SIMPLIFIED INSTRUCTIONS FOR PROGRAMMING GMH ENGINEERING'S SRO100 DIGITAL INDICATOR

When we ship out the SRO100, it is preprogrammed as follows:

File Number 0	Display reads in mph where 100 pulses per second equals 1 mile per hour. To be used in applications where the target is moving directly towards the sensor.
File Number 1	Display reads in mph where 86.6 pulses per second equals 1 mile per hour. To be used in applications where the offset angle is 30 degrees. For example, sensor is mounted on a vehicle and the sensor is looking at the ground at an angle 30 degrees down from horizontal.
File Number 2	Display reads in km/h where 62.14 pulses per second equals 1 kilometer per hour. To be used in applications where the target is moving directly towards the sensor.
File Number 3	Display reads in km/h where 53.81 pulses per second equals 1 kilometer per hour. To be used in applications where the offset angle is 30 degrees. For example, sensor is mounted on a vehicle and the sensor is looking at the ground at an angle 30 degrees down from horizontal.

Generally, when we ship out the SRO100, it is set at file number "0." If you need to reprogram the SRO100, the following is a step by step explanation of how it is done.

COMMUNICATON CABLE

The best way to program the SRO100 is with your computer. You will need a nine pin connector cable. A standard, nine pin, connector cable has one male end and one female end. You will need to buy a converter that will change the male end to a female end so that the cable has two female ends. In the United States, we call such a converter a "gender bender." If you cannot find a converter to change the male end to a female end, you may make your own cable. You will need two female connectors and some 3 conductor wire. Only three of the nine pins are used. One wire will go from pin number five on the first connector to pin number five on the second connector. The second wire will go from pin number two on the first connector to pin number three on the second connector. The third wire will go from pin number three on the first connector to pin number two on the second connector. (If you look very closely on the connectors, the pins are all numbered.)

GETTING THE COMPUTER READY

I assume that the operating system on your computer is Windows.

Turn on your computer.

Click on "Start" and a menu will pop up. Go to "Programs." Go to "Accessories." Go to "Communications." Go to "Hyper Terminal."

When you have opened Hyper Terminal, click on "Hypertrm.exe."

When you have opened "Hypertrm.exe," a "Connection Description" box may be on your screen. If it is not there, drag from "File" down to "New Connection." You should now have the "Connection Description" box on your screen.

In the name box, type in any name that you wish (something like "SRO Connection").

You may also pick an icon. It does not matter which icon you pick.

Click on "OK."

A "Phone Number" box should now appear on your screen. Ignore the first three boxes because you are not going to use a telephone. In the forth box, "Connect using," drag down to "Direct to Com 1." (This is the communication port on the back of your computer. This is the communication port into which you have the plugged the cable going to the SRO100. If the SRO100 is plugged into communication port number 2 on your computer, then drag down to "Direct to Com 2.)

Click on "OK."

A box for "Com1 Properties" should appear. There are five boxes in "Port Setting." These are already set to your default settings. You may or may not have to change them. If they are not already set to the following, change them.

Bits per second: "9600"
Data bits: "8"
Parity: "None"
Stop bits: "1"
Flow Control: "None"

When everything is set to the above settings, click on "OK."

Drag from "File" down to "Properties."

Click on "Settings."

Again, depending on your default setting you may or may not have to make the following changes:

Function, arrow, and ctrl keys act as "Terminal Keys."
Emulation: "Auto Detect"
Backscroll buffer lines: "500"
Beep three times when connecting or disconnecting: (I leave this unchecked. But you may check it if you like. It does not matter.)

When everything is set to the above settings, click on "ASCII Setup…"

Under "ASCII Sending, it should be set as follows:

Send line end with line feeds: This should be "Checked."
Echo typed characters locally: This should be "Checked."
Line delay: "0" milliseconds
Character delay: "0" milliseconds

Under "ASCII Receiving, it should be set as follows:

Append line feeds to incoming line ends: This should be "Unchecked."
Force incoming data to 7-bit ASCII: This should be "Unchecked."
Wrap lines that exceed terminal width: This should be "Checked."

Click "OK" in the "ASCII Setup" box.

Click "OK" in the "Settings" box.

You are now ready to program the SRO100

GETTING THE SRO100 READY

Supply 12 VDC to the SRO100. Turn on the SRO100.

SETTING UP TO PROGRAM THE SRO100

You should have power going to the SRO100. The SRO100 should be turned on. The SRO100 should be connected to your computer's communication port. Your computer should be opened to the Hyper Terminal setup as described above.

To verify that your computer is ready to communicate with the SRO100, Type: ****R** and press "Enter." If everything has been done correctly, the computer will respond with a "1". If there is no response, something is wrong.

Final notes before programming:

The programming is case sensitive. Always use capital letters when instructed to do so.

The SRO100 has an address code. When they come from the factory, the address code is: 00 (that is two zeros – not two letters O). You may change the code, but if you change the code and forget what you changed it to, you will be in trouble. When programming, each command is preceded by the address code. In my instructions, I will use the factory set address code of "00." If you have changed the address code, substitute your new address code for my "00."

PROGRAMMING THE SRO100

Verify communication with the SRO100 by typing "**R" and by pressing "Enter." If your computer has responded with a "1," you are ready to program. If you make a mistake while typing the program, you cannot go back or press delete. Simply press "Enter." The computer will ignore the command as a bad command and not respond with a "1." Then continue to program.

The SRO100 has the ability to store four file programs. The four files are numbered 0, 1, 2, and 3. But before storing any files, you need to load the setup files which are common to all:

Programming Settings Common to All Files

Type: **00UD** and press "Enter." This will load the Default Configuration.

Type: **00G0** and press "Enter." The computer should respond with a "1." This will turn the backlighting off. If you would like the backlighting on, type: 00G1 and press "Enter."

Type: **00Z0** and press "Enter." The computer should respond with a "1." This will cause the leading zeros to be blanked.

Type: **00J1** and press "Enter." The computer should respond with a "1." This will give you one decimal point.

Type: **00A0** and press "Enter." The computer should respond with a "1." This turns the alarms off.

Programming the First File (File number "0")

The first file is numbered file "0." We program the first file to read in MPH, and where 100 pulses per second equals 1 MPH.

Type: **00EMPH** and press "Enter." The computer should respond with a "1." This will cause the engineering units to read, "MPH."

Type: **00D0.1** and press "Enter." The computer should respond with a "1." This enters the "M" value. (I will discuss the "M" value later. Or, you can look at the bottom of page 8 in the SR0100 instruction manual.)

Type: **00C0** and press "Enter." The computer should respond with a "1." This enters the "C" value. (The "C" value will always be "0")

Type: **00X** and press "Enter." Whenever you enter "00X" it will display the programmed information for the file you have open. The computer should now respond with the information we have just programmed. The response should be as follows:

V1.4
0
100000
10000
0
0.100000
0.000000
1
0
1
MPH
0
0

Now I will explain what the displayed information means. I will first type the computers response and then explain its meaning.

DISPLAY	EXPLAINATION OF ITS MEANING
V1.4	This is the Firmware version. This never changes
0	This tells you if the Alarm is on or off. (0 = Off; 1 = On)
100000	This is the High Alarm Value
10000	This is the Low Alarm Value
0	This is the Hyst Value. It should always be 0.
0.100000	This is the "M" or Math value.
0.000000	Math "C" value. This never changes.
1	This is for Averaging (1 = normal; 2 = 2 Readings; 3 = 4 Readings; 4 = 8 Readings). It should always be "1."
0	This shows if a leading zero is to be displayed. (0 = Off; 1 = On) It should not be a leading "0."
1	This indicates that there is only to be one decimal point. This was done initially in the programming common to all files.
MPH	This is what will be displayed with the three small digits that indicate the engineering units.
0	This indicates whether the backlighting is on or off. (0 = Off; 1 = On)
0	This indicates whether the alarm buzzer in on or off. (0 = Off; 1 = On)

If the computer's response is correct, you now save this program into the memory. We are going to load this program into the memory of file number 0.

Type: **00US0** and press "Enter." The computer should respond with a "1." (Basically, what you have just typed is: 00 (this is the address of the SRO100 unless you have changed it) US (this stands for User Save) 0 this is the number of the file in which you saved it.

Programming the Second File (File Number "1")

You have programmed the first file in the SRO100 and saved it as file number "0." Now we will program the second file and save it as file number "1." In this file we will program the SRO in MPH where 86.60 pulses per second equals one mile per hour. At a 30 degree offset angle, the output of the sensor is 86.60 pulses per second for every mile per hour of speed measured.

If you are programming file number 0, file number one, file number two, and file number three file all at one time, there is no need to reprogram the settings common to all files. If you have turned off the SRO100, loaded files, or anything else that would cause the SRO100 to go back to the default settings, you will need to again program the setting common to all files (See above; Programming Settings Common to All Files). But, quickly, they are the following commands:

00UD
00G0
00Z0
00J1
00A0

If you are programming and saving more than one file at a time, you do not need to reenter the settings common to all files. Just continue by typing the following:

Type: **00EMPH** and press "Enter." The computer should respond with a "1." This will cause the engineering units to read, "MPH."

Type: **00D0.117786** and press "Enter." The computer should respond with a "1." This enters the "M" value for a 30 degree offset angle when measuring in MPH.

Type: **00C0** and press "Enter." The computer should respond with a "1." This enters the "C" value. (The "C" value will always be "0")

Type: **00X** and press "Enter." The computer should now respond with the information we have just programmed. The response should be as follows:

V1.4
0
100000
10000
0
0.117786
0.000000
1
0
1
MPH
0
0

If the computer's response is correct, save this program into the memory. We are going to load this program into the memory of file number 1.

Type: **00US1** and press "Enter." The computer should respond with a "1." You have just saved this program in file number 1. Now, let's go directly to programming file number 2. This will be for a 0 degree offset angle and measuring in Kilometers per hour.

Programming the Third File (File Number "2")

Type: **00EKPH** and press "Enter. The computer should respond with a "1." This will cause the engineering units to read, "KPH."

Type: **00D0.160934** and press "Enter." The computer should respond with a "1." This enters the "M" value for a 0 degree offset angle when measuring in KPH.

Type: **00C0** and press "Enter." The computer should respond with a "1." This enters the "C" value. (The "C" value will always be "0")

Type: **00X** and press "Enter." The computer should now respond with the information we have just programmed. The response should be as follows:

V1.4
0
100000
10000
0
0.160934
0.000000
1
0
1
KPH
0
0

If the computer's response is correct, you now save this program into the memory. We are going to load this program into the memory of file number 2.

Type: **00US2** and press "Enter." The computer should respond with a "1." You have just saved this program in file number 2. Now, let's go directly to

programming file number 3. This will be for a 30 degree offset angle and measuring in Kilometers per hour.

Programming the Forth File (File Number "3")

Type: **00EKPH** and press "Enter. The computer should respond with a "1." This will cause the engineering units to read, "KPH."

Type: **00D0.189558** and press "Enter." The computer should respond with a "1." This enters the "M" value for a 30 degree offset angle when measuring in KPH.

Type: **00C0** and press "Enter." The computer should respond with a "1." This enters the "C" value. (The "C" value will always be "0")

Type: **00X** and press "Enter." The computer should now respond with the information we have just programmed. The response should be as follows:

V1.4
0
100000
10000
0
0.189558
0.000000
1
0
1
KPH
0
0

If the computer's response is correct, you now save this program into the memory. We are going to load this program into the memory of file number 3.

Type: **00US3** and press "Enter." The computer should respond with a "1." You have just saved this program in file number 3.

Now I, personally, like to go back and check everything. I load each file and check to see if everything was saved correctly.

Type: **00UL0** and press "Enter." The computer should respond with a "1." What you have just done is load file number 0. You typed 00 (the address code) UL

(this stands for User Load) 0 (this is the number of the file you want loaded). Now that you have loaded file number 0,

Type: **00X** and press "Enter." We have opened file number 0. Once the file is open, typing 00X will display the programmed information for the file we have opened. Open all four files and check to make sure the response is correct.

Response for File Number "0"	**Response for File Number "1"**	**Response for File Number "2"**	**Response for File Number "3"**
V1.4	V1.4	V1.4	V1.4
0	0	0	0
100000	100000	100000	100000
10000	10000	10000	10000
0	0	0	0
0.100000	0.117786	0.160934	0.189558
0.000000	0.000000	0.000000	0.000000
1	1	1	1
0	0	0	0
1	1	1	1
MPH	MPH	KPH	KPH
0	0	0	0
0	0	0	0

When you have finished checking all the files, load the file that you want to use. You are now done.

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