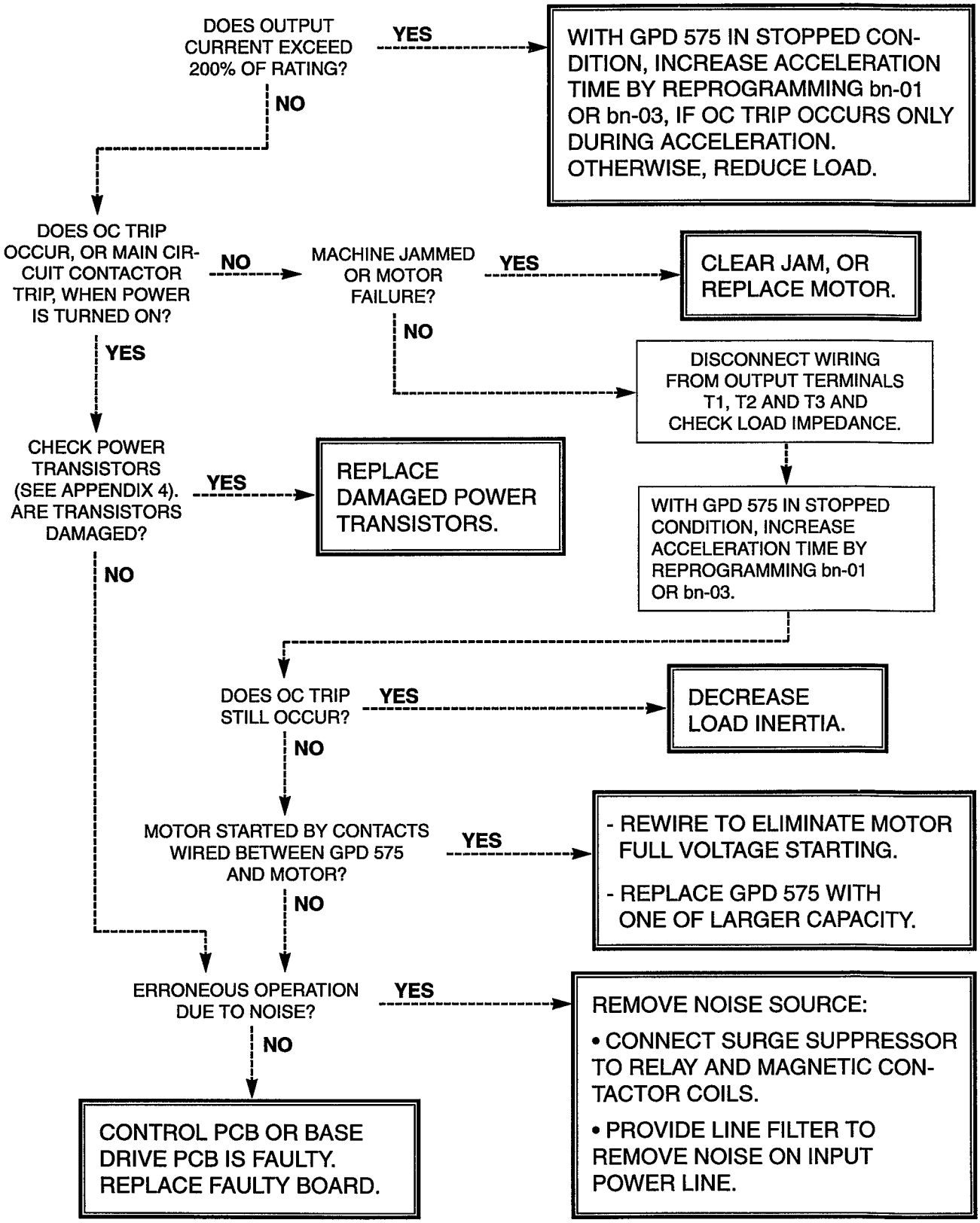


CAUTION

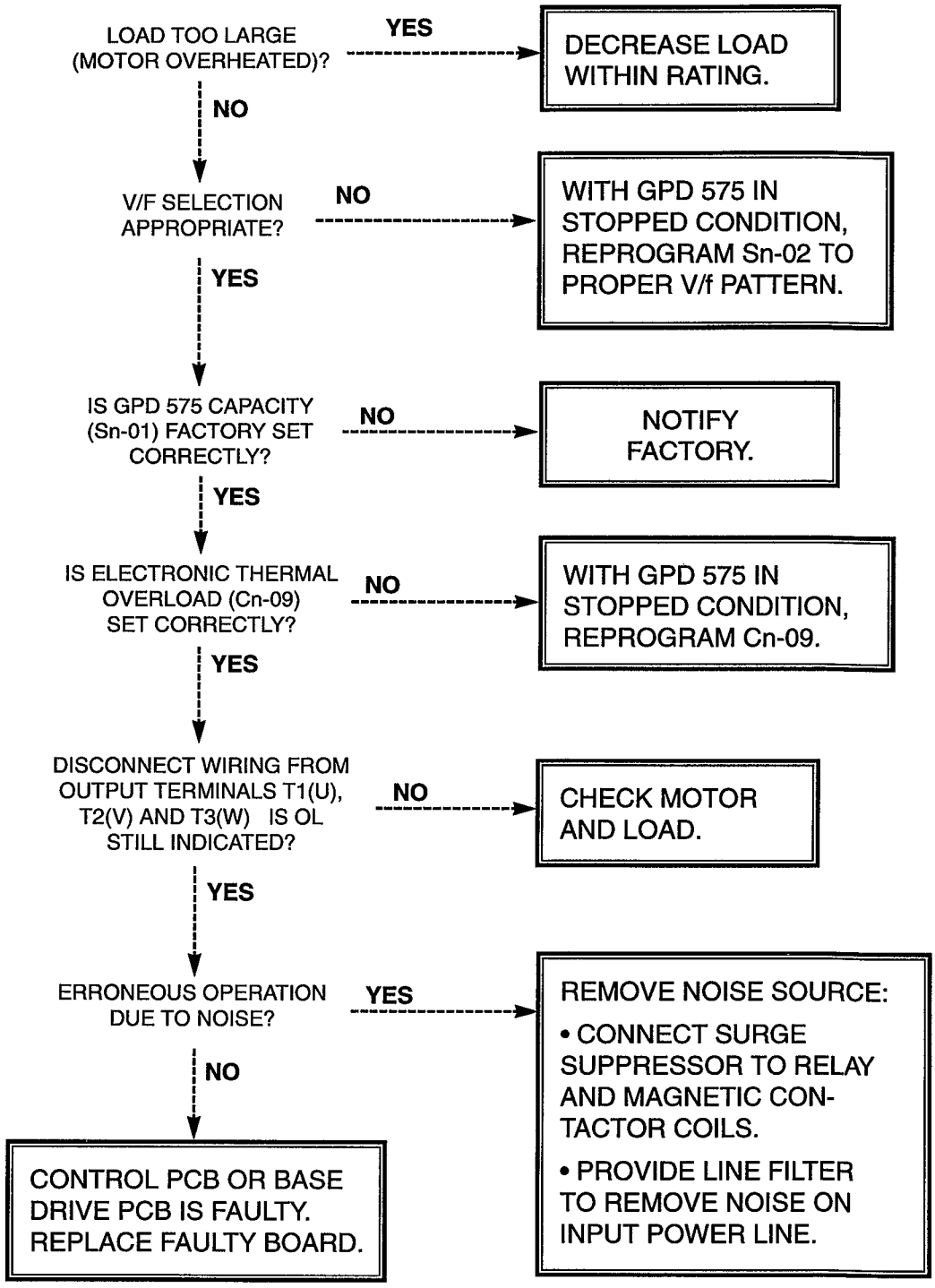
DO NOT REPLACE DC BUS FUSE WITHOUT

FIRST CHECKING OUTPUT TRANSISTORS.

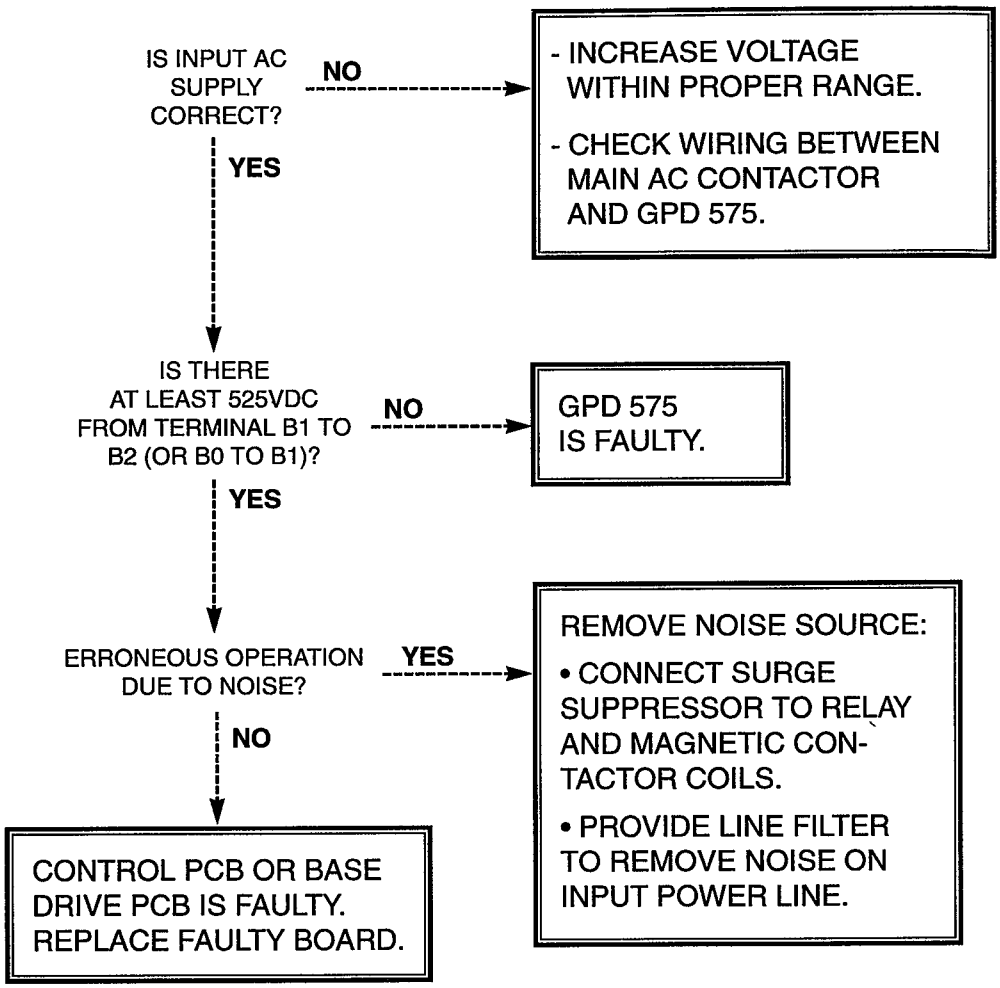
OVERCURRENT (oC) FAULT INDICATION



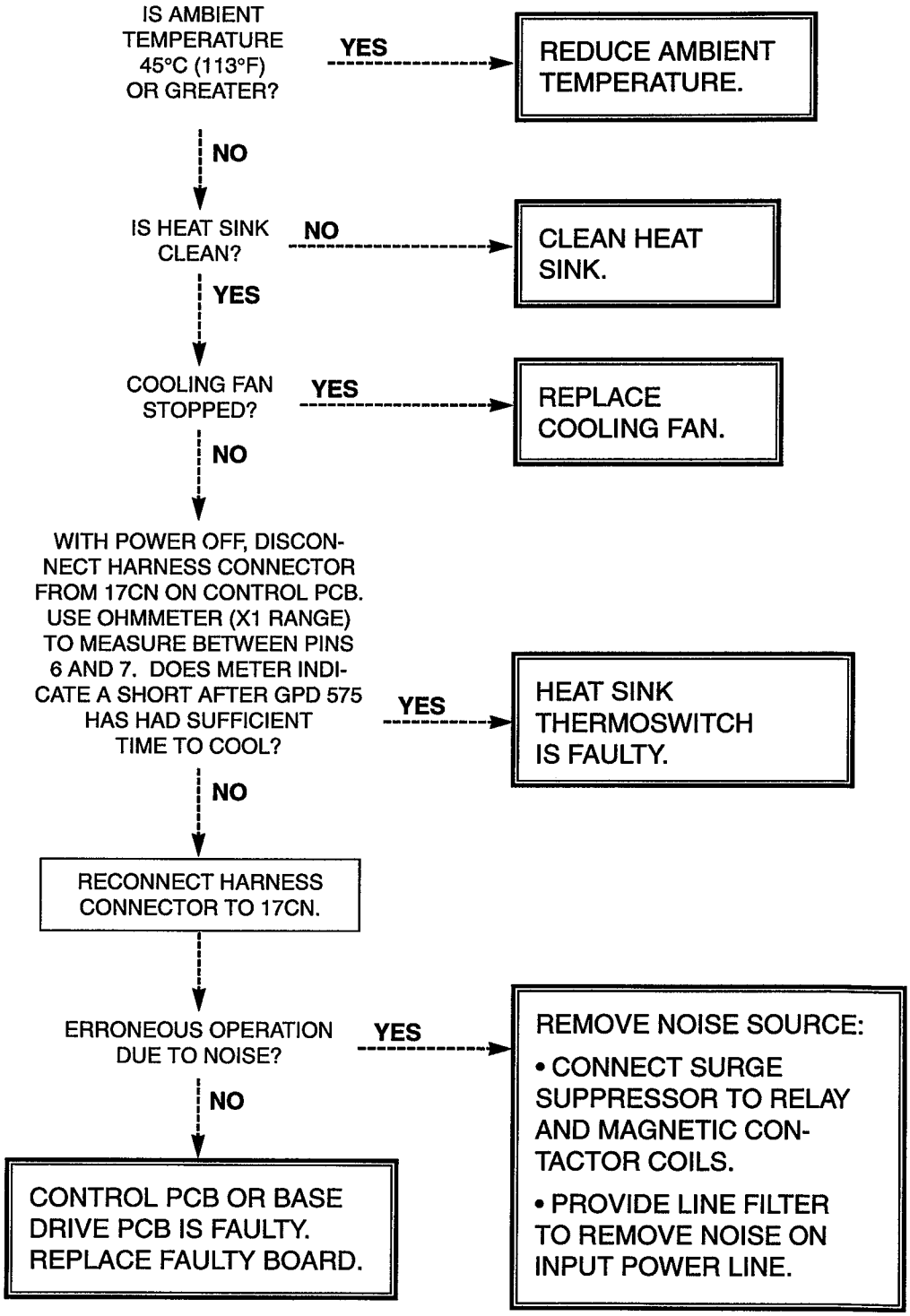
OVERLOAD (oL_) FAULT INDICATION



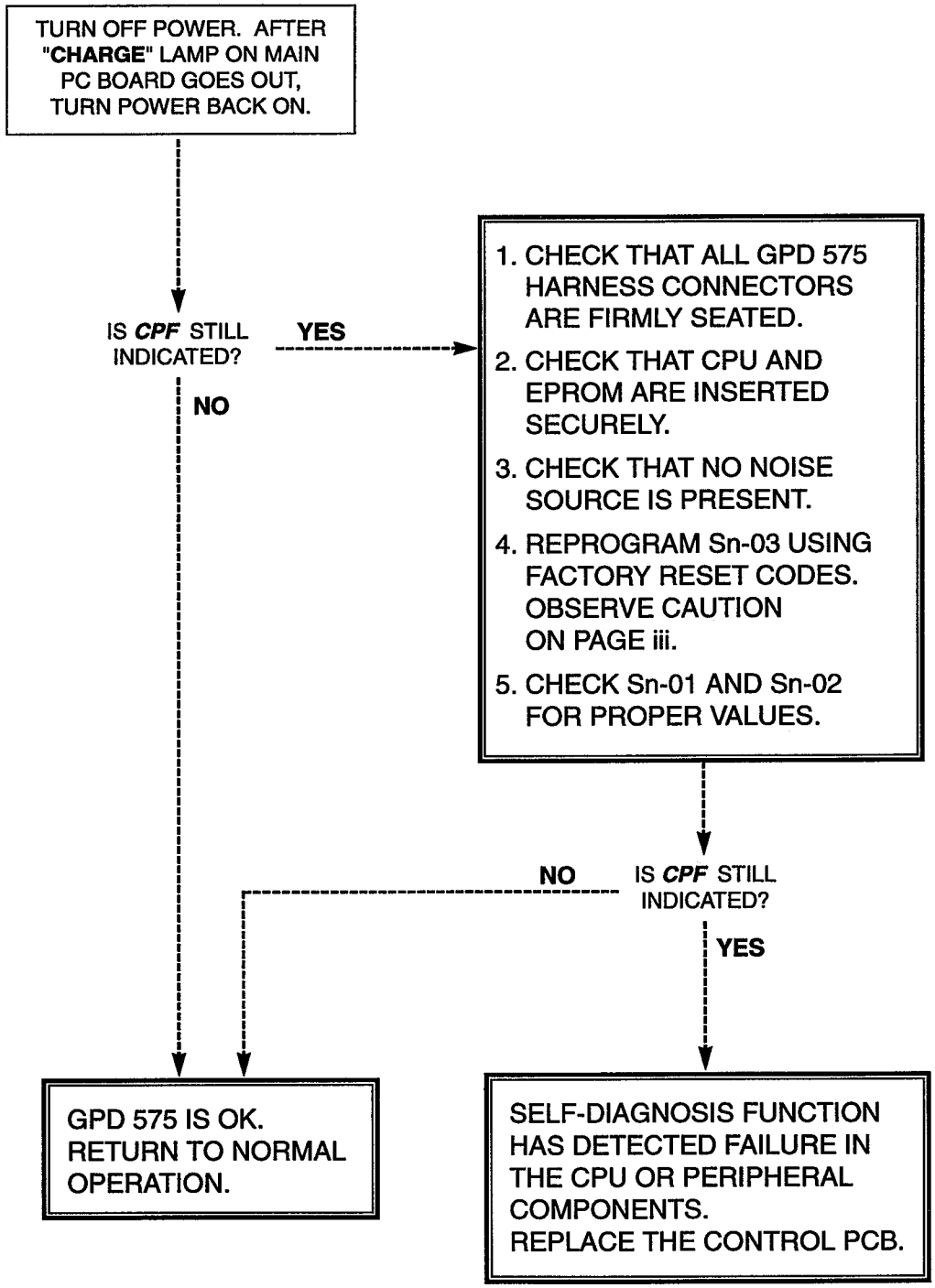
UNDERVOLTAGE (Uu_) FAULT INDICATION



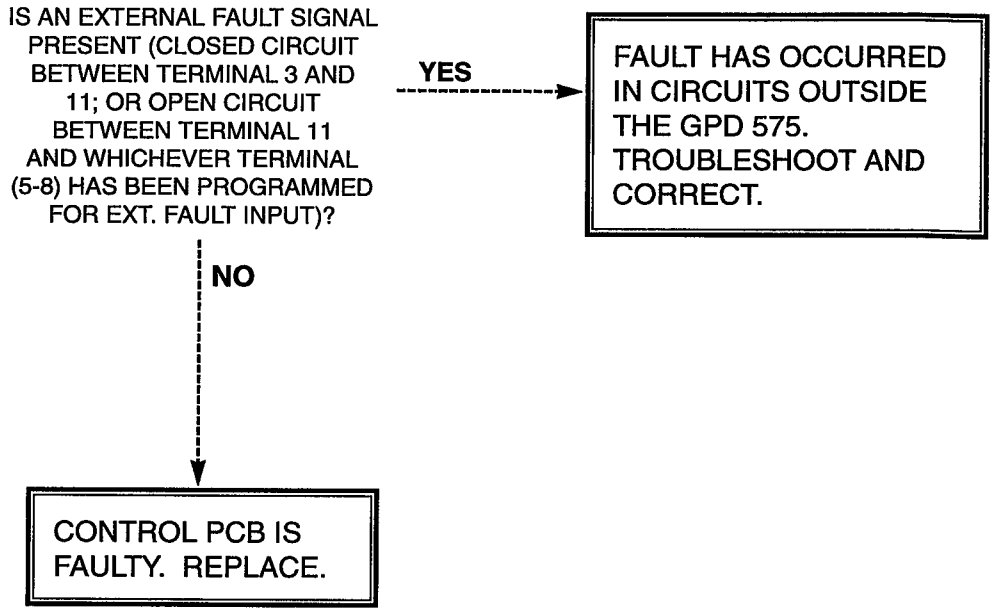
INVERTER OVERHEATED (oH) FAULT INDICATION



CONTROL FUNCTION ERROR (CPF_ _) FAULT INDICATION



EXTERNAL FAULT (EF_) INDICATION



Appendix 1. LISTING OF CONSTANTS

The GPD 575 control circuits use five types of constants to select functions and characteristics of the GPD 575.

1. Frequency Reference memory settings (An-XX)
2. Run Operative settings (bn-XX)
3. System constants (Sn-XX)
4. Control constants (Cn-XX)
5. Monitor Display (Un-XX)

The following tables list all constants of each type in numerical order. For each constant, reference paragraph(s) in Section 2 are listed (if applicable) where the features of the GPD 575 affected by that constant are described.

Table A1-1. Frequency Reference Memory Settings (An-XX)

CONSTANT NUMBER	DATA NAME	INCREMENT	SETTING RANGE	FACTORY SETTING	USER SETTING	PARA. REF.
An-01	Frequency Reference 1	0.01 Hz	0.00 - 400.00	0.00		2.24
An-02	Frequency Reference 2	0.01 Hz	0.00 - 400.00	0.00		2.24
An-03	Frequency Reference 3	0.01 Hz	0.00 - 400.00	0.00		2.24
An-04	Frequency Reference 4	0.01 Hz	0.00 - 400.00	0.00		2.24
An-05	Frequency Reference 5	0.01 Hz	0.00 - 400.00	0.00		2.24
An-06	Frequency Reference 6	0.01 Hz	0.00 - 400.00	0.00		2.24
An-07	Frequency Reference 7	0.01 Hz	0.00 - 400.00	0.00		2.24
An-08	Frequency Reference 8	0.01 Hz	0.00 - 400.00	0.00		2.24
An-09	Jog Reference	0.01 Hz	0.00 - 400.00	6.00		2.15, 2.24

Table A1-2. Run Operative Settings (bn-XX)

CONSTANT NUMBER	DATA NAME	INCREMENT	SETTING RANGE	FACTORY SETTING	USER SETTING	PARA. REF.
bn-01	Accel Time 1	0.1 S	0.0 - 6000.0	10.0		2.2A, 2.2C, 2.18
bn-02	Decel Time 1	0.1 S	0.0 - 6000.0	10.0		2.2A, 2.2C, 2.18
bn-03	Accel Time 2	0.1 S	0.0 - 6000.0	10.0		2.2A, 2.2C, 2.18
bn-04	Decel Time 2	0.1 S	0.0 - 6000.0	10.0		2.2A, 2.2C, 2.18
bn-05	Frequency Command Gain	0.1 %	0 - 1000.0	100.0		2.13
bn-06	Frequency Command Bias	1 %	-100 to 100	0		2.13
bn-07	Torque Compensation Gain	0.1	0.0 - 9.9	1.0		2.31
bn-08	Slip Compensation Gain (Motor Rated Slip)	0.1 %	0.0 - 9.9	0.0		2.26
bn-09	Energy Saving Gain	1 %	0 - 200	80		2.11
bn-10	Monitor No. After Power-up	1	1 - 3	1		2.10
bn-11	Analog Monitor Channel 1 Gain	0.01	0.01 - 2.55	1.00		2.20 (*1*)
bn-12	Emergency Stop Decel Time	0.01 S	0.01 - 2.55	0.50		
bn-13	Not Used			0000		
bn-14	Not Used			0000		
bn-15	Not Used			0000		
bn-16	Not Used			0000		
bn-17	Not Used			0000		
bn-18	Not Used			0000		

(*1*) Refer to separate Option Instruction Sheet.

Table A1-3. System Constants (Sn-XX)

CONSTANT NUMBER	DATA NAME	DIGIT	SET DATA	FUNCTION	FACTORY SETTING	USER SETTING	PARA. REF.
Sn-01	kVA (HP) Select	--		GPD 575 capacity selection	See App. 3, Table A3-1		--
Sn-02	V/f Select	--		V/f pattern selection	01		2.32, 2.33
Sn-03	Operator Status	XXXX		0000 = Setting and reading of An-, bn-, Sn-, and Cn- constants 1110 = NV-RAM initialization (reset) for 2-wire control operation 1111 = NV-RAM initialization (reset) for 3-wire control operation	0000		2.25
Sn-04	Operation Mode Select 1	XXXX	0	Auto reference at external terminals 13 & 17 or 14 & 17	0011		2.24, 2.24.1
			1	Frequency reference by memory setting in An-01			
		XXXX	0	Run/Stop by external input signals			
			1	Run/Stop by means of Digital Operator keypad			
		XXXX		00 = Ramp to stop 01 = Coast to stop 10 = Full-range DC injection braking stop 11 = Coast to stop (setting of bn-02 provides time delay before accepting run command)			2.8A
Sn-05	Operation Mode Select 2	XXXX	0	Stop command from either Digital Operator or external terminal	0000		--
			1	Stop command from external terminal only			
		XXXX	0	Reverse Run enabled			
			1	Reverse Run disabled			
		XXXX	0	Double-reading function of sequence reference			
			1	Single-reading function of sequence reference			
		XXXX	0	Multi-function analog output (term. 21 & 22): voltage proportional to output frequency			2.20
			1	Multi-function analog ouptut (term. 21 & 22): voltage proportional to ouptut current			

Table A1-3. System Constants (Sn-XX) - Continued

CONSTANT NUMBER	DATA NAME	DIGIT	SET DATA	FUNCTION	FACTORY SETTING	USER SETTING	PARA. REF.
Sn-06	Operation Mode Select 3	XXXX	00 = S-curve at Accel/Decel, with 0.2 second delay 01 = S-curve at Accel/Decel disabled 10 = S-curve at Accel/Decel, with 0.5 second delay 11 = S-curve at Accel/Decel, with 1.0 second delay		0000		2.27
		XXXX	0	Output frequency proportional to Auto reference			2.3
			1	Output frequency inversely proportional to Auto ref.			
		XXXX	0	Auto Reference - Loss Detection disabled			2.4
			1	Auto Reference - Loss Detection enabled			
Sn-07	Overtorque Detection	XXXX	0	Overtorque detection is disabled	0000		2.22
			1	Overtorque detection is enabled			
		XXXX	0	Detects only during set frequency			
			1	Detects during all frequency conditions			
		XXXX	0	Operation continues after overtorque detection			
			1	Coasts to stop when overtorque is detected			
		XXXX	–	Not Used			
Sn-08		XXXX	0	Operated from - installed option	0000		
			1	Operated from Digital Operator and/or external terminals			
		XXXX	–	Not Used			– –
Sn-09		XXXX	–	Not Used	0000		– –

Table A1-3. System Constants (Sn-XX) - Continued

CONSTANT NUMBER	DATA NAME	DIGIT	SET DATA	FUNCTION	FACTORY SETTING	USER SETTING	PARA. REF.
Sn-10	Protective-Character-istics Select 1 (Stall Prevention)	XXXX	0	Stall prevention during accel enabled	0000		2.29
			1	Stall prevention during accel disabled			
		XXXX	0	Stall prevention during decel enabled			
			1	Stall prevention during decel disabled			
		XXXX	0	Stall prevention during operation enabled			
			1	Stall prevention during operation disabled			
		XXXX	0	Decel time during stall prevention is "DECEL TIME 1" (bn-02 set value)			
			1	Decel time during stall prevention is "DECEL TIME 2" (bn-04 set value)			
Sn-11	Protective Character-istics Select 2 (Momentary Power Loss Protection)	XXXX	0	Braking resistor (heat sink mounted) not provided. Overheat protection disabled.	0000		Separate Option Instruction Sheet
			1	Braking resistor (heat sink mounted) provided. Overheat protection enabled.			
		XXXX	0	Fault contact status during auto restart: remains open			2.5B
			1	Fault contact status during auto restart: closes			
		XXXX	0	Operation stops when momentary power loss is detected			2.16, 2.5A
			1	Operation continues during momentary power loss			
		XXXX	–	Not Used			– –
Sn-12	Protective Character-istics Select 3 (External Fault Signal Input at Terminal 3)	XXXX	0	External fault signal: N.O. contact input	0100		2.12
			1	External fault signal: N.C. contact input			
		XXXX	0	External fault signal always detected			
			1	External fault signal only detected during operation			

Table A1-3. System Constants (Sn-XX) - Continued

CONSTANT NUMBER	DATA NAME	DIGIT	SET DATA	FUNCTION	FACTORY SETTING	USER SETTING	PARA. REF.
Sn-12	(Cont'd)	XXXX		Condition when external fault signal is detected: 00 = Ramp to stop (major failure) 01 = Coast to stop (major failure) 10 = Emergency stop (major failure) Time to stop determined by bn-04 set value 11 = Continuous operation (minor failure)			2.12
Sn-13		XXXX		Not Used	0000		—
Sn-14	Protective Characteristics Select 5 (Motor Protection)	XXXX	0	Electronic thermal motor protection enabled	0000		2.30
			1	Electronic thermal motor protection disabled			
		XXXX	0	Electronic thermal protection for variable torque			
			1	Electronic thermal protection for constant torque			
		XXXX	1	Short time rating disabled			
			0	Electronic thermal protection for constant torque			
		XXXX		Not Used			

Table A1-3. System Constants (Sn-XX) - Continued

CONSTANT NUMBER	DATA NAME	DIGIT	SET DATA	FUNCTION	FACTORY SETTING	USER SETTING	PARA. REF.
Sn-15 ✚	Terminal 5 Function	--	00 – FF	Selects terminal 5 function (Auto/Man select)	03 (00) *		2.19, 2.2B, 2.8D, 2.11, 2.12, 2.15, 2.24, 2.28
Sn-16 ✚	Terminal 6 Function	--	00 – FF	Selects terminal 6 function (multi-step frequency ref. select)	04 (03) *		2.19, 2.2B, 2.8D, 2.11, 2.12, 2.15, 2.24, 2.28
Sn-17 ✚	Terminal 7 Function	--	00 – FF	Selects terminal 7 function (Jog)	06 (04) *		2.19, 2.2B, 2.8D, 2.11, 2.12, 2.15, 2.24, 2.28
Sn-18 ✚	Terminal 8 Function	--	00 – FF	Selects terminal 8 function (external baseblock by N.O. contact input)	08 (06) *		2.19, 2.2B, 2.8D, 2.11, 2.12, 2.15, 2.24, 2.28
Sn-19	Multi-function Analog Input	--	00 – 0F	Selects terminal 16 function	00		2.18, 2.2C, 2.8C, 2.22, 2.24, 2.29
Sn-20	Multi-function Output 1	--	00 – 0F	Selects multi-function contact (terminals 9 & 10) function	00		2.21, 2.22, 2.23
Sn-21	Multi-function Output 2	--	00 – 0F	Selects multi-function open collector (terminal 25) function	01		2.21, 2.22, 2.23
Sn-22	Multi-function Output 3	--	00 – 0F	Selects multi-function open collector (terminal 26) function	02		2.21, 2.22, 2.23
Sn-23		--		Not Used	00		
Sn-24		--		Not Used	00		

* ( ) are constant settings after 3-wire Reset Code has been entered.

✚ Settings of these four constants MUST be in ascending value.

Table A1-3. System Constants (Sn-XX) - Continued

CONSTANT NUMBER	DATA NAME	DIGIT	SET DATA	FUNCTION	FACTORY SETTING	USER SETTING	PARA. REF.
Sn-25	Analog Speed Setter (AI-14B)	XXXX	0	Plus/minus values of frequency reference sum enabled	0000		Separate Option Instruction Sheet
			1	Plus value of frequency reference sum enabled			
		XXXX	–	Not Used			– –
Sn-26	Digital Speed Reference (DI-08) Frequency reference set mode selection	XXXX	0000 = BCD input, 1% accuracy 0001 = BCD input, 0.1% accuracy 0010 = BCD input, 0.01% accuracy 0011 = BCD input, 1Hz 0100 = BCD input, 0.1Hz 0101 = BCD input, 0.01Hz 0110 = Reserve 0111 = Binary input, 255 / 100% 1000 = Binary input (set value displayed in decimal on Digital Operator)		0000		Separate Option Instruction Sheet
Sn-27		XXXX	Not Used		0000		
	Pulse Monitor (PO-36F)	XXXX	Number of output pulses selection	000 = 1F 001 = 6F 010 = 10F 011 = 12F 100 = 36F			Separate Option Instruction Sheet
Sn-28	Analog Monitor (AO-08 or AO-12)	XXXX	Select item to output from channel 1	00 = Output frequency (max. frequency / 100%) 01 = Output current (rated current / 100%) 10 = Output voltage ref. (input voltage / 100%) 11 = DC voltage [Vpn] (875V / 100%)	0100		Separate Option Instruction Sheet
		XXXX	Select item to output from channel 2				
Sn-29		– –		Not Used	00		– –
Sn-30		XXXX	–	Not Used	0000		– –
Sn-31		XXXX	–	Not Used	0000		– –

Table A1-3. System Constants (Sn-XX) - Continued

CONSTANT NUMBER	DATA NAME	DIGIT	SET DATA	FUNCTION	FACTORY SETTING	USER SETTING	PARA. REF.
Sn-32		XXXX	–	Not Used	0000		
Sn-33		XXXX	–	Not Used	0000		
Sn-34		XXXX	–	Not Used	0000		
Sn-35		XXXX	–	Not Used	0000		
Sn-36		XXXX	–	Not Used	0000		
Sn-37		XXXX	–	Not Used	0000		
Sn-38		XXXX	–	Not Used	0000		
Sn-39		XXXX	–	Not Used	0000		
Sn-40		XXXX	–	Not Used	0000		
Sn-41		XXXX	–	Not Used	0000		

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Table A1-4. Control Constants (Cn-XX)

CONSTANT NUMBER	DATA NAME	INCREMENT	SETTING RANGE	FACTORY SETTING	USER SETTING	PARA. REF.
Cn-01	Output Voltage Regulator	0.1 V	0.0 - 733.1	575		2.33
Cn-02	Frequency - Max.	0.1 Hz	50.0 - 400.0	60.0 *See Note 1*		2.33
Cn-03	Voltage - Max.	0.1 V	0.0 - 733.1	575 *See Note 1*		2.33
Cn-04	Frequency - Max. Voltage Point	0.1 Hz	0.0 - 400.0	60.0 *See Note 1*		2.33
Cn-05	Frequency - Midpoint	0.1 Hz	0.0 - 400.0	3.0 *See Note 1*		2.33
Cn-06	Voltage - Midpoint	0.1 V	0.0 - 733.1	43.1 *See Note 1*		2.33
Cn-07	Frequency - Min.	0.1 Hz	0.0 - 400.0	1.5 *See Note 1*		2.33
Cn-08	Voltage - Min.	0.1 V	0.0 - 733.1	28.7 *See Note 1*		2.33
Cn-09	Motor Rated Current	0.1 A	*See Note 3*	See App. 3, Table A3-1		--
Cn-10	DC Injection Braking Start Freq.	0.1 Hz	0.0 - 10.0	1.5 *See Note 1*		2.8B, 2.8D
Cn-11	DC Injection Braking Current	1 %	0 - 100	50 *See Note 4*		2.8B, 2.8C
Cn-12	DC Injection Time at Stop	0.1 S	0.0 - 25.5	0.5		2.8A, 2.8B
Cn-13	DC Injection Time at Start	0.1 S	0.0 - 25.5	0.0		2.8B
Cn-14	Frequency Command Upper Limit	1 %	0 - 109	100		2.14
Cn-15	Frequency Command Lower Limit	1 %	0 - 109	0		2.14
Cn-16	Prohibit Frequency 1	0.1 Hz	0.0 - 400.0	0.0		2.7A
Cn-17	Prohibit Frequency 2	0.1 Hz	0.0 - 400.0	0.0		2.7A
Cn-18	Prohibit Frequency 3	0.1 Hz	0.0 - 400.0	0.0		2.7A
Cn-19	Prohibit Frequency Deadband	0.1 Hz	0.0 - 25.5	1.0		2.7B
Cn-20	Operator Display Mode Reference and Indication	1	0 - 39999	0		2.9

Table A1-4. Control Constants (Cn-XX) - Continued

CONSTANT NUMBER	DATA NAME	INCREMENT	SETTING RANGE	FACTORY SETTING	USER SETTING	PARA. REF.
Cn-21	Speed Coincidence Frequency	0.1 Hz	0.0 - 400.0	0.0		2.23, 2.21
Cn-22	Speed Coincidence Bandwidth	0.1 Hz	0.0 - 25.5	2.0		2.23, 2.21
Cn-23	Carrier Frequency Upper Limit	0.1 KHz	0.4 - 10.0	10.0 *See Note 3*		--
Cn-24	Carrier Frequency Lower Limit	0.1 KHz	0.4 - 10.0	10.0 *See Note 3*		--
Cn-25	Frequency Proportion Gain	1	0 - 99	0		--
Cn-26	Overtorque Detection Level	1 %	30 - 200	160		2.18, 2.22
Cn-27	Overtorque Detection Time	0.1 S	0.0 - 25.5	0.1		2.22
Cn-28	Stall Prevention Level During Accel (Constant Torque Region)	1 %	30 - 200	170		2.29
Cn-29	Stall Prevention Limit During Accel (Constant HP Region)	1 %	30 - 200	50		2.29
Cn-30	Stall Prevention Level (at set frequency)	1 %	30 - 200	160		2.29
Cn-31	Motor-to-Motor Cable Resistance	0.001 Ω	0.000 - 65.535			--
Cn-32	Torque Compensation Iron Loss	1 W	0 - 65535			--
Cn-33	Torque Compensation Limiter	1 V	0 - 143			--
Cn-34	Motor No-load Current	1 %	0 - 99	30 *See Note 2*		--
Cn-35	Slip Correction First-order Lag	0.1 S	0.0 - 25.5	2.0		--
Cn-36	No. of Auto-Restart Attempts	1	0 - 10	0		2.5A
Cn-37	Momentary Power Failure Ride-thru Time	0.1 S	0.0 - 2.0	*See Note 3*		--
Cn-38	Speed Search Operation Level	1 %	0 - 200	150		--
Cn-39	Speed Search Decel Time	0.1 S	0.0 - 25.5	2.0 *See Note 5*		--
Cn-40	Min. Base Block Time	0.1 S	0.0 - 2.0			--
Cn-41	V/f During Speed Search	1 %	0 - 100	100		--
Cn-42	Voltage Recovery Time	0.1 S	0.1 - 2.0	0.3		--
Cn-43	Not Used	—	—	—		
Cn-44	Not Used	—	—	—		
Cn-45	Not Used	—	—	—		

Table A1-4. Control Constants (Cn-XX) - Continued

CONSTANT NUMBER	DATA NAME	INCRE-MENT	SETTING RANGE	FACTORY SETTING	USER SETTING	PARA. REF.
Cn-46	Not Used	—	—	—		
Cn-47	Not Used	—	—	—		
Cn-48	Not Used	—	—	—		
Cn-49	Not Used	—	—	—		
Cn-50	Not Used	—	—	—		
Cn-51	Not Used	—	—	—		
Cn-52	Not Used	—	—	—		
Cn-53	Not Used	—	—	—		
Cn-54	Not Used	—	—	—		
Cn-55	Not Used	—	—	—		
Cn-56	Not Used	—	—	—		
Cn-57	Not Used	—	—	—		
Cn-58	Not Used	—	—	—		
Cn-59	Not Used	—	—	—		
Cn-60	Not Used	—	—	—		
Cn-61	Not Used	—	—	—		
Cn-62	Not Used	—	—	—		
Cn-63	Not Used	—	—	—		
Cn-64	Not Used	—	—	—		
Cn-65	Not Used	—	—	—		

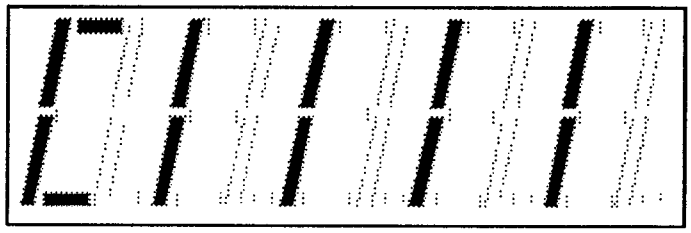
NOTES:

1. Initial value differs depending on V/f curve selected (Sn-02 set value). Values shown are initial values when Sn-02 is set to ***0F***.
2. Motor rated current (Cn-09) is the 100% level. Setting range: 10 to 200% of GPD 575 rated current.
3. Initial value depends on GPD 575 capacity.
4. Set value ≤ 50%: carrier frequency = 8 KHz; set value > 50%: carrier frequency = 1 KHz.
5. If set to zero, speed search will be disabled.

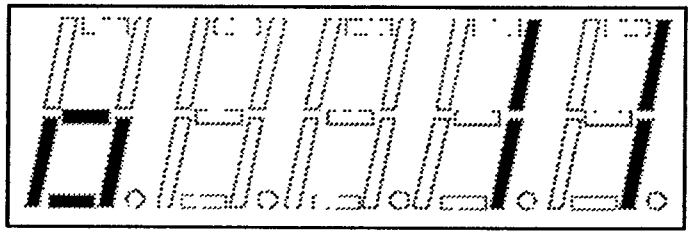
Table A1-5. Monitor Displays (Un-XX)

CONSTANT NO.	MONITOR ITEM	DISPLAY EXAMPLE	PARA. REF.
Un-01	Frequency reference	*60.00*	2.17
Un-02	Output frequency	*60.00*	2.17
Un-03	Output current	*12.5A*	2.17
Un-04	Voltage reference	*575v*	2.17
Un-05	DC voltage (VPN)	*Pn775*	2.17
Un-06	Output power (KW)	(-) *.75*	2.17
Un-07	Input terminal status	*C IIII* ◊	2.17
Un-08	Output terminal status	*o II*Δ	2.17
Un-09	LED lamp check	*8.8.8.8.8.*	2.17
Un-10	Control Section Software PROM No. Lower 5 Digits [NSH 6XXXXX]	*15 155*	

◊ Actual display appearance:



Δ Actual display appearance:



NOTE

These two displays are explained in paragraph 2.17.

Table A1-5. Monitor Displays (Un-XX) - Continued

CONSTANT NO.	MONITOR ITEM	DISPLAY EXAMPLE	PARA. REF.
Un-11	Not Used	- - - -	
Un-12	Not Used	- - - -	
Un-13	Not Used	- - - -	
Un-14	Not Used	- - - -	
Un-15	Not Used	- - - -	
Un-16	Not Used	- - - -	
Un-17	Not Used	- - - -	
Un-18	Not Used	- - - -	
Un-19	Not Used	- - - -	
Un-20	Not Used	- - - -	
Un-21	Not Used	- - - -	

Appendix 2. SPECIFICATIONS

Table A2-1. Standard Specifications

SECTION A. PER UNIT HORSEPOWER RATING												
HP RATING			5	7.5	10	15	20	25	30	40	50	60	75
Input Current		Amps	7	10.5	14	19	24	30	35	47	59	70	89
Output Characteristics	GPD 575 Capacity	KVA	5	7.5	10	15	20	25	30	40	50	60	75
	Output Current	Amps	6.3	9.5	12.5	17	22	27	32	43	54	64	81
	Max. Continuous Output Current (Note 1)		7	10.5	14	19	25	30	36	48	60	72	90
	Max Output Voltage		3 Phase, 500 / 575V (matches input voltage)										
	Rated Output Frequency		50, 60, 72, 90, 120, 180 Hz (Up to 400 Hz available)										
Power Supply	Rated Input Voltage and Frequency		3 Phase 500 / 575V 50 / 60Hz										
	Allowable Voltage Fluctuation		± 10% (600V: +5%)										
	Allowable Frequency Fluctuation		± 5%										
MCCB	Rated Current		20A	20A	20A	30A	50A	60A	60A	100A	100A	100A	150A

SECTION B. ALL GPD 575s		
Control Characteristics	Control Method	Sine Wave PWM
	Frequency Accuracy	Digital command 0.01% (-10 to 40°C) (+14 to 104°F)
		Analog command: 0.1% (15 to 35°C) (59 to 95°F)
	Frequency Resolution	Digital Operator reference: 0.1 Hz Analog reference: 0.06 Hz/60Hz
	Output Frequency Resolution	0.01 Hz (1/30000)
	Overload Capability	Up to 150% for one minute.
	Frequency Setting Signal	0 to 10 VDC (20K Ohms), 4-20mA (250 Ohms)
	Accel / Decel Time	0 1 to 6000 sec (Accel / Decel time setting independently)
	Braking Torque	Approximately 20%
	V/F Pattern Selection	15 Standard Patterns: 4 for general purpose, 4 for high starting torque, 4 for fans and pumps; 3 for machine tools. 1 custom pattern: defined by control constant settings.

Table A2-1. Standard Specifications (Continued)

SECTION B. ALL GPD 575s		
Protective Functions	Motor Overload Protection	Electronic thermal overload relay
	Instantaneous Overcurrent	Motor coasts to a stop at approximately 200% rated current.
	Fuse Blown Protection	Motor coasts to a stop by blown-fuse.
	Overload	Motor coasts a stop after 60 sec. overload condition.
	Overvoltage	Motor coasts to a stop if GPD 575 DC bus voltage exceeds 1,000 V (575V input), 875V (500V input).
	Undervoltage	Motor coasts to a stop if GPD 575 DC bus voltage drops to 525 V or below.
	Momentary Power Failure	Factory setting provides for motor to coast to a stop after momentary power failure of more than 15 ms. Can be reprogrammed to allow continuous operation (ride-through) during power failure of up to 2 seconds.
	Fin Overheat	Thermostat
	Stall Prevention	Stall prevention at acceleration/deceleration and constant speed operation.
	Ground Fault	Provided by electronic circuit.
	Power Charge Indication	"CHARGE" lamp remains lit until bus voltage drops below 50 V.
Environmental Conditions	Location	Indoor (protected from corrosive gases and dust).
	Ambient Temperature	-10 to 40°C (+14 to 104°F)
	Storage Temperature (Note 2)	-20 to 60°C (-4 to 140°F)
	Humidity	90% RH (no condensation)
	Vibration	1 G at less than 20 Hz, up to 0.2 G at 20 to 50 Hz.

NOTES:

1. A standard 4-pole motor is used for Maximum Applicable Motor Output.
2. Temperature during shipping. Storing in this temperature for a long period may deteriorate main circuit capacitor.

Appendix 3. GPD 575 CAPACITY

System Constant Sn-01 (GPD 575 Capacity) is factory preset per the voltage and horsepower ratings of the GPD 575. Tabel A3-1 identifies the set value. If the Control PCB is replaced, the new board MUST be set based on Table A3-1 criteria.

Table A3-1. GPD 575 Capacity

Sn-01 Set Value	HP Rating	Max Motor Output HP - (KW)	Motor Rated Current Current (Amps) (Cn-09) (See Note 1)	Reference Current For Setting Constants (Amps) (See Note 2)
44	5	5 (3.7)	6.1	6.3
45	7.5	7.5 (5.5)	9.0	9.5
46	10	10 (7.5)	11.0	12.5
47	15	15 (11)	17.0	17.0
48	20	20 (15)	22.0	22.0
49	25	25 (18.5)	27.0	27.0
4A	30	30 (22)	32.0	32.0
4b	40	40 (30)	41.0	43.0
4C	50	50 (37)	52.0	54.0
4d	60	60 (45)	62.0	64.0
4E	75	75 (55)	77.0	81.0

NOTES:

1. Cn-09 is factory preset.
2. See description of "Overtorque Detection" (Cn-26) in Section 2.

Appendix 4. DIODE AND TRANSISTOR MODULE RESISTANCE TEST

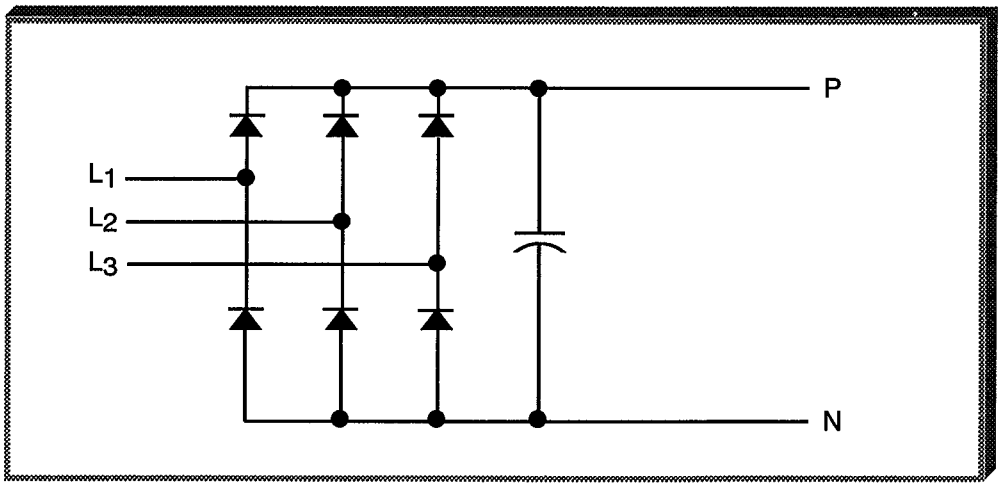
DIODE MODULE

Measure the resistance across the module terminals with a volt-ohm meter. Set the meter at the X1 range. The measured resistance should be within the values listed in Table A4-1.

Table A4-1. Diode Module Resistances

+ ON	− ON	NORMAL READING (OHMS)	ABNORMAL READING (OHMS)	+ ON	− ON	NORMAL READING (OHMS)	ABNORMAL READING (OHMS)
L1	P	10 to 50	0 or INFINITE	L1	N	INFINITE	LESS THAN
L2	P			L2	N		
L3	P			L3	N		
N	L1			P	L1		
N	L2			P	L2		
N	L3			P	L3		
				P	N	MAGNITUDE OF CAP CHARGE TO INFINITE	0 or INFINITE

RESISTANCE TEST FOR 3Ø CONVERTER MODULES (BRIDGE RECT)



VOM RESISTANCE SCALE RX1
+ IS THE POSITIVE POLARITY LEAD*
- IS THE NEGATIVE POLARITY LEAD

*THE VOM RED LEAD IS NOT NECESSARILY THE POSITIVE POTENTIAL IN THE RESISTANCE MODE. FOR THESE TESTS THE + LEAD REFERS TO THE POSITIVE POTENTIAL. MAKE SURE YOU KNOW WHICH POLARITY YOU HAVE ON YOUR VOM.

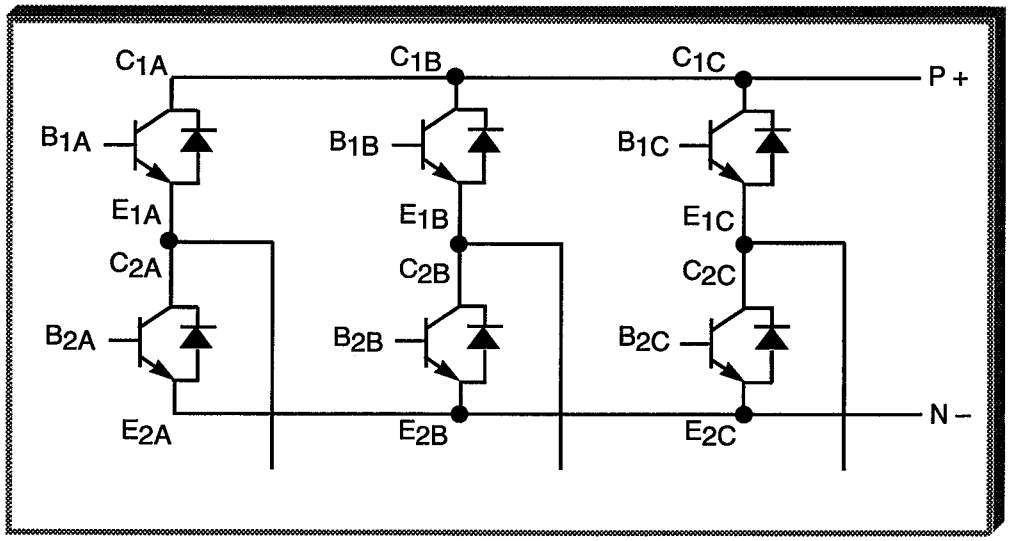
TRANSISTOR MODULE

Measure the resistance across the module terminals with a volt-ohm meter. Set the meter to the X1 range. The measured resistance should be within the values listed in Table A4-2.

Table A4-2. Transistor Module Resistances

+ ON	– ON	NORMAL READING (OHMS)	ABNORMAL READING (OHMS)	+ ON	– ON	NORMAL READING (OHMS)	ABNORMAL READING (OHMS)
P+	T1			B1A	T1		
P+	T2	GREATER		B1B	T2		GREATER
P+	T3			B1C	T3	10 to 50	
T1	N-	THAN	0	B2A	N-		THAN
T2	N-			B2B	N-		
T3	N-	50K OHMS		B2C	N-		10K OHMS
T1	P+			T1	B1A		
T2	P+			T2	B1B		
T3	P+	10 to 50	0 or INFINITE	T3	B1C	200 to 5K	0 or INFINITE
N-	T1			N-	B2A		
N-	T2			N-	B2B		
N-	T3			N-	B2C		

RESISTANCE TEST FOR 3Ø TRANSISTOR MODULES



VOM RESISTANCE SCALE RX1
+ IS THE POSITIVE POLARITY LEAD*
- IS THE NEGATIVE POLARITY LEAD

*THE VOM RED LEAD IS NOT NECESSARILY THE POSITIVE POTENTIAL IN THE RESISTANCE MODE. FOR THESE TESTS THE + LEAD REFERS TO THE POSITIVE POTENTIAL. MAKE SURE YOU KNOW WHICH POLARITY YOU HAVE ON YOUR VOM.

NOTES

NOTES

GPD 575

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