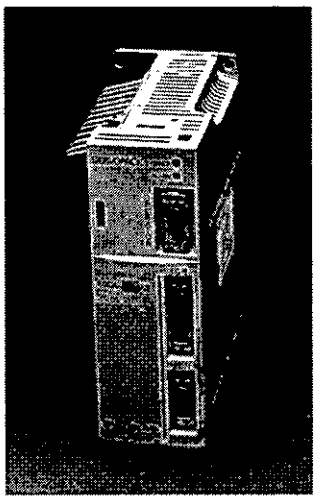
SGDA Servo Amplifier



For Additional Information	Page(s)
SGDA Ratings & Specifications	71 - 72
SGDA Dimensions	73 - 74
SGDA Internal Connections	75 - 78
SGM Sigma Servo System	11 - 32
SGMP Sigma Servo System	33 - 68

Design Features

1. Compact
- Small sized Servo Amplifier
  Volume ratio approx. 1/4 that of the conventional model.
  Compatible with incremental encoders or absolute encoder feedback.

2. Quick Response (for Speed/Torque Control)
- Speed control range 1 : 5000
- Frequency characteristics 250Hz
  Positioning time is shortened.

3. Easy Operation
- Includes auto-tuning function, JOG operation, various monitoring functions (I/O monitor, wave form display of speed and torque, and error messages) and PC monitoring function.

4. Simple Wiring
- Simplified troublefree wiring work
  Sigma Servo Amplifier and encoder cables have been reduced from 15 to 9 (in case of incremental encoders).

5. Improved Environmental Resistance
- Servo Amplifier circuit board coated with varnish

6. Electronic Gear Function is Built-In (for Position Control)
- Electrically converts encoder pulse numbers to "command unit equal to machine transitional units".
- Can change users' pulse numbers to lower than 1024 or 2048.

7. Certified International Standards
- UL, cUL Listed (File #: E147823)

Model Number Designation

SGDA - 02 A ☐

SGDA Servo Amplifier

Model
- P : Position Control (Digital Input)
- S : Speed (Torque) Control (Analog Input)

Power Supply
- A : 200V
- B : 100V
- V : 200V Optional CE
- W : 100V Optional CE

Rated Capacity
- A3 : 30W (0.04 HP)
- A5 : 50W (0.07 HP)
- 01 : 100W (0.13 HP)
- 02 : 200W (0.27 HP)
- 03 : 300W (For 100V only) (0.40 HP)
- 04 : 400W (For 200V only) (0.54 HP)
- 08 : 750W (For 200V only) (1.01 HP)

Servo Amplifier Ratings and Specifications

Voltage	Servo Amplifier SGDA-	Max. Applicable Motor Capacity W (HP)	Combined Specifications						Basic Specificatons
			Max. Output Current A (rms)	Continuous Output Current A (rms)	Motor				
					Allowable Load Inertia *1 JL kg • m^2 × 10^{-4} (oz • in • s^2 × 10^{-3})	Motor Capacity W (HP)	Type		
							SGM-	SGMP-	Approx. Mass kg (lb)
200 VAC	A3☐	30 (0.04)	1.3	0.42	0.63 (8.80)	30 (0.04)	A3☐	-	0.9 (1.98)
	A5☐	50 (0.07)	1.9	0.60	0.78 (11.0)	50 (0.07)	A5☐	-	
	01☐	100 (0.13)	2.8	0.87	1.20 (17.0)	100 (0.13)	01☐	01☐	
	02☐	200 (0.27)	6.0	2.0	3.69 (52.2)	200 (0.27)	02☐	02☐	
	04☐	400 (0.53)	8.0	2.6	3.82 (54.1)	400 (0.53)	04☐	04☐	1.2 (2.65)
	08☐	750 (1.01)	13.9	4.4	13.4 (189)	750 (1.01)	08☐	08☐	1.5 (3.31)
100 VAC	A3☐	30 (0.04)	2.0	0.63	0.63 (8.80)	30 (0.04)	A3☐	-	0.9 (1.98)
	A5☐	50 (0.07)	2.9	0.9	0.78 (11.0)	50 (0.07)	A5☐	-	
	01☐	100 (0.13)	7.1	2.2	1.20 (17.0)	100 (0.13)	01☐	01☐	
	02☐	200 (0.27)	8.4	2.7	3.69 (52.2)	200 (0.27)	02☐	02☐	1.2 (2.65)
	03☐	300 (0.40)	14.8	3.7	3.82 (54.1)	300 (0.40)	03☐	03☐	1.5 (3.31)

Notes for Ratings and Specifications are on Page 72.

*1 : Allowable load inertia ranges require no optional external regenerative unit. Values are 30 times the moment of inertia for 30W (0.04HP) to 200W (0.27HP) servomotors, and 20 times for 400W (0.53HP) and 750W (1.01HP) servomotors. If load inertias exceed these ranges, restrict the operation or use a regenerative unit.

*2 : Supply voltage should not exceed 230V + 10% (253V) or 115V + 10% (127V). A step-down transformer is required if the voltage should exceed these values.

*3 : Use within the ambient temperature range. When enclosed in a box, the internal temperatures must not exceed the ambient temperature range.

*4 : The lowest speed of the speed control range is the speed at which the motor does not stop under 100% load.

*5 : Speed regulation is defined as follows :

$$\text{Speed regulation} = \frac{\text{No load speed - Full load speed}}{\text{Rated speed}} \times 100\%$$

The motor speed may change due to voltage variations or amplifier drift and changes in processing resistance due to temperature variation.

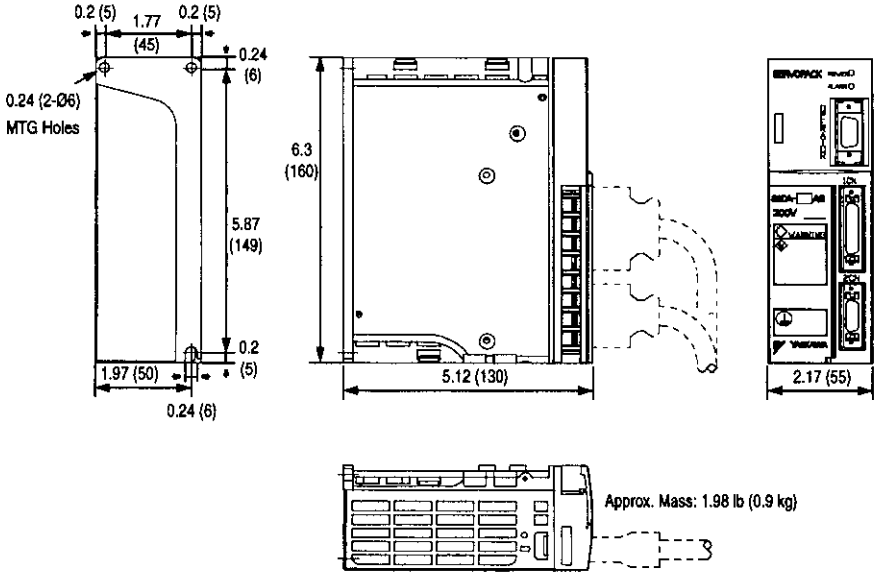
*6 : N is the number of encoder pulses.

Basic Specifications	Power Supply		Single-phase 200 to 230VAC, + 10 to -15%, 50/60 Hz Single-phase 100 to 115VAC *2, + 10 to -15%, 50/60Hz
	Control Method		Single-phase, full-wave rectification IGBT-PWM (single-wave driven)
	Feedback		Incremental encoder 2048 PPR, absolute encoder 1024 PPR
	Location	Ambient Temperature	0 to 55°C *3
		Storage Temperature	-20 to +85°C
		Ambient/Storage Humidity	90% or less (with no condensation)
		Vibration/Shock Resistance	0.5/2 G
	Structure		Base-mounted (book type)
Performance (Speed/Torque Control)	Speed Control Range *4		1 :5000
	Speed Regulation *5	Load Regulation	0 to 100% : 0.01% max. (at rated speed)
		Voltage Regulation	0%
		Temperature Regulation	25±25°C : ±0.1% max (at rated speed)
	Frequency Characteristics		250 Hz (at $J_L = J_M$)
	Torque Control (Repeatability)		±2.0%
	Accel/Decel Time Setting		0 to 10 s
Input Signal (Speed/Torque Control)	Speed Reference	Rated Reference Voltage	±6VDC (positive motor rotation with positive reference) at rated speed (factory setting) Variable setting range : ±2 to ±10VDC at rated torque
		Input Impedance	Approx. 30 kΩ
		Circuit Time Constant	Approx. 47 (μs)
	Torque Reference	Rated Reference Voltage	±3VDC (positive motor rotation with positive reference) at rated speed (factory setting) Variable setting range : ±2 to ±10VDC at rated torque
		Input Impedance	Approx. 30 kΩ
		Circuit Time Constant	Approx. 47 (μs)
Performance (Position Control)	Bias Setting		0 to 450rpm (Setting resolution: 1 rpm)
	Feed Forward Compensation		0 to 100% (Setting resolution: 1%)
	Position Complete Width Setting		0 to 250 reference units. Reference unit: Minimum unit of position data which moves load
Input Signal (Position Control)	Reference Pulse	Type	SIGN + PULSE train 90° phase difference 2-phase pulse (A-phase + B phase), CCW pluse + CW pulse
		Pulse Form	Line driver (+5V level), open collector (+5V or +12V level)
		Pulse Frequency	0 to 450 kpps
	Control Signal		CLEAR (input pulse form identical to reference pulse)
I/O Signals	Position Output	Output Form	A-, B-, C-phase line driver
		Frequency Dividing Ratio	No/N N=2048, 1024 *6 Set No. with value (16 to N) as user parameter
	Sequence Input (Seven Points)		Servo ON, P drive (or motor forward/reverse by torque control, zero-clamp drive reference, or internal setting speed), forward run stop (P-OT), reverse run stop (N-OT), current limit • selection (or internal speed selection), current limit-selection (or internal speed selection), alarm reset
	Sequence Output (Five Points)		Current limit detection (or TGON), speed coincidence, external brake interlock, servo alarm, 3-bit alarm codes
Dynamic Brake			Operated at main power OFF, servo alarm or overtravel
External Regenerative Unit			Required when exceeding the allowable load inertia *1
Overtravel			Dynamic brake stop at P-OT or N-OT or deceleration stop
Protective Functions			Overcurrent, grounding, overload, overvoltage, overspeed, reference input read error, overrun prevention, origin error, CPU error, encoder error
Indicators			Alarm and power LEDs
			Programming panel is available as an option
Others			Torque control, zero clamp operation (position loop stop), soft start/stop, speed coincidence, brake interlock signal output, reverse run connection, JOG run, auto-tuning
Combined Specifications	Motor	Rated/Max. Motor Speed	3000/4500 rpm
		Applicable Encoder	Incremental encoder 2048 PPR, Absolute encoder 1024 PPR optional

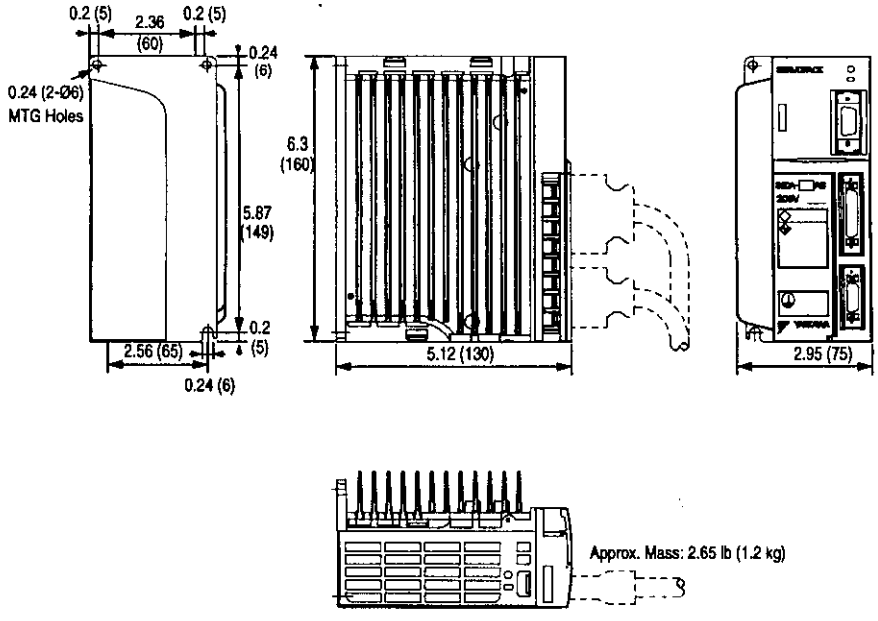
• See notes on previous page.

Dimensions in inches (mm)

(1) SGDA-A3☐ to 02☐ (200V, 30 to 200W), SGDA- A3☐ to 01☐ (100V, 30 to 100W)

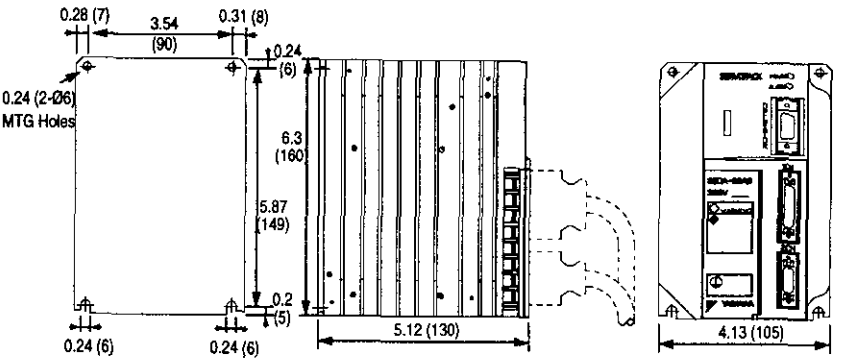


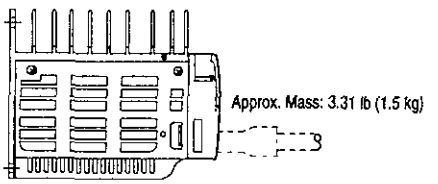
(2) SGDA-04☐ (200V, 400W), SGDA-02☐ (100V, 200W)



SGDA

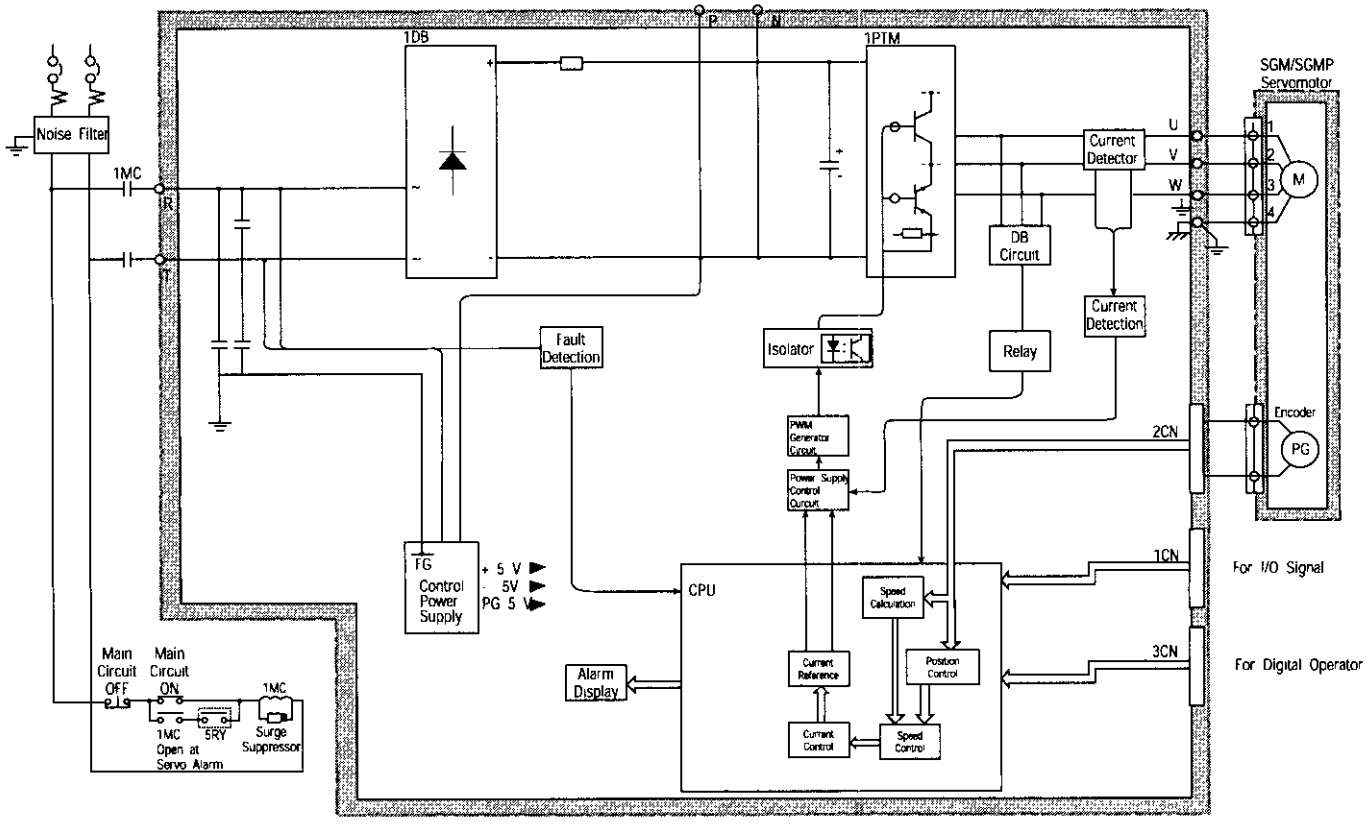
(3) SGDA-08□ (200V, 750W), SGDA-03□ (100V, 300W)





Internal Connection Diagram

Single-phase 200 to 230 VAC $^{+10}_{-15}$ % 50/60Hz
or 50/60 Hz
Single-phase 100 to 115 VAC $^{+10}_{+10}$ %

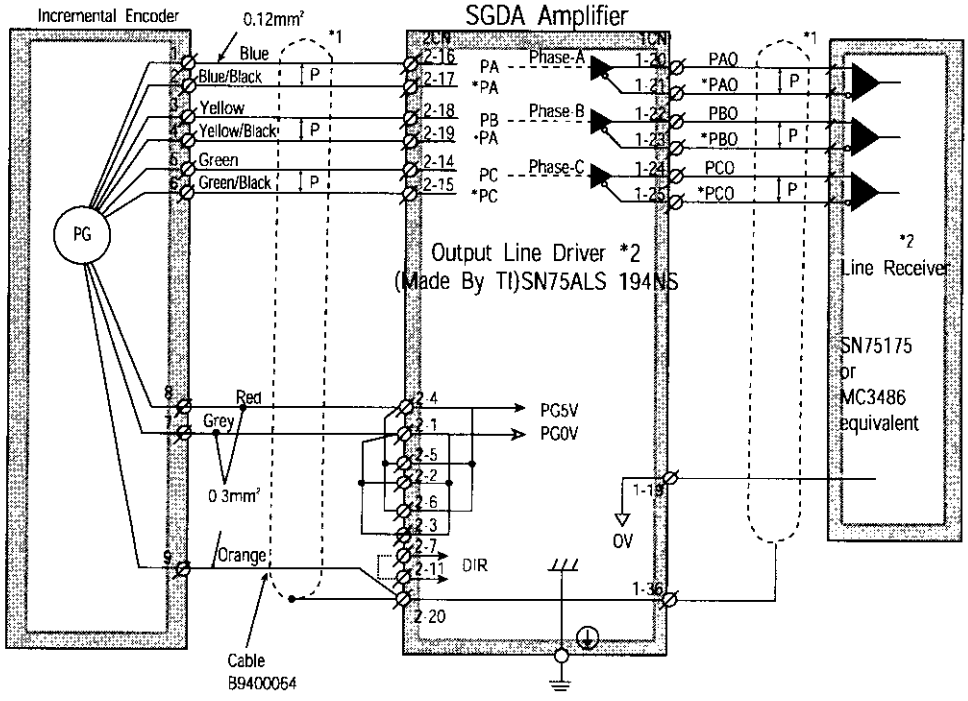


SGDA

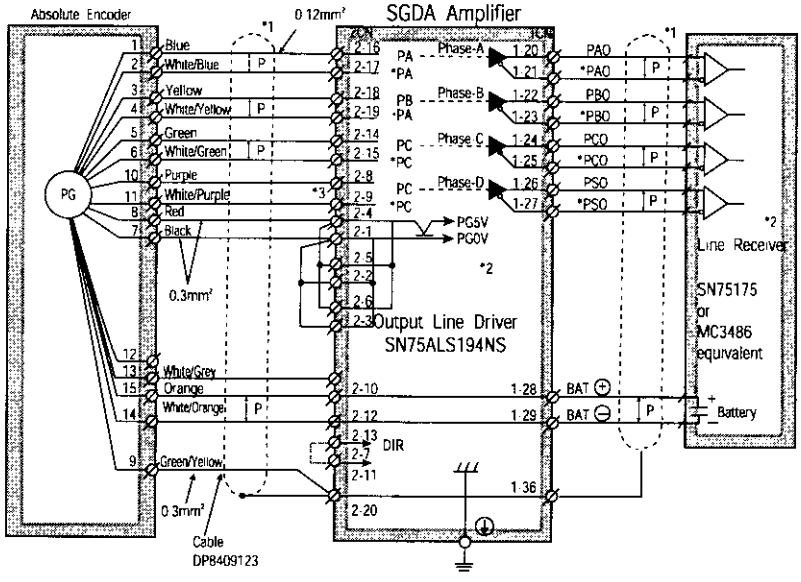
Internal Connection Diagram

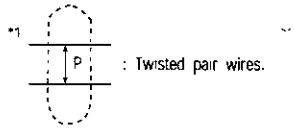
Encoder Signal (2CN) Connections

- **Connector 2CN for Incremental Encoder Connection and 1CN Output Processing**



- **Connector 2CN for Absolute Encoder Connection and 1CN Output Processing**



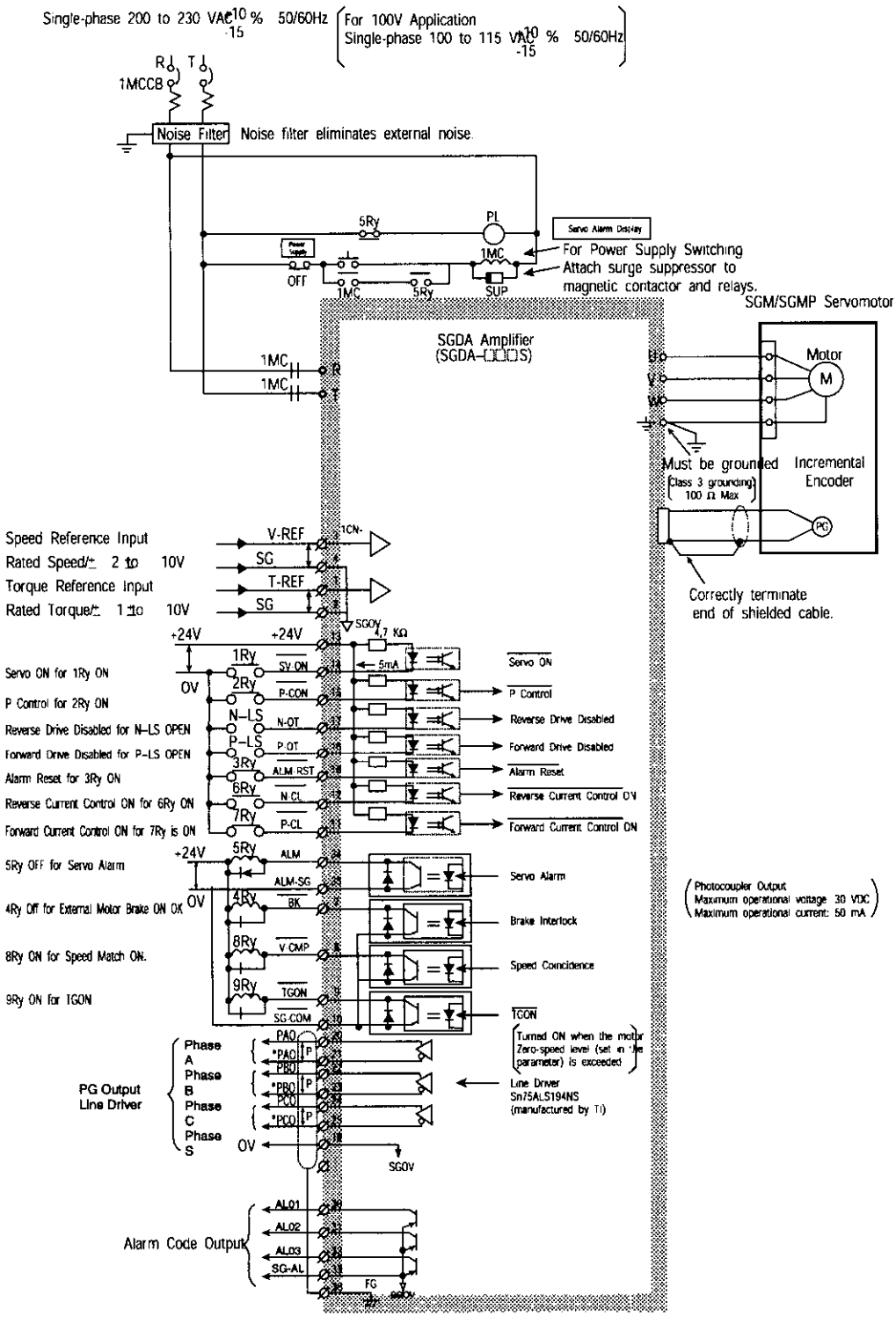


*2 TI Made by Texas Instruments Inc.

*3 Phase-S signal is effective when using absolute encoder

Internal Connection Diagram

Connection Example: SGDA Servo Amplifier (SGDA-□□□S), SGM Servomotor (with Incremental Encoder) and Peripheral Devices



Internal Connection Diagram

Connection Example: SGDA Servo Amplifier (SGDA-□□□P), SGM Servomotor (with Incremental Encoder) and Peripheral Devices