
Programming the M1052

16 Channel PLS

The following is an overview of the programming modes on the M1052-16 Channel PLS. The different modes are accessed by repeatedly pressing the MODE Key until the desired mode is displayed. More detailed description of the programming modes follow on the next page.

When inputs Svp0 = False and Svp1 = True, all programming modes are accessible. All outputs are disabled. All parameters can be programmed.

- **Default Display** — Program number, tachometer, and position are simultaneously displayed.
- Scale Factor (16 to 999)
- Offset (0 to scale factor)
- PLS Set Points (0 to scale factor)
- New Cycle Reset (0 to scale factor)
- Speed Compensation (0.000 to 0.900 msec)
- Enable association for channels 1 to 5
- Analog scaling 4.0 to 20.0 mA and 0 to 999 RPM
- Program Duplication
- High and Low Motion Limits (0 to 999)
- Low Motion Enable (0 to 999)
- **Program number selection from keyboard**— the program number is changed by direct keyboard selection, if the external program selection (EP) is true. The program number is controlled by input PS0- PS3 and the program number mode is not accessible.

Note:

Programming of the analog output scaling is only necessary when the optional analog/digital board is plugged into the M1052.

When inputs Svp0 = True and Svp1 = True only, the following three modes are displayed. All outputs are enabled. Setpoints and speed compensation can be programmed.

- Default Display
- PLS Setpoints
- Speed Compensation

When input Svp0 = True/False and Svp1 = False, only the default mode is displayed. All programming is disabled.

The M1052 will automatically return to the default display mode if left without any key presses for more than one minute.

Note:

1. See Flow Chart on the next page.
2. See Symbols used on page 12.

Definitions

Program

There are sixteen distinct setups that may be preprogrammed into the M1052. These setups are identified by a Program Number 1 to H. The current Program Number may be selected in two ways:

1. External Program Selection, if EP enabled.
2. Keyboard Program Number Selection, if EP disabled.

The following parameters are independent of Program Number and are common to all programs:

- Scale Factor
- Offset
- High/Low Motion Limits
- End/Beginning of new cycle
- Enable Inputs association
- Analog output scaling
- Low Motion Enable

The remainder may have different values from program to program. There are 16 independent output channels, each of which contains its own setpoint program to turn the output on or off at different shaft angles. Channels 1 to 5 also contain their own speed compensation factors

Key Functions

The programming key sequences are fairly general for all modes. The keys function as follows:

MODE Key:

Press to sequence through the different programming modes. Pressing the MODE Key will save programming changes to the nonvolatile memory.

INC / DEC Keys:

Blinking digits in a window indicate that that window's contents may be changed; numbers will be incremented or decremented, non-numerical selections will change to other selections. Channel Number in the second window can always be increased and decreased.

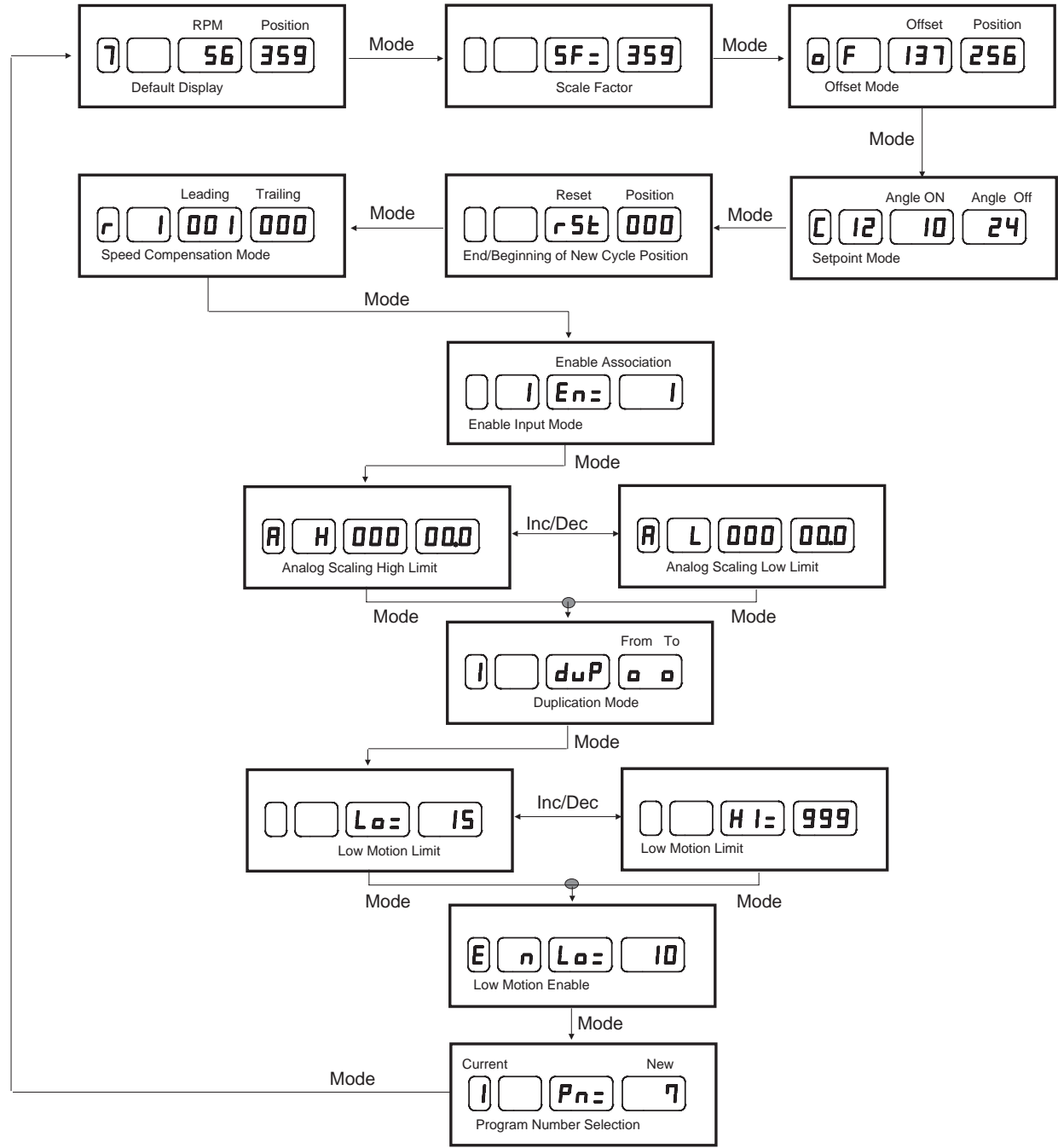
Right Arrow Key:

If programming is enabled, use the Right Arrow Key to change which window may be edited. Editing may occur in the window with the blinking digits.

Recall Key:

The Recall Key is used to recall setpoints in Channel Setpoint mode. It is also used to perform programming duplication in the duplication mode.

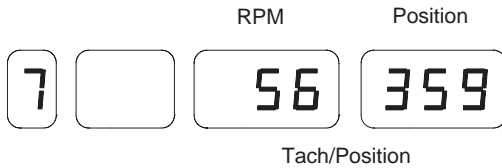
Programming Flow Chart



SVP0	SVP1	Modes Available
F/T	F	Default display only
F	T	All modes
T	T	Default display, setpoint and speed compensation

1. Default Display

Program Number, Tachometer RPM, Base Position.



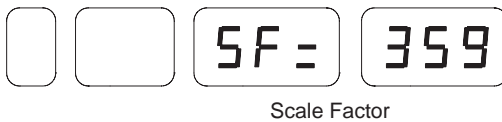
In the event of a resolver cable fault: Program Number, and the message “CABLE” instead of Tach and Position.



The Base Position for the M1052 is composed of the absolute resolver position plus the machine offset value which is common to all sixteen programs.

2. Scale Factor

Svp0=False and Svp1=True for programming and viewing



The Scale Factor is the desired counts per turn minus one. For example, to work in degrees, program the Scale Factor to 359. The allowed range of values is 16 to 999. The Scale Factor is common to all Programs 1 to H.

3. Offset

Svp0=False and Svp1=True for programming and viewing

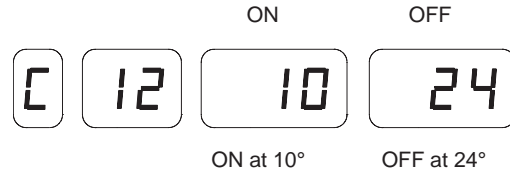


The Offset value is the angle that when added to the absolute resolver position, yields the desired machine position. The allowed range for the offset is 0 to Scale Factor. The Base Offset is common to all Programs 1 to H.

4. Setpoint Programming

Svp1=True for programming and viewing

Angle-on/Angle-off setpoints are programmed in this mode.



When the Shaft is moving in the forward direction (CCW), Angle-on/Angle-off setpoints are defined as: Angle-on = Angle at which the output will turn on. Angle-off = Angle at which the output will turn off. These angles are programmed by using the Right Arrow Key to select the number to edit, then Incrementing or Decrementing the number. Pressing the Right Arrow Key moves you from Channel Number to On Setpoint to Off Setpoint to both On and Off setpoints together, and back to Channel Number. Pressing the Recall Key will reveal any additional Setpoints in the selected channel and will provide the “Null Setpoint” symbol [o][o] so that additional setpoints may be added to that channel. Each Channel 1 to 16 may contain any number of setpoints (on/off pairs) up to the following limits: 60 setpoints channels 1 to 16.

5. End/Beginning of New Cycle Position

Svp0=False and Svp1=True for programming and viewing



Use the **INC** and **DEC** Keys to change the reset position. When the resolver reaches this position, the M1052 resets the output channels associated with the enable inputs EN1–EN3.

6. Speed Compensation

Svp1=True for programming and viewing



Each channel from 1 to 5 has its own pair of speed compensations. The value in the RPM window is the leading speed compensation, and the trailing speed compensation is in the position window in msec. The right **Arrow Key** moves you

from channel to leading to trailing values. The values are changed using the **INC** and **Dec Keys**. The trailing speed compensation is always less than or equal to the leading speed compensation. The Mode Key advances to the next page. The speed compensation values displayed are in msec.

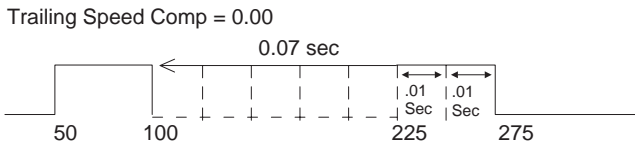
Note:

Caution must be used in programming the speed compensations. Since the leading speed compensation can be much larger than the trailing speed compensation, it is possible to have a setpoint leading edge collide with the trailing edge of itself or the previous setpoint. This situation is RPM dependant. What works at low RPM might not work at a higher RPM.

Example:

Scale Factor = 360

$(360 \text{ Degree/Rev}) (\text{RPM}) (\text{Min}/60 \text{ Sec}) = (\text{Deg/Sec})$

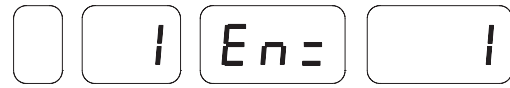


@ 417 RPM $360 * 417 * 1/16 = 2500 \text{ Deg/Sec}$

At 417 RPM with the leading speed compensation set to 070 (.07) sec and the trailing speed compensation set 000, the above setpoints collide with each other. These speed compensation and/or setpoint values will not function correctly at any RPM faster than 417.

7. Enable Inputs:

Svp0=False and Svp1=True for programming and viewing

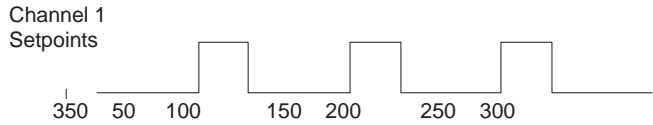


Channels 1 to 5

Enable associated with the selected channels
 1 = EN1
 2 = EN2
 3 = EN3
 PLS = Channel always enabled

Enables EN1, EN2 and EN3 are user assignable to channels 1 to 5. These enable inputs are read during the period between the new cycle position and the next setpoint position for that channel. If a true level is read then the channel associated with that input is enabled for that cycle.

Example SF=359, EN=3
 New Cycle Position=350



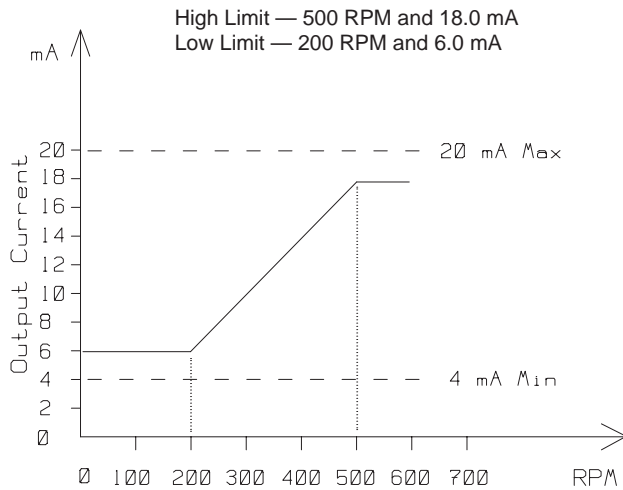
If EN3 is high at any point between positions 350 and 50, channel 1 is enabled for that cycle. If not channel 1 is disabled for that cycle. If the channel association is PLS, the corresponding channel is always enabled, independent of the EN1–EN3 inputs (functions as normal PLS). The FCI input controls the channels (1 to 5) associated with any enable. For these channels to be active during the first cycle (one revolution after the resolver is stopped), the FCI has to be true.

8. Analog Output Scaling

Svp0=False and Svp1=True for programming and viewing
 The **Inc** and **Dec** Keys toggle from L (low) to H (High) limits. Enter the RPM limit and the corresponding current at that limit. The output current will act as depicted in the graph below.

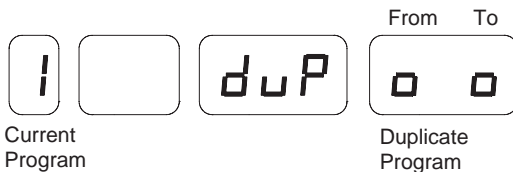


The Analog Output is 4 to 20 mA. The minimum value for low limit current is 4 mA. The maximum value for the high limit current is 20 mA.



9. Duplication of Programs

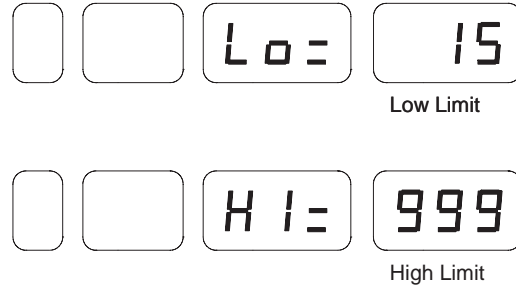
Svp0=False and Svp1=True for programming and viewing



The current program number is displayed in the program number window. The program numbers to duplicate from and to are displayed in the position window. The **INC** and **DEC** Arrows toggle between the from and to program numbers in the position window. Pressing the **Recall** Key will duplicate the from program parameters into the to program parameters. The current to program parameters are lost, they are replaced with the duplicated values. The duplication is complete when a Null "0" appears in to window.

10. Motion Limit

Svp0=False and Svp1=True for programming and viewing
 The motion output is controlled by the low and high motion limits.



If the resolver shaft RPM is between the motion limits inclusively, the motion output will be energized. Motion limits are common for all 16 programs.

11. Low Motion Enable

Svp0=False and Svp1=True for programming and viewing



If the shaft RPM is greater than the low motion enable value, the channels 1–5 associated with any EN1, EN2, EN3 are enabled. When the RPM is less, these associated channels are disabled.

12. Program Number Selection

Svp0=False and Svp1=True for programming and viewing
 Program Number Selection is allowed only if the following conditions are met:

- The shaft is not turning (RPM < 4),
- The Program Enable is on.



The Program Number may be selected from the keyboard only if the External Program Select input is off. If the External Program Select input is on, then the states of the Program Select inputs will determine which Program is selected.

Symbols Used in Programming Displays

Symbol				English	Function/Description
7		CA	BLE	CABLE	Cable fault
		SF=	359	SF	Scale factor
		Lo=	15	Lo	Low motion limit
		HI=	999	HI	High Motion Limit
E	n	Lo=	10	EnLo	Low Motion Enable
1		Pn=	7	Pn	Program number
C	12	10	24	C	Channel dwells, Ch 1–16
r	1	001	000	r	Rate (speed comp) leading and lagging
	1	En=	1	En	Enable select for Ch 1–5
		rSt	000	rSt	Cycle reset position, Ch 1–5
A	H	000	00.0	A	Analog scaling
				H	High (L–Low)
1		duP	0 0	duP	Program duplication

M1052 Troubleshooting Guide

Symptoms	Possible causes
Unable to program unit parameters (Scale Factor, Offset, etc.)	<ul style="list-style-type: none"> • Is the Program Enable Input Svp1? (i.e., the voltage level at the input is less than 11V) • Is the machine moving? — programming of several parameters (Scale Factor, Program Number) is disabled if the resolver is turning faster than 3 RPM. • If unable to program setpoints, the PLS program may already have 60 setpoints.
Program memory is changing by itself.	<ul style="list-style-type: none"> • Has the program number been changed to a different number (P1-P16)? • Have proper grounding and shielding practices been applied? • Is the Svp1 input TRUE? (while this will not cause the program to change itself, keeping it FALSE when not actually programming the unit ensures that the memory cannot be programmed.)
Position and RPM readings are incorrect.	<ul style="list-style-type: none"> • Is the resolver correctly wired? Follow the steps below for a quick check. <ol style="list-style-type: none"> 1. Turn power off to M1052 unit 2. With main terminal block removed from unit, measure with ohm meter the followings: <ol style="list-style-type: none"> A. Term. 5 to Term. 6 (R1 to R2) = about 30 ohms B. Term. 1 to Term. 3 (S1 to S3) = about 55 ohms C. Term. 2 to Term. 4 (S2 to S4) = about 55 ohms • Is the resolver cable properly grounded and shielded?
Mechanical Zero drifts.	<ul style="list-style-type: none"> • Is the mechanical Resolver linkage loose? • Has the offset value been changed?
If all fails	<ul style="list-style-type: none"> • Call AVG Technical Support at 1 (800) TEC-ENGR (832-3647)

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