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Bulletin No. GEM5-C
Drawing No. LP0321
Released 1/05

GEMINI 5200 - PRESETTABLE DUAL RATE INDICATOR WITH RATIO (A/B)

- *DIFFERENCE (A-B), OR DRAW [(A-B)/B] INDICATION*
- *6-DIGIT, 0.56" (14.2 mm) HIGH LED DISPLAY WITH NEGATIVE SIGN, OVERFLOW & DISPLAYED VALUE INDICATORS*
- *THREE SEPARATELY DISPLAYABLE VALUES: A, B, & C*
- *TWO PRESETS ASSIGNABLE TO A, B, OR C*
- *SEPARATE INPUT SCALING FOR BOTH RATE A & B CHANNELS*
- *ACCEPTS COUNT RATES TO 10 KHz*
- *SOLID-STATE CURRENT SINK OUTPUTS*
- *OPTIONAL 20 mA CURRENT LOOP FOR SERIAL DATA COMMUNICATION*
- *OPTIONAL RELAY OUTPUTS (Field Replaceable)*
- *PROGRAMMABILITY OF DECIMAL POINT LOCATION & LEADING ZERO BLANKING*
- *PROGRAMMABLE TIMED OUTPUTS (0.01 TO 599.99 sec.)*

- *ABILITY TO LOCK OUT FRONT PANEL FUNCTIONS*
- *SEALED FRONT PANEL CONSTRUCTION (NEMA 4/IP65)*
- *NON-VOLATILE MEMORY (E^2PROM)*

DESCRIPTION

The Gemini 5200 is a multifunction dual rate indicator which can fulfill almost any rate indication application. The unit can operate as two independent rate indicators, with scaling, decimal point placement, and update times separately programmable for each channel. The Gemini 5200 also has three other unit personalities. These personalities feature a third display Channel C, which can indicate the ratio, difference or draw between the A and B rate channels.

The programming of the rate channels and the calculated display is a very straightforward task. Setting up Channel C only requires programming the desired amount of resolution *(for ratio and draw)* and the appropriate decimal point location. The Gemini 5200 simply takes the two rate values and mathematically calculates display *"C"* accordingly.

The rate indicators use a time interval method *(1/tau)* to calculate the rate value. This method enables high resolution at all input rates. The unit counts input pulses and after a programmable minimum update time has occurred, it waits until the next count edge occurs, then takes the elapsed time and number of edges and calculates the rate value. At slower rates, averaging can be accomplished by programming the *"Rate Minimum Update Time"* (0.5 sec. to 16 sec.) for the desired response. The minimum input frequency is 0.03 counts/sec. or one pulse every 32 sec. Extensive scaling capabilities allow practically any desired reading at very slow input rates.

The 20 mA Current Loop Communications Option provides the capability of two-way serial communications between the Gemini and other equipment such as a printer, programmable controller, or host computer. The baud rate can be set to 300, 600, 1200, or 2400 baud. The format for transmitted and received data is 1 start bit, 7 data bits, 1 parity bit (odd), and a stop bit. When utilizing an external power supply (30 VDC max.), up to sixteen units can be installed in the loop, each with an individual address. When utilizing the Gemini's 20 mA current source, up to seven units can be installed in a loop. The Rate values, Presets, and Scale Factors can all be interrogated, while the Presets and Scale Factors can also be changed by sending the proper command codes and numerical data. Various *"Print Options"* can be selected to automatically interrogate the Rate values, Presets, or Scale Factors by activating the "Print Request" terminal when a printer is being used.

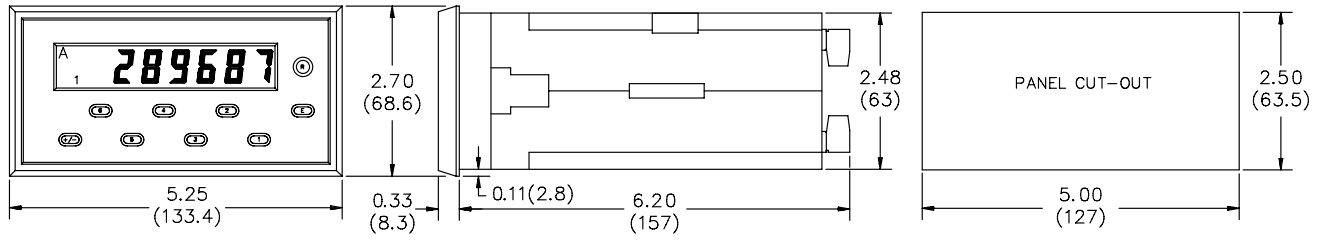
The construction of the Gemini 5200 features a metal die-cast bezel, offering maximum durability with a high quality appearance. The sealed front panel meets NEMA 4/IP65 specifications for wash-down and/or dust when properly installed. Electrical connections are made via plug-in terminal strips. Clamp-type pressure plate terminals accept stripped #14 AWG wire without lugs.

SPECIFICATIONS

1. **DISPLAY:** 6-digit 0.56" (14.2 mm) High LED display.
2. **POWER REQUIREMENTS:**
   AC Power: Switch selectable 115/230 VAC (±10%), 50/60 Hz, 20 VA
   DC Power: 11 to 14 VDC @ 0.7 A max.
3. **SENSOR POWER:** +12 VDC (±25%) @ 100 mA.
4. **MEMORY:** Non-volatile E^2PROM memory retains all programming information when power is removed or interrupted.
   Power Cycles (ON/OFF): 100,000 min.
   Data Retention: 10 years min.
5. **INPUTS A AND B:** Switch selectable to accept pulses from a variety of sources including switch contacts, outputs from CMOS or TTL circuits, and all standard RLC sensors.
   Current Sourcing: Unit provides 3.9 KΩ pull-down resistor for sensors with current sourcing outputs. (Max. input voltage = 28 VDC @ 7 mA.)
   Current Sinking: Unit provides 7.8 KΩ pull-up resistor for sensors with current sinking outputs. (Max. sensor current = 1.6 mA.)
   Debounce: Damping capacitor provided for switch contact debounce. Limits rate to 100 Hz max. with 50% duty cycle.
   Lo Bias: Input trigger levels V_{IL} = 1.5 V, V_{IH} = 3.75 V
   Hi Bias: Input trigger levels V_{IL} = 5.5 V, V_{IH} = 7.5 V
   Note: Bias levels given are ±10% @ 12 VDC. They vary proportionally with sensor supply voltage at "DC OUT" terminal.
6. **MAGNETIC PICKUP INPUTS A & B:**
   Sensitivity: 150 mV peak (typical @ 12 VDC)
   Hysteresis: 100 mV
   Input Impedance: 26.5 KΩ @ 60 Hz
   Maximum Input Voltage: ±50 Vp

DIMENSIONS *In inches (mm)*

Note: Recommended minimum clearance (behind the panel) for mounting clip installation is 6.8" (173) W.



SPECIFICATIONS (Cont'd)

7. **RATE ACCURACY AND REPEATABILITY:** +0.025%
8. **RATE MINIMUM INPUT FREQUENCY:** 0.03 Hz
   Note: At frequencies below 0.03 Hz (1 pulse every 32 sec.) the rate indicator will display a zero.
9. **RATE MAXIMUM INPUT FREQUENCY:** 10 KHz
10. **CONTROL INPUTS:**
   Reset: Active low (V_{IL} = 1.5 V max.) internally pulled up to +12 VDC (I_{SNK} = 3 mA), Activation and De-activation response time = 10 msec.
   Program Disable: Active low (V_{IL} = 1.5 V max.), internally pulled up to +5 VDC (I_{SNK} = 1 mA).
   Print Request: (GEM521xx only) Active low (V_{IL} = 1.5 V max.), internally pulled up to +5 VDC (I_{SNK} = 1 mA).
11. **SERIAL COMMUNICATIONS (Optional):**
   Type: Bi-directional 20 mA current loop, 20 mA source provided. *(Powers up to seven units in a loop with internal current source.)*
   Baud Rate: Programmable 300 to 2400.
   Maximum Address: 16 units. *(Actual number in a single loop is limited by serial hardware specifications.)*
   Data Format: 10 bit frame, Odd parity *(one start bit, 7 data bits, one odd parity bit, and one stop bit.)*
   Serial Hardware Specifications:
      SO - Output Transistor Rating: V_{MAX} = 30 VDC, V_{SAT} = 1 V_{MAX} @ 20 mA.
      SI - Input Diode Rating: V_F = 1.25 V_{TYP}; 1.5 V_{MAX}
      Note: The compliance voltage rating of the source must be greater than the sum of the voltage drops around the loop.
12. **OUTPUTS:**
   Solid-State: Current sinking NPN Open Collector Transistors. I_{SNK} = 100 mA max. @ V_{CE} = 1 V. V_{OH} = 30 VDC max. (Internal Zener Diode Protection).
   Relays: Mounted on a field-replaceable PC board. Form C contacts rated at 5 A @ 120/240 VAC or 28 VDC *(resistive load)*, 1/8 H.P. @120 VAC *(inductive load)*. The operate time is 5 msec nominal and the release time is 3 msec nominal.
   Relay Life Expectancy: 100,000 cycles at Max. Rating. *(As load level decreases, life expectancy increases.)*
   Programmed Timed Outputs: The timed outputs can be set from 0.01 to 599.99 seconds, ±(0.01% + 10 msec).
13. **CERTIFICATIONS AND COMPLIANCES:**
   SAFETY
      IEC 1010-1, EN 61010-1: Safety requirements for electrical equipment for measurement, control, and laboratory use, Part 1.
      IP65 Enclosure rating (Face only), IEC529
      Type 4 Enclosure rating (Face only), UL50
   ELECTROMAGNETIC COMPATIBILITY

Immunity to EN 50082-2		
Electrostatic discharge	EN 61000-4-2	Level 2; 4 Kv contact [1] Level 3; 8 Kv air
Electromagnetic RF fields	EN 61000-4-3	Level 3; 10 V/m 80 MHz - 1 GHz
Fast transients (burst)	EN 61000-4-4	Level 4; 2 Kv I/O Level 3; 2 Kv power [2]
RF conducted interference	EN 61000-4-6	Level 3; 10 V/rms 150 KHz - 80 MHz
Power frequency magnetic fields	EN 61000-4-8	Level 4; 30 A/m
Emissions to EN 50081-2		
RF interference	EN 55011	Enclosure class A Power mains class A

   Notes:
   1. Metal bezel of unit connected with ground from rear bezel screw to metal mounting panel.
   2. When the unit is DC powered, a power line filter (RLC# LFIL0000 or equivalent) was installed, so as not to impair the function of the unit.
   Refer to the EMC Installation Guidelines section of the manual for additional information.
14. **ENVIRONMENTAL CONDITIONS:**
   Operating Temperature: 0 to 50°C
   Storage Temperature: -40 to 70°C
   Operating and Storage Humidity: 85% max. relative humidity (non-condensing) from 0°C to 50°C.
   Altitude: Up to 2000 meters
15. **CONSTRUCTION:**
   Metal die-cast bezel, plastic case. This unit is rated for NEMA 4/IP65 indoor use. Installation Category II, Pollution Degree 2.
16. **WEIGHT:** 2.1 lbs. (0.9 kg)

PROGRAMMABLE FUNCTIONS

UNIT PERSONALITY
Functions as a programmable Dual Rate Indicator, with or without speed ratio, speed difference or draw indication.

PRESETS
Range 0 to ±999999

SCALE FACTORS
Separate 5-digit input scaling for both rate channels. Range 0.0001 to 5.9999.

SCALE MULTIPLIER
Multiplies the actual rate input by 1000, 100, 10, 1, 0.1, or 0.01 to view the desired number of significant digits on the 6-digit display.

RESET OPERATION
Manual reset via front panel pushbutton or remote *"RST"* terminal can be programmed to act on one or both outputs. A separate *"RST.A"* terminal is available to provide independent reset of each channel. Front panel pushbutton reset may be disabled by a switch at the rear of the unit. Reset only applies to the outputs and has no effect on the sample time or the displayed value.

RIGHT-HAND DUMMY ZEROS
Up to three non-functional zeros may be placed on the least significant end of the display when the unit is programmed in the dual rate only mode.

UPDATE TIME
The Rate Minimum Update Time is programmable from 0.5 to 16 seconds. Provides averaging capability for non-consistent pulse spacing. Rate Maximum Update Time will vary with the minimum time selected.

RATE CONVERSION FACTOR
Provides easy display conversion for readout in Rate Per Second, Rate Per Minute, or Rate Per Hour.

DECIMAL POINT & LEADING ZERO BLANKING
Decimal point programmable to desired location. Leading zero blanking, when selected, begins with second digit to the left of the decimal point.

OUTPUT TERMINATION MODES
Terminate at Manual Reset
Terminate at Manual Reset End
Terminate after Time Delay
Boundary
   For positive preset value: Output terminates when Display is less than Preset.
   For negative preset value: Output terminates when Display is greater than Preset, *(i.e. more positive)*.
Note: In any of the above modes, the unit may be programmed for "Reverse Phase" operation which complements the logic state of the output.

TIMED OUTPUTS
Programmable from 0.01 to 599.99 seconds. Accurate to ±(0.01% + 10 msec.).

FRONT PANEL LOCKOUT MODES
When the *"Program Disable"* control input is activated, the ability to change front panel programmed functions will be prevented as per the following modes:
Complete Front Panel Disabled
Presets Enabled Only
Scale Factors Enabled Only
Presets and Scale Factors Enabled
Note: Manual Reset may be independently enabled or disabled in any of the above modes.

SELF-TEST
Performs a complete check on the display and output circuitry along with a functional check on the CPU.

PROGRAMMING

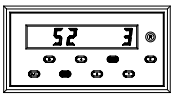
The Gemini 5200 input circuit set-up is programmed using DIP switches on the rear of the unit. All other functions are programmed through the front panel pushbuttons.

To program or interrogate a function, the user first enters a two-digit function code. The unit will then display that function code along with a single-digit mode identifier.

EXAMPLE: The function code representing *"Output 1 Termination Modes"* is 52. The mode identifiers for this function are:

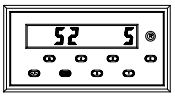
3. Terminate at Manual Reset
4. Terminate at Manual Reset End
5. Terminate after Timed Output 1
6. Boundary

To interrogate the output termination mode, Press "5", then "2":

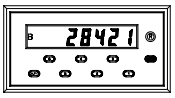


Unit displays the function code along with mode identifier 3 *(Terminate at Manual Reset).*

To change this mode to *"Terminate After Timed Output"*, Press "5":



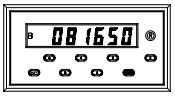
To enter and save the new mode, Press "E":



Unit enters new mode and returns display to the present selected display value.

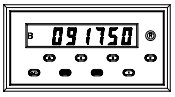
The most commonly used functions, Presets and Scale Factors, are initialized through single front panel pushbuttons rather than a two-digit function code. Pressing the *"1"* or *"3"* pushbuttons will immediately display the current Preset or Scale Factor value for the selected display. To change any digit, the user presses the pushbutton directly below that particular digit, which is then scrolled until the desired value is obtained. Each digit is changed, if necessary, in the same manner until the complete Preset or Scale Factor value is registered on the display. Pressing the *"E"* pushbutton completes the entry sequence.

To interrogate the Preset value, Press "1":



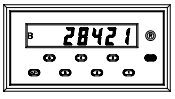
Unit displays current Preset value.

To change the Preset value:



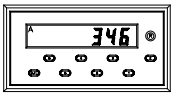
Any digit may be changed by pressing the pushbutton directly below it. Release the pushbutton when the digit reaches the desired value.

Press "E":

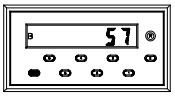


Unit enters new Preset value and returns display to the present selected display value.

The Gemini 5200 Series can display any of three selected display values as indicated by LEDs along the left side of the display.



To display a different value:



Press the "+/-" pushbutton repeatedly until the indicator corresponding to the desired value turns on.

GEMINI 5200 APPLICATIONS

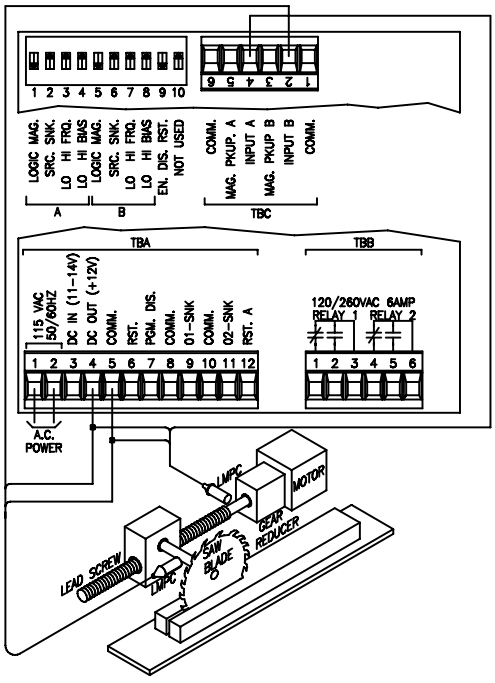
MONITORING TWO SEPARATE RATES IN ONE PROCESS

Many applications require more than one rate to be monitored for a given process. The Gemini 5200 allows the monitoring of two independent rates with one instrument and provides separate scaling for each channel when required.

In this example, an industrial saw blade is used to cut timbers to length. The application requires monitoring both saw blade speed in RPM and feed rate in tenths of inches per minute. The blade is moved into the material with a lead screw which makes 12 revolutions per inch of travel. The lead screw is driven by a 1750 RPM motor through a 2:1 gear reducer which yields a speed of 875 RPM. Since the blade moves 1 inch in 12 revolutions, the feed rate of the blade will be 72.9 inches per minute. *(875 RPM/12 revolutions per in. = 72.9 in./min.)*

A Model LMPC sensor is used to sense a raised target on the lead screw which delivers 1 pulse per revolution to Rate Channel A of the Gemini 5200. In terms of travel, one pulse represents 0.0833" *(1/12").* However, since the desired readout is in tenth inches, the input must be multiplied by 10. Therefore, a scale factor of 0.8333 is programmed into Channel A. A decimal point is programmed to the left of digit 1 and the Rate A conversion factor is programmed for Rate per Minute *(x60)* which automatically multiplies the input pulses by 60 to yield a direct readout in inches per minute.

Measuring saw blade speed is a simple matter of using an LMPC sensor to detect a keyway in the blade drive shaft which delivers one pulse per shaft revolution to Channel B of the Gemini 5200. Programming the Rate B scaler for rate per minute *(x60)* yields a direct reading of blade speed in RPM.



CONTROLLING THE RELATIONSHIP BETWEEN SPECIFIED AMOUNTS OF MATERIAL

This application involves the monitoring and control of a glue allocation process on a continuous web of industrial grade paper. In this case, the desired results are to maintain a flow of glue between 2.00 and 2.50 gallons per 100 feet of web. To accomplish this, a Gemini 5200 is used in the A/B ratio indicator mode, which will yield a direct readout in gallons per 100 feet to the nearest hundredth gallon.

Channel A is connected to a 100 PPR RPGC pulse generator which is mounted to the shaft of the glue pump. The pump delivers 0.38 gallons per shaft revolution. Therefore, a scale factor of 0.3800 is programmed into Channel A of the Gemini 5200 to yield 38 pulses per revolution. This effectively multiplies the glue flow rate by 100 which allows a decimal point to be programmed to the left of digit 2, producing a display of gallons per second to the nearest hundredth gallon on Channel A.

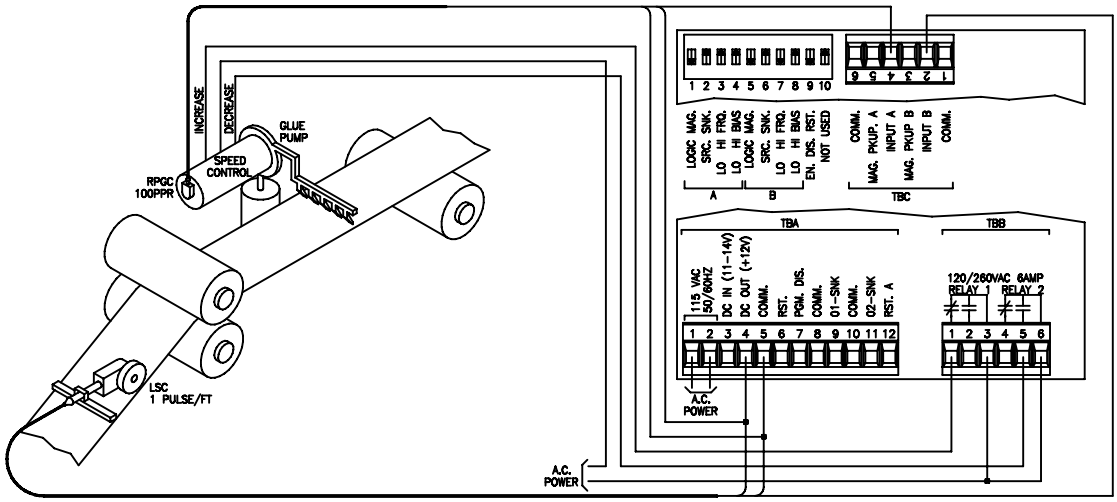
A length sensor providing one pulse per foot of web material is fed into Channel B of the Gemini. The Channel B scale multiplier is programmed for x100 to produce a display reading of feet per second to the nearest hundredth on Channel B.

The Gemini 5200 performs the A/B calculation and displays the ratio in gallons per feet on Channel C. Since the application requires resolution in hundredths of gallons, the Channel C display must be multiplied by 100 to provide such resolution. However, the desired readout is not in terms of gallons per foot, but rather gallons per 100 feet which requires the display to be multiplied by another factor of 100. Therefore, the Channel C scale multiplier is programmed for x10,000 *(i.e. 100 x 100)* which provides the desired Channel C reading of gallons per 100 feet to the nearest hundredth gallon.

The relay outputs of the Gemini 5200 are connected to a speed control mechanism on the glue pump which increases or decreases the glue flow rate while the appropriate relay contacts are closed. Both preset outputs are assigned to Channel C in the boundary mode of operation and are programmed for the upper and lower acceptable limits of the glue flow rate. In this case, the pump initially increases the output flow until a rate of 2.00 gallons per 100 feet is reached, at which time Output 1 toggles to prevent further increase in speed.

If the flow rate reaches or exceeds 2.50 gallons per 100 feet, Output 2 will toggle and send a correction signal to the pump until the speed slows to acceptable limits. If the rate falls back below the lower limit, Output 1 again toggles to speed-up the glue pump.

The Gemini 5200 can be used in this type of application to indicate and control virtually any process that requires the distribution of a specified amount of material in relation to another specified amount of material.



ORDERING INFORMATION

MODEL NO.	DESCRIPTION	W/20 mA CURRENT LOOP	PART NUMBERS
			115/230 VAC
GEM52	Gemini 5200	No	GEM52060
		Yes	GEM52160
_	Gemini 5200 Relay Board		RLYBD002
For more information on Pricing, Enclosures & Panel Mount Kits refer to the RLC Catalog or contact your local RLC distributor.			

GEMINI 5200 PROGRAMMING CHARTS

CHART #1-DUAL RATE [NO DISPLAY C]

FEATURE & MODE SELECTION (See Programming Procedure)

DETAILED MODE MENUS

41 (1) → **UNIT PERSONALITY ***

(±1) DUAL RATE (±2) DUAL RATE W/SPD. RATIO
(±3) DUAL RATE W/SPD. DIFF. (±4) DUAL RATE W/SPD. DRAW
*Changing Unit Personality will load factory settings into the unit. A (-) sign modifier in front of the mode identifier will also load factory settings.

42 ( ) → **RESET BUTTON & TERMINAL ACTUATION MODES**

(1) RST RATE A OUTPUT(S) (2) RST RATE B OUTPUT(S) (3) RST RATE A & B OUTPUTS

43 ( ) → **RATE B CONVERSION FACTOR**

(1) RATE/SEC (X1) (2) RATE/MINUTE (X60) (3) RATE/HR. (X3600)

44 ( ) → **RATE B MINIMUM UPDATE TIME***

(1) 0.5 Sec (2) 1 Sec (3) 2 Sec
(4) 4 Sec (5) 8 Sec (6) 16 Sec
* Maximum update time varies with each minimum update time.

45 ( ) → **RATE B SCALE MULTIPLIER**

(1) x1000 (2) x100 (3) x10 (4) x1 (5) x0.1 (6) x0.01

46 ( ) → **RATE B DECIMAL POINT & LEADING ZERO BLANKING**

(1)	0	(-1) 0 0 0 0 0 0 (NO L.Z.B.)
(2)	0.0	(-2) 0 0 0 0 0.0
(3)	0.0 0	(-3) 0 0 0 0.0 0
(4)	0.0 0 0	(-4) 0 0 0.0 0 0
(5)	0.0 0 0 0	(-5) 0 0.0 0 0 0
(6)	0.0 0 0 0 0	(-6) 0.0 0 0 0 0

51 ( ) → **OUTPUT ASSIGNMENT ***

(±1) OUT 1→ RATE A, OUT2 →RATE B (±2) OUT 1&2 →RATE B (±3) OUT 1&2 →RATE A
* A (-) preceding the mode identifier enables Preset 1 to track Preset 2

52 ( ) → **OUTPUT 1 TERMINATION MODES**

MODE	AT RESET START	AT RESET END	AFTER TIMED OUTPUT 1	BOUNDARY MODE	OUTPUT 1 NORMALLY "OFF"	OUTPUT 1 NORMALLY "ON"
(3)	●				●	
(-3)	●					●
(4)		●			●	
(-4)		●				●
‡ (5)			●		●	
‡ (-5)			●			●
* (6)				●	●	
* (-6)				●		●

‡ Output 1 activates when Rate ≥ Preset 1 in modes [51 1].
Output 1 activates when Rate ≤ Preset 1 in modes [51 2,3].
* BOUNDARY MODE: Output goes "OFF" when Rate < Preset and goes "ON" when Rate is ≥ Preset as the value goes up and down through the Preset.

53 ( ) → **TIMED OUTPUT 1 VALUE**

Timed Output Value range; 0.01 to 599.99 Sec

54 ( ) → **OUTPUT 2 TERMINATION MODES**

MODE	AT RESET START	AT RESET END	AFTER TIMED OUTPUT 2	BOUNDARY MODE	OUTPUT 2 NORMALLY "OFF"	OUTPUT 2 NORMALLY "ON"
(3)	●				●	
(-3)	●					●
(4)		●			●	
(-4)		●				●
‡ (5)			●		●	
‡ (-5)			●			●
* (6)				●	●	
* (-6)				●		●

‡ Output 2 activates when Rate ≥ Preset 2.
* BOUNDARY MODE: Output goes "OFF" when Rate < Preset and goes "ON" when Rate is ≥ Preset as the value goes up and down through the Preset.

55 ( ) → **TIMED OUTPUT 2 VALUE**

Timed Output Value range; 0.01 to 599.99 Sec

56 ( ) → **RATE B RIGHT HAND DUMMY ZEROS**

(1) 0 (2) 00 (3) 000 (4) NONE

61 ( ) → **RATE A RIGHT HAND DUMMY ZEROS**

(1) 0 (2) 00 (3) 000 (4) NONE

62 ( ) → **RATE A CONVERSION FACTOR**

(1) RATE/SEC (X1) (2) RATE/MINUTE (X60) (3) RATE/HR. (X3600)

63 ( ) → **RATE A MINIMUM UPDATE TIME***

(1) 0.5 Sec (2) 1 Sec (3) 2 Sec
(4) 4 Sec (5) 8 Sec (6) 16 Sec
* Maximum update time varies with each minimum update time.

64 ( ) → **RATE A SCALE MULTIPLIER**

(1) x1000 (2) x100 (3) x10 (4) x1 (5) x0.1 (6) x0.01

65 ( ) → **RATE A DECIMAL POINT & LEADING ZERO BLANKING**

(1)	0	(-1) 0 0 0 0 0 0 (NO L.Z.B.)
(2)	0.0	(-2) 0 0 0 0 0.0
(3)	0.0 0	(-3) 0 0 0 0.0 0
(4)	0.0 0 0	(-4) 0 0 0.0 0 0
(5)	0.0 0 0 0	(-5) 0 0.0 0 0 0
(6)	0.0 0 0 0 0	(-6) 0.0 0 0 0 0

66 ( ) → **"OPERATOR ACCESSIBLE FUNCTIONS" MODES**

(With "PGM. DIS." terminal to "COMM")

MODE	PRESET VALUES	SCALE FACTORS	RESET BUTTON &TERMINAL
(1)			●
(-1)			
(2)	●		●
(-2)	●		
(3)		●	●
(-3)		●	
(4)	●	●	●
(-4)	●	●	

CHART #2 - DUAL RATE W/SPEED RATIO OR DRAW (DISPLAY C)

FEATURE & MODE SELECTION (See Programming Procedure)

DETAILED MODE MENUS

41 (2 or 4) →

UNIT PERSONALILTY *

(±1) DUAL RATE (±2) DUAL RATE W/SPD. RATIO
(±3) DUAL RATE W/SPD. DIFF. (±4) DUAL RATE W/SPD. DRAW
*Changing Unit Personality will load factory settings into the unit. A (-) sign modifier in front of the mode identifier will also load factory settings.

42 ( ) →

RESET BUTTON & TERMINAL ACTUATION MODES

(1) RST RATE A OUTPUT (S) (2) RST RATE B OUTPUT (S) (3) RST RATE A & B OUTPUTS
(4) RST DISP C OUTPUT (S) (5) RST DISP C & RATE A OUTPUTS (6) RST DISP C & RATE B OUTPUTS

43 ( ) →

RATE B CONVERSION FACTOR

(1) RATE/SEC (x1) (2) RATE/MINUTE (x60) (3) RATE/HR. (x3600)

45 ( ) →

RATE B SCALE MULTIPLIER

(1) x1000 (2) x100 (3) x10 (4) x1 (5) x0.1 (6) x0.01

46 ( ) →

DISPLAY C DECIMAL POINT & LEADING ZERO BLANKING

(1)	0	(-1)	0 0 0 0 0 0 (NO L.Z.B.)
(2)	0.0	(-2)	0 0 0 0 0.0
(3)	0.0 0	(-3)	0 0 0 0.0 0
(4)	0.0 0 0	(-4)	0 0 0.0 0 0
(5)	0.0 0 0 0	(-5)	0 0.0 0 0 0
(6)	0.0 0 0 0 0	(-6)	0.0 0 0 0 0

51 ( ) →

OUTPUT ASSIGNMENT *

(±1) OUT 1 → RATE A, OUT 2 → RATE B (±2) OUT 1& 2 → RATE B (±3) OUT 1& 2 → RATE A
(±4) OUT 1 → B, OUT 2 → DISP C (±5) OUT 1 → RATE A, OUT 2 → DISP C (±6) OUT 1& 2 → DISP C
* A(-) preceding the mode identifier enables Preset 1 to track Preset 2

52 ( ) →

OUTPUT 1 TERMINATION MODES

MODE	AT RESET START	AT RESET END	AFTER TIMED OUTPUT 1	BOUNDARY MODE	OUTPUT 1 NORMALLY "OFF"	OUTPUT 1 NORMALLY "ON"
(3)	●				●	
(-3)	●					●
(4)		●			●	
(-4)		●				●
‡ (5)			●		●	
‡ (-5)			●			●
* (6)				●	●	
* (-6)				●		●

‡ Output 1 activates when Rate ≥ Preset 1 in modes [51 1,4,5].
Output 1 activates when Rate ≤ Preset 1 in modes [51 2,3,6].
* BOUNDARY MODE: Output goes "OFF" when Rate < Preset and goes "ON" when Rate is ≥ Preset as the value goes up and down through the Preset.

53 ( ) →

TIMED OUTPUT 1 VALUE
Timed Output Value range; 0.01 to 599.99 Sec

OUTPUT 2 TERMINATION MODES

MODE	AT RESET START	AT RESET END	AFTER TIMED OUTPUT 2	BOUNDARY MODE	OUTPUT 2 NORMALLY "OFF"	OUTPUT 2 NORMALLY "ON"
(3)	●				●	
(-3)	●					●
(4)		●			●	
(-4)		●				●
‡ (5)			●		●	
‡ (-5)			●			●
* (6)				●	●	
* (-6)				●		●

‡ Output 2 activates when Rate ≥ Preset 2.
* BOUNDARY MODE: Output goes "OFF" when Rate < Preset and goes "ON" when Rate is ≥ Preset as the value goes up and down through the Preset.

54 ( ) →

TIMED OUTPUT 2 VALUE
Timed Output Value range; 0.01 to 599.99 Sec

55 ( ) →

DISPLAY C MULTIPLIER

(1) 1 (2) 10 (3) 100 (4) 1000 (5) 10000

61 ( ) →

RATE A CONVERSION FACTOR

(1) RATE/SEC (x1) (2) RATE/MINUTE (x60) (3) RATE/HR. (x3600)

62 ( ) →

RATE MINIMUM UPDATE TIME *

(1) 0.5 Sec (2) 1 Sec (3) 2 Sec
(4) 4 Sec (5) 8 Sec (6) 16 Sec
* Maximum update time varies with each minimum update time.

63 ( ) →

RATE A SCALE MULTIPLIER

(1) x1000 (2) x100 (3) x10 (4) x1 (5) x0.1 (6) x0.01

64 ( ) →

RATE A & B DECIMAL POINT & LEADING ZERO BLANKING

(1)	0	(-1)	0 0 0 0 0 0 (NO L.Z.B.)
(2)	0.0	(-2)	0 0 0 0 0 0.0
(3)	0.0 0	(-3)	0 0 0 0 0.0 0
(4)	0.0 0 0	(-4)	0 0 0 0.0 0 0
(5)	0.0 0 0 0	(-5)	0 0 0.0 0 0 0
(6)	0.0 0 0 0 0	(-6)	0.0 0 0 0 0 0

65 ( ) →

"OPERATOR ACCESSIBLE FUNCTIONS" MODES
(With "PGM. DIS." terminal to "COMM")

MODE	PRESET VALUES	SCALE FACTORS	RESET BUTTON &TERMINAL
(1)			●
(-1)			
(2)	●		●
(-2)	●		
(3)		●	●
(-3)		●	
(4)	●	●	●
(-4)	●	●	

66 ( ) →

CHART #3 - DUAL RATE W/DIFFERENCE (DISPLAY C)

FEATURE & MODE SELECTION (See Programming Procedure)

DETAILED MODE MENUS

41 (3) → **UNIT PERSONALILTY ***

(±1) DUAL RATE (±2) DUAL RATE W/SPD. RATIO
(±3) DUAL RATE W/SPD. DIFF. (±4) DUAL RATE W/SPD. DRAW
*Changing Unit Personality will load factory settings into the unit. A (-) sign modifier in front of the mode identifier will also load factory settings.

42 ( ) → **RESET BUTTON & TERMINAL ACTUATION MODES**

(1) RST RATE A OUTPUT(S) (2) RST RATE B OUTPUT(S) (3) RST RATE A & B OUTPUTS
(4) RST DISP C OUTPUT(S) (5) RST DISP C & RATE A OUTPUTS (6) RST DISP C & RATE B OUTPUTS

43 ( ) → **RATE B CONVERSION FACTOR**

(1) RATE/SEC (x1) (2) RATE/MINUTE (x60) (3) RATE/HR. (x3600)

45 ( ) → **RATE B SCALE MULTIPLIER**

(1) x1000 (2) x100 (3) x10 (4) x1 (5) x0.1 (6) x0.01

46 ( ) → **DISPLAY C DECIMAL POINT & LEADING ZERO BLANKING**

(1)	0	(-1)	0 0 0 0 0 0 (NO L.Z.B.)
(2)	0.0	(-2)	0 0 0 0 0.0
(3)	0.0 0	(-3)	0 0 0 0.0 0
(4)	0.0 0 0	(-4)	0 0 0.0 0 0
(5)	0.0 0 0 0	(-5)	0 0.0 0 0 0
(6)	0.0 0 0 0 0	(-6)	0.0 0 0 0 0

51 ( ) → **OUTPUT ASSIGNMENT ***

(±1) OUT 1 → RATE A, OUT 2 → RATE B (±2) OUT 1& 2 → RATE B (±3) OUT 1& 2 → RATE A
(±4) OUT 1 → B, OUT 2 → DISP C (±5) OUT 1 → RATE A, OUT 2 → DISP C (±6) OUT 1& 2 → DISP C
* A(-) preceding the mode identifier enables Preset 1 to track Preset 2

52 ( ) → **OUTPUT 1 TERMINATION MODES**

MODE	AT RESET START	AT RESET END	AFTER TIMED OUTPUT 1	BOUNDARY MODE	OUTPUT 1 NORMALLY "OFF"	OUTPUT 1 NORMALLY "ON"
(3)	●				●	
(-3)	●					●
(4)		●			●	
(-4)		●				●
‡ (5)			●		●	
‡ (-5)			●			●
* (6)				●	●	
* (-6)				●		●

‡ Output 1 activates when Rate ≥ Preset 1 in modes [51 1,4,5].
Output 1 activates when Rate ≤ Preset 1 in modes [51 2,3,6].
* BOUNDARY MODE: Output goes "OFF" when Rate < Preset and goes "ON" when Rate is ≥ Preset as the value goes up and down through the Preset.

53 ( ) → **TIMED OUTPUT 1 VALUE**

Timed Output Value range; 0.01 to 599.99 Sec

OUTPUT 2 TERMINATION MODES

MODE	AT RESET START	AT RESET END	AFTER TIMED OUTPUT 2	BOUNDARY MODE	OUTPUT 2 NORMALLY "OFF"	OUTPUT 2 NORMALLY "ON"
(3)	●				●	
(-3)	●					●
(4)		●			●	
(-4)		●				●
‡ (5)			●		●	
‡ (-5)			●			●
* (6)				●	●	
* (-6)				●		●

‡ Output 2 activates when Rate ≥ Preset 2.
* BOUNDARY MODE: Output goes "OFF" when Rate < Preset and goes "ON" when Rate is ≥ Preset as the value goes up and down through the Preset.

54 ( ) →

55 ( ) → **TIMED OUTPUT 2 VALUE**

Timed Output Value range; 0.01 to 599.99 Sec

62 ( ) → **RATE A CONVERSION FACTOR**

(1) RATE/SEC (x1) (2) RATE/MINUTE (x60) (3) RATE/HR. (x3600)

63 ( ) → **RATE MINIMUM UPDATE TIME ***

(1) 0.5 Sec (2) 1 Sec (3) 2 Sec
(4) 4 Sec (5) 8 Sec (6) 16 Sec
* Maximum update time varies with each minimum update time.

64 ( ) → **RATE A SCALE MULTIPLIER**

(1) x1000 (2) x100 (3) x10 (4) x1 (5) x0.1 (6) x0.01

65 ( ) → **RATE A & B DECIMAL POINT & LEADING ZERO BLANKING**

(1)	0	(-1)	0 0 0 0 0 0 (NO L.Z.B.)
(2)	0.0	(-2)	0 0 0 0 0 0.0
(3)	0.0 0	(-3)	0 0 0 0 0.0 0
(4)	0.0 0 0	(-4)	0 0 0 0.0 0 0
(5)	0.0 0 0 0	(-5)	0 0 0.0 0 0 0
(6)	0.0 0 0 0 0	(-6)	0 0.0 0 0 0 0

66 ( ) → **"OPERATOR ACCESSIBLE FUNCTIONS" MODES**

(With "PGM. DIS." terminal to "COMM")

MODE	PRESET VALUES	SCALE FACTORS	RESET BUTTON &TERMINAL
(1)			●
(-1)			
(2)	●		●
(-2)	●		
(3)		●	●
(-3)		●	
(4)	●	●	●
(-4)	●	●	

GEMINI 5200 PROGRAMMING

SOME NOTES & HINTS ON PROGRAMMING THE GEMINI 5200

1. Be systematic about programming! Plan out the exact features & functions you need for your application. Write out the code entries you need from start to finish, and then enter the codes completely. Don't start in the middle of the program codes & make arbitrary entries to "see what it will do." This is a sure way to create confusing results. Finally, after you are done, record your program & file it where you can find it later if you want to make changes. You can use this card to write in your codes in the program ladder on the reverse side, together with any fixed data entries, for convenient future reference.

2. Watch out for conflicting modes! The programs in the GEMINI 5200 have been written to prevent illegal code entry. However, to provide optimum flexibility, some reliance must be placed on the programmer to avoid conflicting codes.

3. The GEMINI 5200 can be interrogated at any time to see what modes & data entries have been made. Such interrogation can be made during a counting cycle or a sample time run without interrupting the normal counting process. In the lockout mode, all functions can also be interrogated, but those functions locked out cannot be changed. Making changes in program modes or data during a run is not recommended since mid-cycle changes can result in unanticipated outputs for that particular cycle.

PROGRAMMING PROCEDURE FOR FUNCTION & MODE SELECTION ☆

(Applies To Programming Chart)

To enter a programmable function or mode, enter the function selector code desired and then select the particular mode identifier required.

For example, to set up a decimal point to display a reading in 1/100ths with leading zero blanking, function selector code #46 must be entered. (See codes on reverse side.)

Press button #4, then button #6. The display will temporarily interrupt its normal readout (without interfering with the normal operation of the unit). It will then display the entered code on the L.H. side.

[46] (DISPLAY READOUT)

Next, enter the mode identifier (button #3) that defines the decimal point location & LZB condition. This code is displayed on the right.

[46 3] (DISPLAY READOUT)

Now, enter this new selection by pressing the "E" button.

PROGRAMMING PROCEDURE FOR DATA ENTRY

In data entry, the front panel pushbuttons are identified by two different sets of references and will cause two different reactions in the course of making a data entry.

In the first phase of a data entry cycle, the particular data entry mode is called up by pushing the buttons identified by their panel markings. (i.e. Buttons "5", "3", "2", or "1"). Once the data entry mode has been entered, the existing data appears on the display and the buttons below the display reference themselves to the digits directly above each button. The data can then be changed a digit at a time by depressing the button directly below the digits to be changed.

After the new data value is obtained, the "E" button is depressed to enter the new value.

[53,55] TIMED OUTPUT VALUES ☆

Entering Code "53" or "55" will call up the Timed Output 1 to 2 Value in seconds & hundredths. The value can be set to the new value by incrementing each digit with the button underneath that digit. Press the "E" button to enter the new Timed Output value. (Max. Timed Output value = 599.99 sec.)

[3] SCALE FACTORS

One stroke of the "3" button calls up the Scale Factor for the currently displayed rate value. (The Scale Factor is the multiplier used to convert the actual rate to the direct readout display). The value can be changed by incrementing each digit with the button below it. Pressing the "E" key enters the new S.F. The S.F. can be set at any value from 0.0001 to 5.9999.

[1,2] PRESETS

One stroke of the "1" or "2" button calls up the Preset 1 or 2 Value, which can then be changed by incrementing each digit with the button below it. Press the "E" button to enter the new Preset.

☆ Program before connecting "PGM. DIS." to "COMMON".

SELF TEST ROUTINE 6, +/-

Depressing "6" & then "+/-" starts the self test routine by lighting all decimal points, then all 9's, all 8's, all 7's etc., until alternate 8's & 9's are displayed. At this time, the output can be manually activated for testing by pressing the "1" or "2" button. (The Output test is disabled when "PGM. DIS." terminal is pulled to "COMMON".) An automatic exit will occur six (6) seconds after the Test Mode is completed. Test Mode can be run at any time and will not interfere with the normal operation of the Gemini 5200 during a run.