Typical Oscillography Settings For the G60

GE Multilin No. GET-8481

Prepared by Darryl Brunner C.E.T.

Description

Oscillography records contain waveforms captured at the sampling rate as well as other relay data at the point of trigger. Oscillography records are triggered by a programmable FlexLogic™ operand. Multiple oscillography records may be captured simultaneously. This technical note is meant to serve as an aid to configuring oscillography. For a complete description of the G60 oscillography feature, refer to the product manual.

The oscillography captures serve as a great tool in analyzing faults, determining wiring and/or setting errors. Proper selection of analog and digital channels in the oscillography menu assures capturing of data needed for fault analysis.

Example

The following is only intended to help the user to understand some of the critical pieces of data required to successfully analyze a fault. Channels may be substituted or added at the user's discretion. Here are the recommended digital points.

SETTING	PARAMETER
Number Of Records	5
Trigger Mode	Automatic Overwrite
Trigger Position	30 %
Trigger Source	Osc_Trig On (VO1)
AC Input Waveforms	32 samples/cycle
Digital Channel 1	100 STATOR OP
Digital Channel 2	ACCDNT ENRG OP
Digital Channel 3	DIR POWER 1 OP
Digital Channel 4	FREQ RATE 1 OP
Digital Channel 5	GEN UNBAL OP
Digital Channel 6	LOSS EXCIT OP
Digital Channel 7	NEG SEQ OV OP
Digital Channel 8	OVERFREQ 1 OP
Digital Channel 9	PH DIR1 BLK
Digital Channel 10	PH DIST Z1 OP
Digital Channel 11	PH DIST Z2 OP
Digital Channel 12	PH DIST Z3 OP
Digital Channel 13	POWER SWING 50DD
Digital Channel 14	POWER SWING BLOCK
Digital Channel 15	RESTD GND FT1 OP
Digital Channel 16	SPLIT PHASE OP
Digital Channel 17	SRC1 50DD OP
Digital Channel 18	SRC1 VT FUSE FAIL OP
Digital Channel 19	STATOR DIFF OP
Digital Channel 20	SYNC 1 SYNC OP

Here is a continuation of the recommended digital points.

SETTING	PARAMETER
Digital Channel 20	SYNC 1 SYNC OP
Digital Channel 21	UNDERFREQ 1 OP
Digital Channel 22	UNDERFREQ 2 OP
Digital Channel 23	UNDERFREQ 3 OP
Digital Channel 24	VOLTS PER HERTZ 1 OP
Digital Channel 25	GROUND IOC1 OP
Digital Channel 26	PHASE TOC1 OP
Digital Channel 27	STATOR DIFF DIR A
Digital Channel 28	STATOR DIFF DIR B
Digital Channel 29	STATOR DIFF DIR C
Digital Channel 30	STATOR DIFF OP
Digital Channel 31	STATOR DIFF PKP A
Digital Channel 32	STATOR DIFF PKP B
Digital Channel 33	STATOR DIFF PKP C
Digital Channel 34	STATOR DIFF SAT A
Digital Channel 35	STATOR DIFF SAT B
Digital Channel 36	STATOR DIFF SAT C
Digital Channel 37	AUX OV 1 OP
Digital Channel 38	OVERFREQ 1 OP
Digital Channel 39	OVERFREQ 2 OP
Digital Channel 40	OVERFREQ 3 OP
Digital Channel 41	OFF

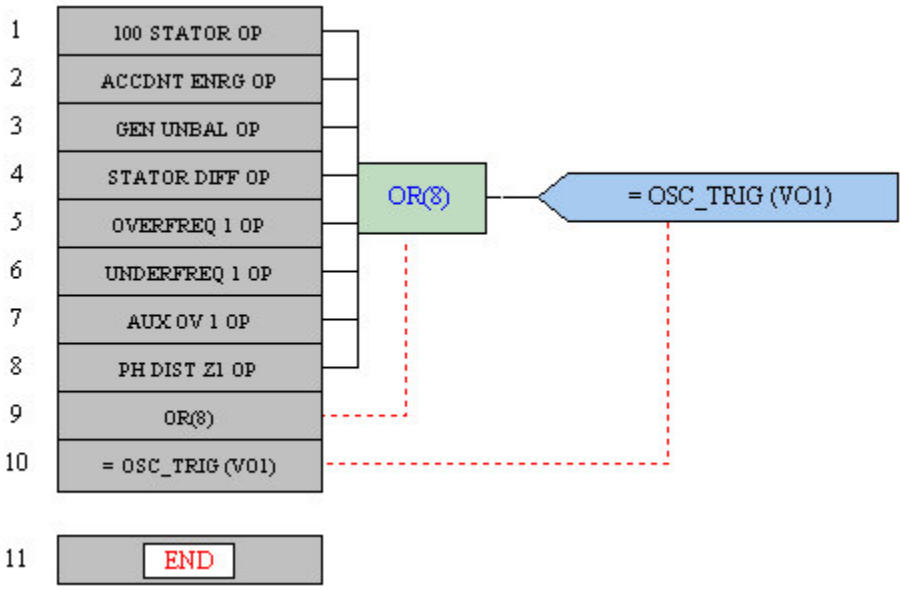
Not all of the possible digital points are included in this example. Other important points include the breaker status contacts (52a, 52b), contact inputs, contact outputs, other desired protection elements (50, 50N/G, 51, 51N/G, UV, OV), virtual inputs/outputs, remote inputs/outputs and direct inputs/outputs. These should be configured depending on the relay and system configurations. Note that all voltages and currents that are configured as sources under the system setup will automatically be included in the oscillography capture.

Here are the recommended analog points.

Digital Channel 63	OFF
Analog Channel 1	Stator Diff Iad
Analog Channel 2	Stator Rest Iar
Analog Channel 3	Stator Diff Ibd
Analog Channel 4	Stator Rest Ibr
Analog Channel 5	Stator Diff Icd
Analog Channel 6	Stator Rest Icr
Analog Channel 7	SRC1 I_0 Mag
Analog Channel 8	SRC1 V_0 Mag
Analog Channel 9	SRC1 I_1 Mag
Analog Channel 10	SRC1 V_1 Mag
Analog Channel 11	SRC1 I_2 Mag
Analog Channel 12	SRC1 V_2 Mag
Analog Channel 13	SRC1 Frequency
Analog Channel 14	Stator Gnd Vn 3rd
Analog Channel 15	Stator Gnd Vn+V0 3rd
Analog Channel 16	SRC1 P

The oscillography trigger must also be configured to ensure that the data is captured at the time of the fault. The trigger source can be one of various protection elements, a trip output or a virtual output consisting of multiple protection elements. The following will show a typical FlexLogic™ equation that could drive a virtual output and thus cause an oscillography trigger.

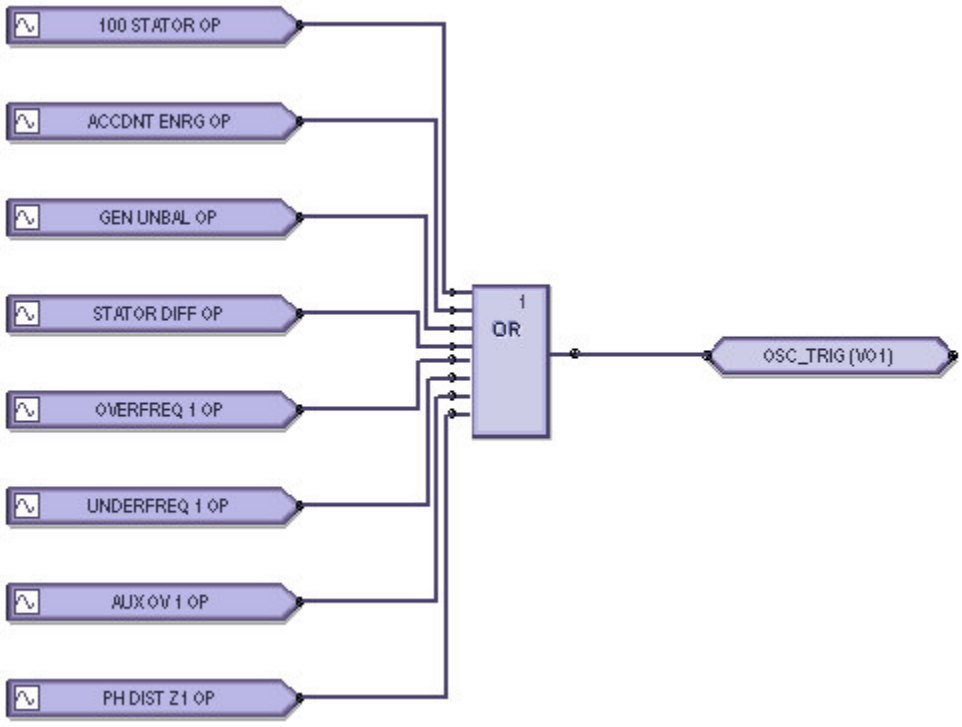
FLEXLOGIC ENTRY	TYPE	SYNTAX
View Graphic	View	View
FlexLogic Entry 1	Protection Element	100 STATOR OP
FlexLogic Entry 2	Protection Element	ACCDNT ENRG OP
FlexLogic Entry 3	Protection Element	GEN UNBAL OP
FlexLogic Entry 4	Protection Element	STATOR DIFF OP
FlexLogic Entry 5	Protection Element	OVERFREQ 1 OP
FlexLogic Entry 6	Protection Element	UNDERFREQ 1 OP
FlexLogic Entry 7	Protection Element	AUX OV 1 OP
FlexLogic Entry 8	Protection Element	PH DIST Z1 OP
FlexLogic Entry 9	OR	8 Input
FlexLogic Entry 10	Write Virtual Output[Assign]	= Osc_Trig (VO1)
FlexLogic Entry 11	End of List	



These diagrams show the FlexLogic™ equation as seen in Enervista UR Setup.

The FlexLogic™ equation shown here was created using the FlexLogic™ equation editor in the enerVista UR Setup software program. EnerVista UR Setup is GE Multilin's toolset that simplifies the process of Settings Creation, Communicating to and testing of the UR relays.

You can download this software free from our website at:
http://www.geindustrial.com/multilin/software/ur/



This diagram shows the FlexLogic™ equation as seen in Enervista Viewpoint Engineer Logic Designer.

The FlexLogic™ equation shown here was created and documented using the Graphical Logic Designer from the Viewpoint Engineer software package. Viewpoint Engineer is GE Multilin's premium toolset that simplifies the process of Settings Creation, Simulation Testing and Commissioning.

You can download and try this software free for 15 days from our website at: http://www.geindustrial.com/multilin/enervista/viewpoint/engineer.htm

This oscillography trigger and FlexLogic™ equation are only intended as an example. The trigger source for each system should be customized to suite the appropriate system configuration and relay settings. It is important to note that the oscillography trigger is automatically included in the oscillography capture.

The number of records, number of samples per cycle and trigger position should also be adjusted to allow for an adequate amount of data to be captured in the oscillography. For a full explanation of these settings, please refer to the product manual.