

INSTRUCTIONS

for

INSTALLATION OPERATION and MAINTENANCE

SLO-SYN[®]

TRANSLATOR MODULES

TYPES STM1800C and STM1800CV

These Devices Manufactured Under
One Or More Of The Following U.S.
Patents: 3,280,395. Patented Can-
ada 1967.

The right to make engineering refinements
on all products is reserved. Dimensions
and other details are subject to change.

INSPECTION

When unpacking the SLO-SYN Translator Module, examine it carefully for any shipping damage. The "Damage and Shortage" instruction packed with the unit outlines the proper procedure to follow if any parts are damaged or missing.

DESCRIPTION

The STM1800C and STM1800CV translator modules are plug-in printed circuit boards with logic capabilities for stepping control of SLO-SYN motors. When used with M Series SLO-SYN stepping motors, rates to 2000 steps per second can be achieved. The STM1800C provides bidirectional stepping control and also has a set circuit which energizes the same two motor windings whenever the module becomes energized. Type STM1800CV is similar, but also has an internal oscillator which can supply the triggering pulses. A 500K ohm logarithmic potentiometer is supplied for controlling oscillator speed. Both types are supplied with a mating 36-pin edge connector.

MOUNTING

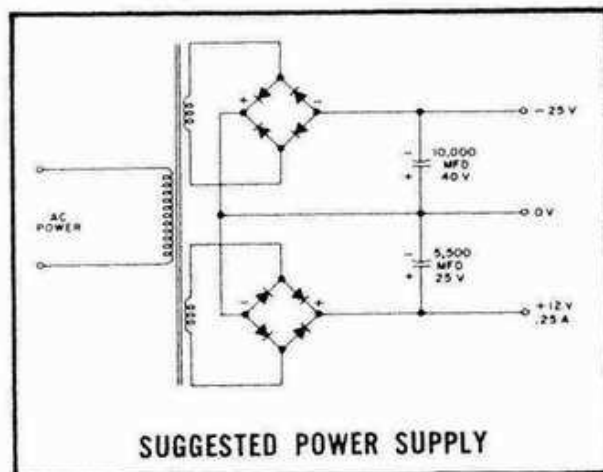
The translator module should be mounted vertically to insure maximum convection flow of air for cooling. This mounting position is very important if the ambient temperature may exceed +35°C. Dimensional drawings of the 36-pin

connector and of the potentiometer provided with the STM1800CV are shown to aid in the mounting of these devices.

CAUTION: When mounting the translator module, a nonconductive support should be provided for the end of the circuit board to hold the board in its receptacle and to prevent damage from vibration.

POWER SUPPLY

STM1800C and STM1800CV translator modules require power supplies which can provide -25VDC and +12VDC and have maximum ripple of 10% peak to peak. A diagram of a suggested power supply is shown. Transformers for this power supply are available and are listed in the Installation Requirements chart. The chart also lists maximum current requirements of the B-power supply for each motor.



TRIGGERING REQUIREMENT

The STM1800C and STM1800CV translator modules require an 8- to 10-volt negative change of voltage with a minimum pulse width of 30 microseconds for external triggering. Input impedance is 3000 ohms. Maximum rise and fall time is 2 microseconds. The units will trigger on the leading edge of negative pulses and on the trailing edge of positive pulses.

Acceleration and deceleration of the pulse rate may be necessary to start and stop the motors at high speeds without missing steps.

Remote switches can also be used to trigger STM1800C and STM1800CV translator modules to provide single step operation. A separate connection diagram shows the required circuit.

INSTALLATION WIRING

External connections to the STM1800C and STM1800CV translator modules are shown in the

appropriate wiring diagrams. A 36-pin connector is supplied to simplify installation.

The switches shown in the STM1800CV diagram for controlling oscillator "on-off", base speed and direction can be replaced by the transistor circuit shown in the separate diagram, if desired.

BASE SPEED SWITCH

When the base speed switch is closed, the oscillator will start and will operate at a fixed rate of approximately 20 steps per second. This rate may be increased to a maximum of 1000 steps per second by connecting a 22K ohm resistor between pins 14 and 20. Increasing the resistance will lower the base speed from the 1000 step per second level. Acceleration and deceleration are not provided in the base speed operating mode.

INTERNAL OSCILLATOR SWITCH AND OSCILLATOR RAMPING

When the internal oscillator switch is placed in the "on" position, the oscillator will begin operating at a low "turn on" rate and will build up to the running rate in approximately 160 milliseconds. The turn on rate will be approxi-

INSTALLATION REQUIREMENTS

MOTOR	STEP INCREMENT	DROPPING RESISTOR*		REQU POWER TRANSF
		VALUE	PART NUMBER	120 VOLT INPUT
M061-FC08 M061-FD08	1.8°	6 ohm $\pm 5\%$, 100 watt	DR103788-G9	T6382
M062-FC09 M062-FD09	1.8°	5 ohm $\pm 5\%$, 160 watt	BM133832-G7	T6382
M063-FC09 M063-FD09	1.8°	5 ohm $\pm 5\%$, 160 watt	BM133832-G7	T6382
M091-FC09 M091-FD09	1.8°	5 ohm $\pm 5\%$, 160 watt	BM133832-G7	T6382
M092-FC09 M092-FD09 M092-FD09D	1.8°	5 ohm $\pm 5\%$, 160 watt	BM133832-G7	T6382
M093-FC11 M093-FD11	1.8°	4.5 ohm $\pm 5\%$, 160 watt	BM133832-G6	T6382
M111-FD12	1.8°	4.5 ohm $\pm 5\%$, 160 watt	BM133832-G6	T6382
M112-FD12 M112-FJ12	1.8°	4.5 ohm $\pm 5\%$, 160 watt	BM133832-G6	T6382
X1500-1001	1.8°	3 ohm $\pm 5\%$, 75 watt	BM132278-G4	T6382
SS1800-1007	1.8°	3 ohm $\pm 5\%$, 75 watt	BM132278-G4	T6
LS50-1005	0.72°	5.5 ohm $\pm 5\%$, 160 watt	BM133832-G4	T6382
TS25-1008	5°	12.5 ohm $\pm 5\%$, 50 watt	BM102088-G13	T6382
TS50-1001	5°	5.5 ohm $\pm 5\%$, 160 watt	BM133832-G4	T6382

*Two required, one in each common of a six-lead motor, or connect in parallel in common of a five-lead motor.

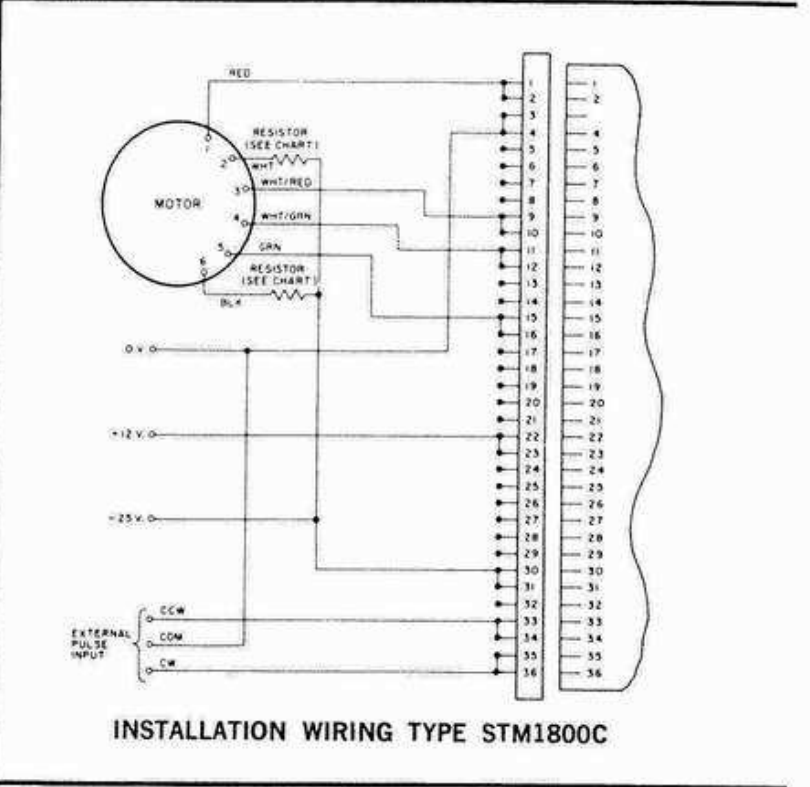
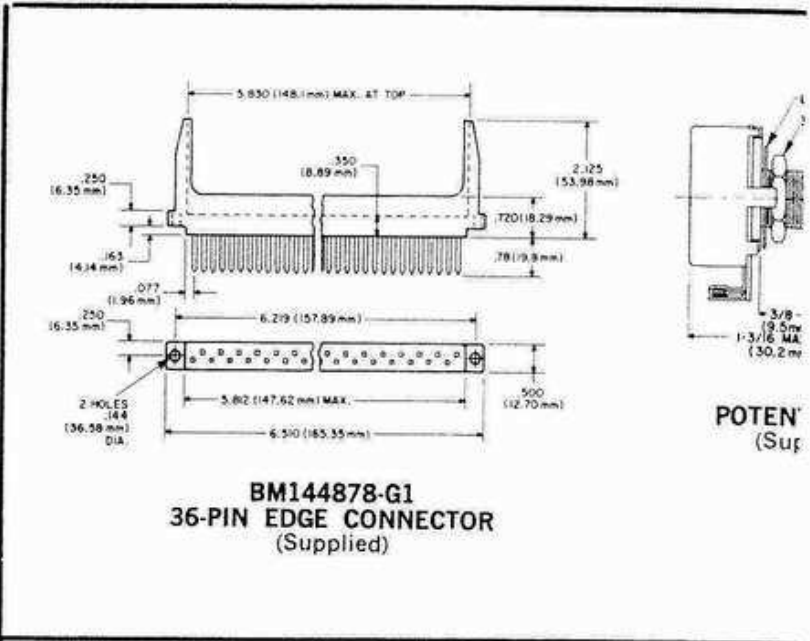
mately 40 steps per second with the oscillator speed control potentiometer at the lowest speed setting and approximately 300 steps per second with the potentiometer set for maximum speed. Intermediate potentiometer settings will produce correspondingly proportional turn on rates.

INTERNAL OSCILLATOR DIRECTION SWITCH

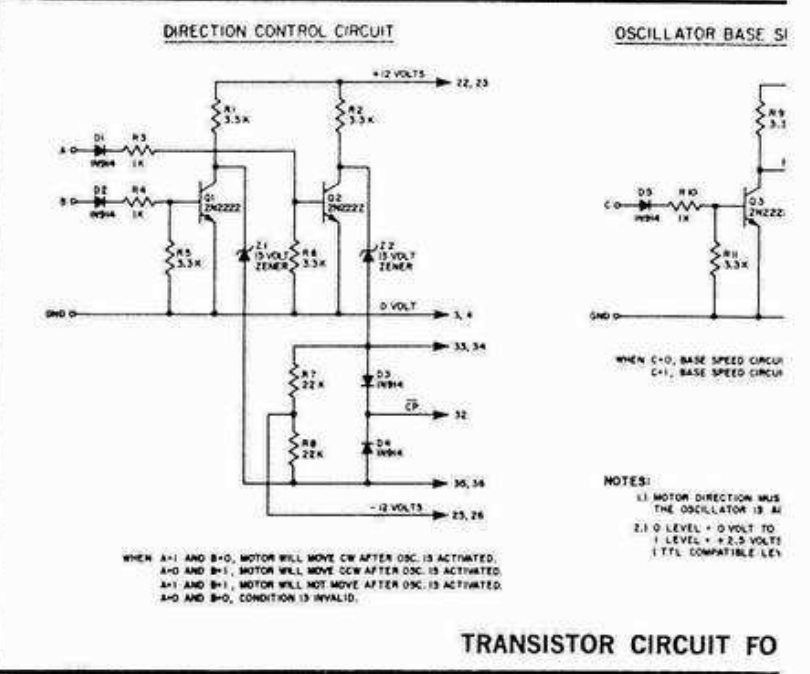
This switch must be actuated before the internal oscillator switch is turned on to allow proper acceleration of the motor. If the internal oscillator switch is turned on first or if the direction is changed without first stopping the motor by turning off the oscillator, the motor may stall.

VOLTAGE CONTROL OF OSCILLATOR SPEED

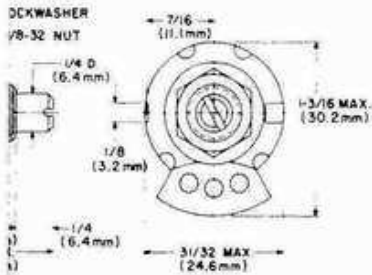
The oscillator speed can be controlled by applying a d-c voltage between pin 24 of the connector and common (pin 4). Maximum current requirement of the d-c supply is 100 milliamperes. A typical curve of oscillator speed vs. applied d-c voltage is shown. This curve was obtained with the speed adjustment potentiometer at the maximum speed position.



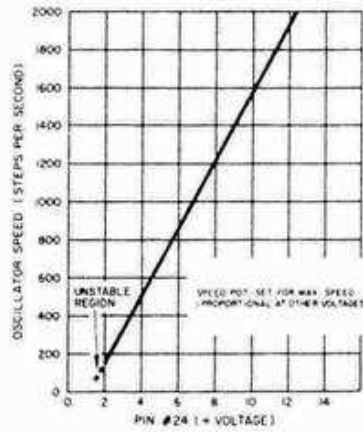
DIODE SUPPLY FORMER	220/240 VOLT INPUT	B - POWER SUPPLY CURRENT (AMPERES)
T6403		9.4
T6403		9.2
T6403		9.2
T6403		9.2
T6403		10
T6403		10
T6403		10
T6403		8
T6403		8
T6403		8
T6403		3
T6403		8



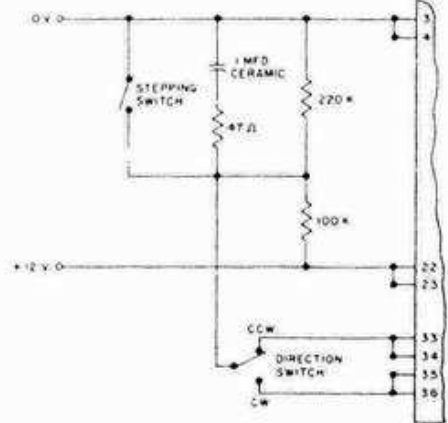
TRANSISTOR CIRCUIT FO



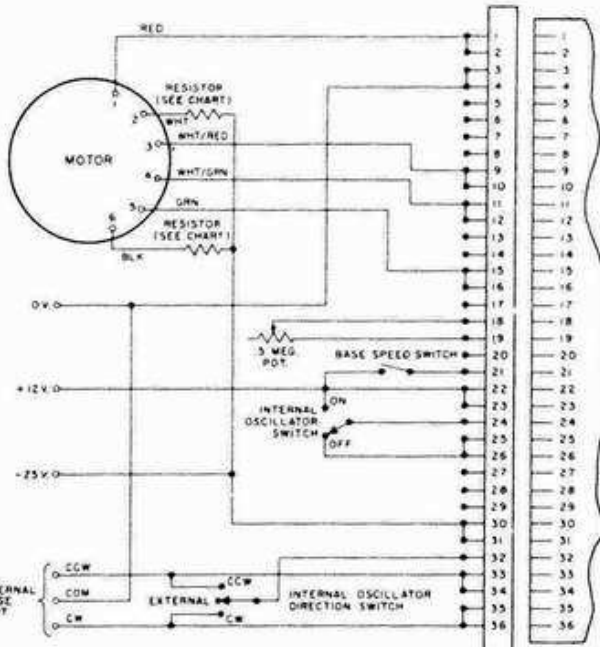
GIOMETER BM144664-G1
 supplied with STM1800CV



VOLTAGE VS. OSCILLATOR SPEED
TYPE STM1800CV



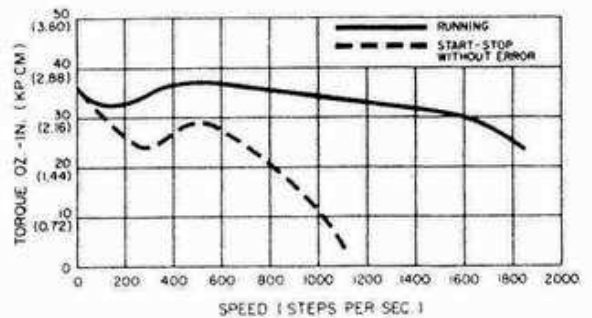
SINGLE-STEP OPERATION



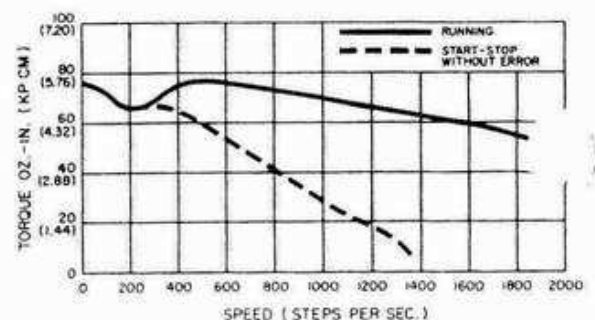
INSTALLATION WIRING TYPE STM1800CV

PERFORMANCE

Speed vs. torque characteristics for appropriate SLO-SYN stepping motors when operated by STM1800C and STM1800CV translator modules are shown. The curves show both maximum running speeds and maximum speeds to which the motors will start without error with various torque loads. Load inertia used when obtaining these curves was negligible. The oscillator provided on type STM1800CV operates over a speed range of 20 to 2000 steps per second and automatically accelerates and decelerates the motors to allow operation at maximum speeds without missing steps. Acceleration and deceleration may be necessary when operating from an external pulse source.



M061-FC08, M061-FD08

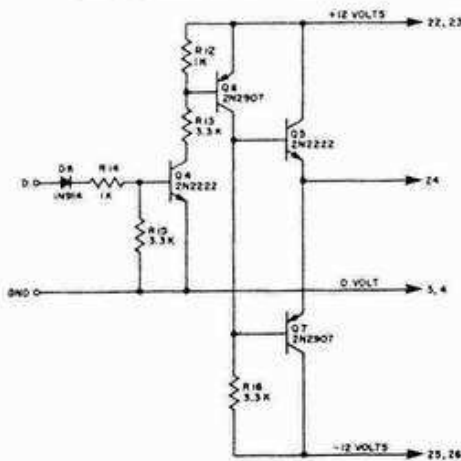


M062-FC09, M062-FD09

SPEED CIRCUIT

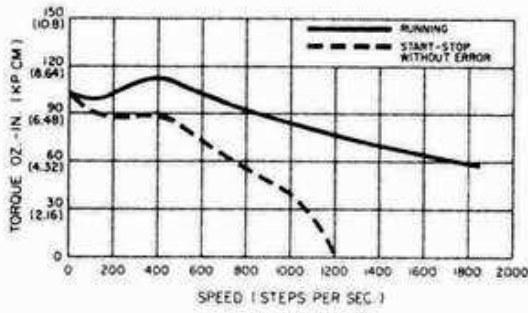


OSCILLATOR RAMP CONTROL CIRCUIT

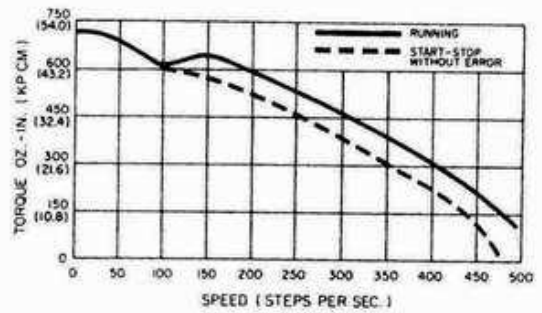


WHEN 0-1, OSCILLATOR TURNS ON AND RAMP UP TO THE MAXIMUM SPEED AS DETERMINED BY THE SPEED POT.
 0-0, OSCILLATOR TURNS OFF AFTER IT HAS DECELERATED FROM MAX. SPEED TO ZERO IN APPROXIMATELY 160 MILLISECOND.

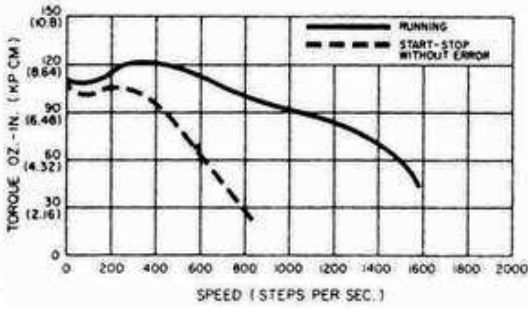
R OSCILLATOR CONTROL



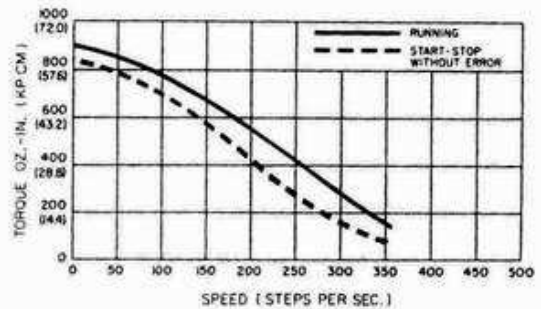
M063-FC09, M063-FD09



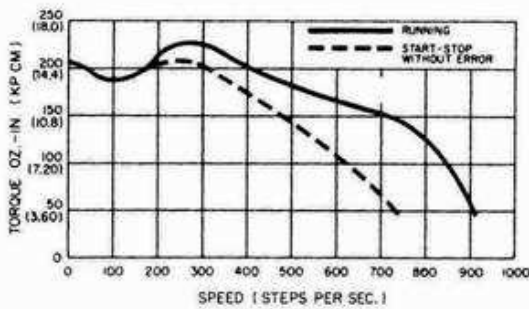
M112-FD12, M112-FJ12



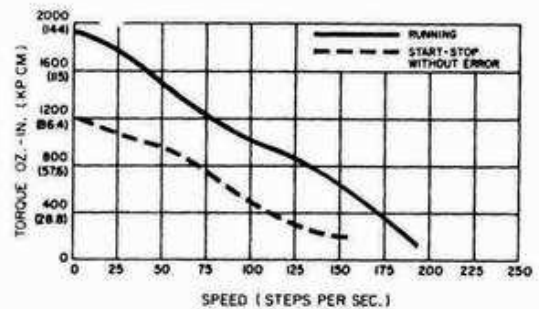
M091-FC09, M091-FD09



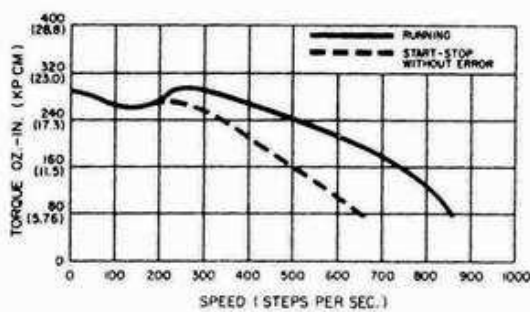
M112-FD08, M112-FJ08



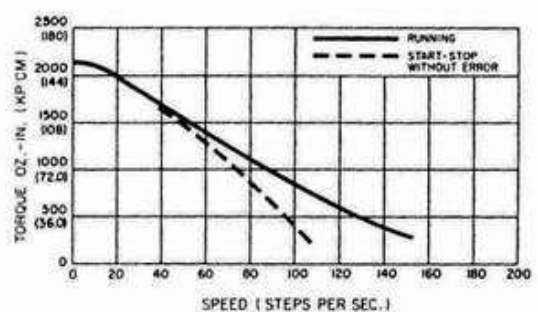
M092-FC09, M092-FD09



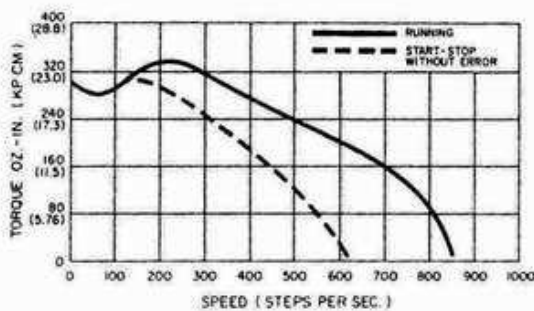
X1500-1001



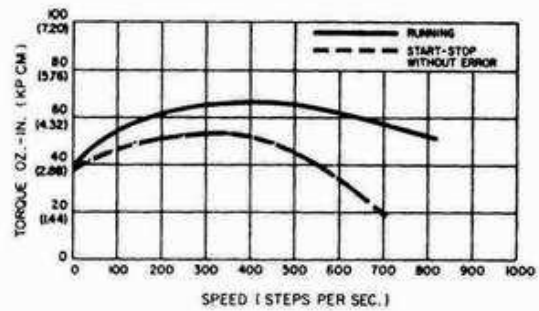
M093-FC11, M093-FD11



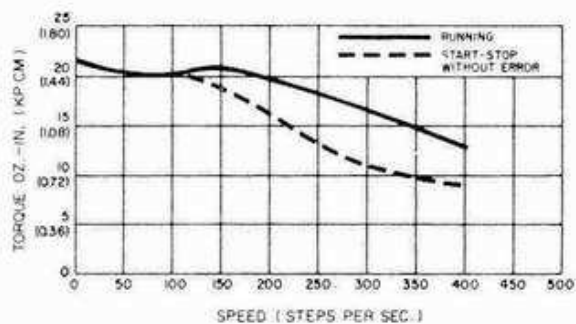
SS1800-1007



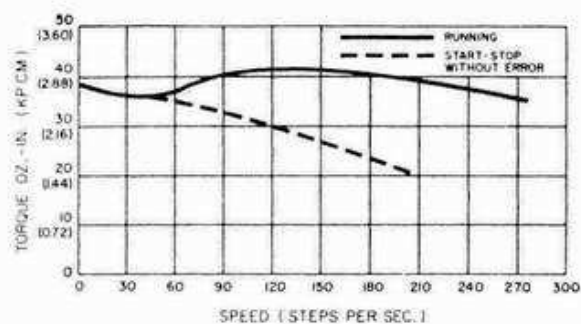
M111-FD12



LS50-1005



TS25-1008

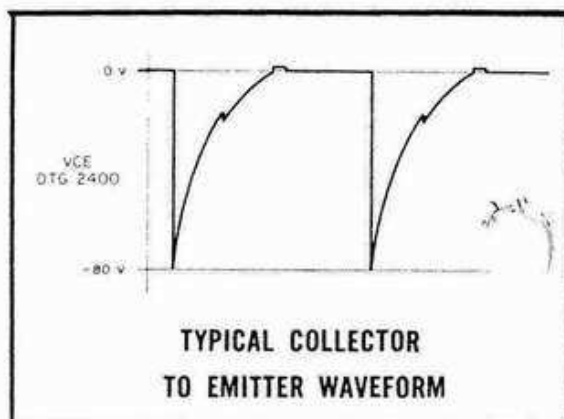


TS50-1001

TROUBLE SHOOTING

If the translator module fails to step the motor properly, check the following items:

1. Check all installation wiring carefully for wiring errors or poor connections.
2. Check the power supply to be sure it meets the required specifications.
3. Check to be sure the proper value dropping resistors have been installed.
4. Check to see that the voltage at connector pins 22 and 23 is +12 volts and that the voltage at connector pins 30 and 31 is -25 volts. Check to see that there is -12 volts at pins 25 and 26.
5. Check to see that there is an 8 to 10 volt negative change of voltage at pins 33 and 34 or at pins 35 and 36 each time a step signal is given. The minimum pulse width should be 30 microseconds.
6. With a d-c voltmeter check to see that the voltage to the motor windings is being switched on and off. Each of the four windings should be energized for two steps and be de-energized for the next two steps. The test should be performed at very low speeds or by triggering the unit with external switches. At higher stepping rates, an oscilloscope can be used to check collector to emitter waveforms of the four power transistors. A typical waveform for an M092-FD09 motor at 500 steps per second is shown.



If the motor will not drive the load at the desired speed and the tests show the translator module is operating correctly, the combination of friction load and inertia may be too great for the system to overcome. This problem can usually be corrected by reducing the speed. In severe cases, it may be necessary to use a motor with a higher torque rating or to drive the load through a gear reduction system.

If any unusual problems are encountered in the installation or operation of the SLO-SYN Translator Module, contact the factory or the nearest field office.



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