

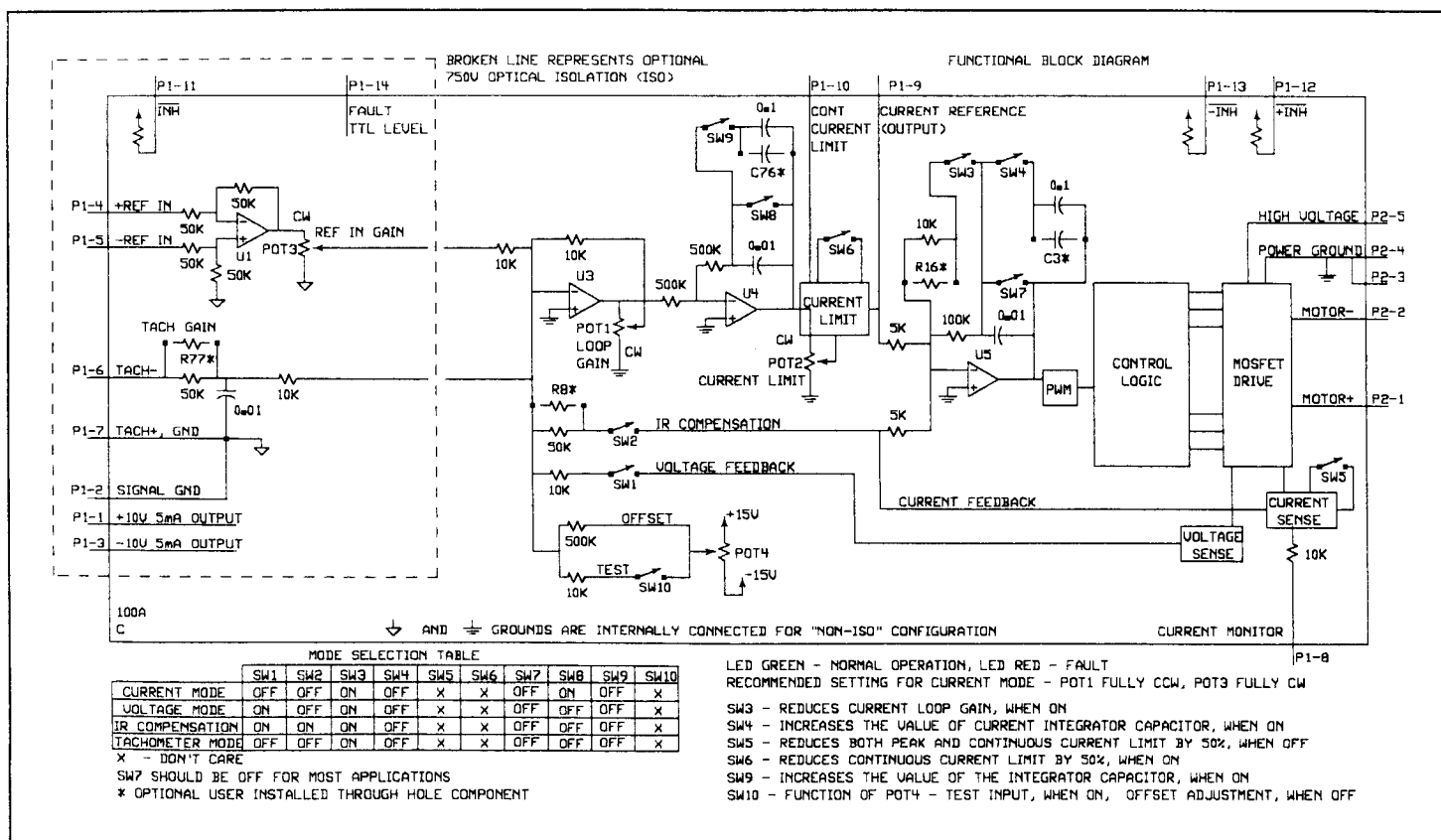
SERIES 100A PWM SERVO AMPLIFIERS MODELS: 100A8, 100A20



FEATURES:

- * Surface-mount technology
- * Small size, low cost, ease of use
- * Optional input signal isolation for off-the-rectified 120 VAC line operation
- * DIP switch selectable: current, voltage, velocity, IR compensation, position loop control
- * Four quadrant regenerative operation

DESCRIPTION: 100A Series PWM servo amplifiers are designed to drive brush type DC motors at a high switching frequency. Single red/green LED indicates operating status. All models are fully protected against over-voltage, over-current, over-heating and short-circuits across motor, ground and power leads. All models interface with digital controllers or can be used as a stand-alone drive. They require only a single unregulated DC power supply. Loop gain, current limit, input gain and offset can be adjusted using 15-turn potentiometers. The offset adjusting potentiometer can also be used as an on-board input signal for testing purposes when SW10 (DIP switch) is "On".



ADVANCED MOTION CONTROLS

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POWER STAGE SPECIFICATIONS	MODELS	
	100A8	100A20
DC SUPPLY VOLTAGE	20-80V	30-200V
PEAK CURRENT (2 sec. max., internally limited)	±100A	
MAX. CONT. CURRENT (internally limited)	±50A	
MINIMUM LOAD INDUCTANCE*	200uH	250uH
SWITCHING FREQUENCY	33KHZ	
HEATSINK (BASE) TEMPERATURE RANGE	-25° to +65°C; shuts off if above +65°C	
POWER DISSIPATION AT CONT. CURRENT	100W	200W
OVER-VOLTAGE SHUT-DOWN (self reset)	86V	200V
BANDWIDTH	2.5kHz	

OUTPUT SPECIFICATIONS		
LOW VOLTAGE POWER SUPPLIES: (for customer use)	+10V P1- 1 -10V P1- 3	5mA, short circuit protected
CURRENT REFERENCE:	P1- 9	7.5V = maximum peak current
CURRENT MONITOR:	P1- 8	1V = 16A, when SW5 = On; 1V = 8A, when SW5 = Off
FAULT:	P1-14	TTL

INPUT SPECIFICATIONS		
$\overline{\text{INHIBIT}}$:	P1-13	TTL, internal pull-up resistor, pull to ground to inhibit amplifier
$\overline{+}\text{INHIBIT}$:	P1-12	
$\overline{\text{INHIBIT}}$:	P1-11	
TACHOMETER:	P1- 6	Maximum ±60V analog, 60K input resistance
INPUT:	P1- 4,5	Differential analog input, maximum ±15V, 50K input resistance

MECHANICAL SPECIFICATIONS	
POWER CONNECTOR	Screw terminals
SIGNAL CONNECTOR	Molex connector
SIZE (inches)	5.06 x 10.00 x 1.70
WEIGHT	2.5 lb.

* "Pancake" and "basket-wound" motors require external inductors

PIN FUNCTIONS

CONNECTOR	PIN	NAME	DESCRIPTION / NOTES	I/O
P1	1	+10V INTERNAL	Provides regulated voltages of +/-10V @ 5mA for customer use. Short circuit protected	O
	2	SIGNAL GND		
	3	-10V INTERNAL		
	4	+REF IN	Differential pre-amp	I
	5	-REF IN		
	6	-TACH	Tachometer	I
	7	+TACH (GND)		
	8	CURRENT MONITOR	This signal is proportional to the actual current in the motor leads. Scaling is 1V=16A when SW5=On (full current), 1V=8A when SW5=Off	O
	9	CURRENT REF	Command signal to the internal current-loop. The maximum peak current rating of the amplifier equals 7.5V at this pin (see section "D")	O
	10	CONTINUOUS CURRENT LIMIT	Can be used to reduce the factory-preset maximum continuous current limit (see section "D")	I
	11	$\overline{\text{INHIBIT}}$	Inhibit. Turns off all four mosfets of the "H" bridge drive when pulled to ground	I
	12	$\overline{+\text{INHIBIT}}$	Inhibits the motor for "+" direction only. This function can be useful to drive the motor off from a "limit switch"	I
	13	$\overline{-\text{INHIBIT}}$	Inhibits the motor for "-" direction only. This function can be useful to drive the motor off from a "limit switch"	I
	14	FAULT (red LED)	TTL compatible output. It becomes high if output short-circuit, over-voltage, over-heating, inhibit, and during "power-on reset". Fault condition indicated by red LED	O
	15	SYNCH IN	Used for synchronizing the switching frequency of several amplifier modules. Consult factory for this option. Not applicable for "ISO" option. In the "ISO" option pin 16 is connected to power ground and can be used as ground with P1- 8,9	N/A
	16	SYNCH OUT		

SWITCH FUNCTIONS

SWITCH	FUNCTION DESCRIPTION	SETTING	
		ON	OFF
1	Internal voltage feedback	On	Off
2	Internal current feedback for IR compensation	On	Off
3	Current loop gain	Decrease	Increase
4	Current loop integration	Increase	Decrease
5	Current scaling. When "Off", increases sensitivity of current sense thus reducing both peak and continuous current limit by 50% (see section "D")		Half-current
6	Can be used to reduce factory-preset maximum continuous current limit (see section "D")		
7	It is recommended to leave SW7 in "Off" position	Shorts out the current loop integrator capacitor	Off
8	This capacitor normally ensures "error-free" operation by reducing the error-signal (output of summing amplifier) to zero	Shorts out the outer velocity / voltage loop integrator capacitor	Off
9	Adjusts the value of the integrator capacitor. It is recommended to leave SW9 in "Off" position for most applications	Increase	Decrease
10	Offset / test. Sensitivity of the "offset" pot. Used as an on-board reference signal in test mode	Increase	Decrease

POTENTIOMETER FUNCTIONS

POTENTIOMETER	DESCRIPTION	TURNING CW
Pot 1	Loop gain adjustment in voltage & velocity modes. Voltage to current scaling factor adjustment in current mode	Increases loop gain
Pot 2	Current limit. It adjusts both continuous and peak current limit by maintaining their ratio	Increases current limit
Pot 3	Reference gain. It adjusts the ratio between input signal and output variables (voltage, current, velocity)	Increases reference input gain
Pot 4	Offset / test. Used to adjust any imbalance in the input signal or in the amplifier. When SW10 (DIP switch) is "On", the sensitivity of this pot is greatly increased thus it can be used as an on-board signal source for testing purposes	N/A

TEST POINTS FOR POTENTIOMETERS

Once the adjustment of potentiometers is complete, the resistance values can be measured for future adjustments. Test points of the potentiometer wipers are provided and are located next to all four potentiometers. Measure resistance between ground and test points (when the power is off).

PLUG-IN-AND-USE TEST MODE

Advanced Motion Controls' 100A Series amplifiers can operate in a DIP switch selectable "Test Mode" to facilitate evaluation and installation (SW 1,10 = On; SW 2, 7, 8, 9 = Off). This is "voltage amplifier mode" with on-board potentiometer adjustable reference. See section "D" for powering-up in test mode.

OPTIONAL INPUT SIGNAL ISOLATION

These amplifiers can be ordered with an internally installed analog isolation amplifier which optically isolates the inputs from the remainder of the amplifier circuitry ("ISO" option). See block diagram on data sheet (page A-5). This optional input isolation facilitates off-the-rectified-line operation. Isolation is necessary in transformerless applications to isolate controller signal ground (often the same as earth ground) from DC power ground. The isolation option may also reduce system noise. This option is generally not required with isolated power supplies.

OPERATING MODE SELECTION

These modes can be selected by the DIP switches according to the chart in the block diagram (page A-5):

- * Current Mode
- * Voltage Mode
- * IR Compensation Mode
- * Tachometer Mode

See section "D" for more information.

CURRENT LIMIT ADJUSTMENTS

These amplifiers feature separate peak and continuous current limit adjustments.

The current limit adjusting Pot 2 adjusts both peak and continuous current limit at the same time. It has 15 turns and is linear. Thus, to adjust the current limit, turn the potentiometer counter-clockwise to zero, then turn clockwise to the appropriate value. Pin P1- 9 is the input to the internal current amplifier stage. Since the output current is proportional to P1- 9, the adjusted current limit can easily be observed at this pin. The maximum peak current value equals 7.5V at this pin. The actual current can be monitored at pin P1- 8. If the desired limit is, for example, 50 amperes, and the servo amplifier peak current is 100 amperes, turn the potentiometer 7.5 turns clockwise from zero.

The continuous current limit can be reduced without affecting the peak current limit by connecting an external current limiting resistor R-lmt between P1-10 and P1- 2.

CURRENT LIMITING RESISTOR	40K	20K	3K	1K	0 K
CONTINUOUS CURRENT LIMIT	90%	80%	50%	30%	10%

SW6 (DIP switch) will reduce the continuous current limit to 50% of the maximum value, when switched "On". SW5 (DIP switch) will reduce the current feedback (monitor) scaling by 50%, thereby reducing both the peak and the continuous current limit by 50%, when switched "Off".

See section "D" for more information

TYPICAL SYSTEM WIRING

