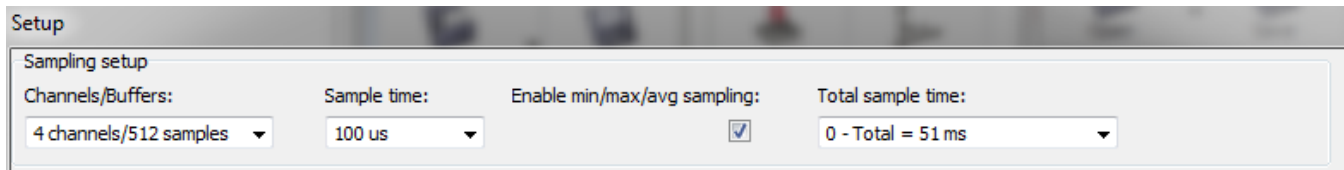


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## Sampling setup



The screenshot shows a 'Setup' window with a 'Sampling setup' section. It contains four controls: 'Channels/Buffers:' with a dropdown menu showing '4 channels/512 samples'; 'Sample time:' with a dropdown menu showing '100 us'; 'Enable min/max/avg sampling:' with a checked checkbox; and 'Total sample time:' with a dropdown menu showing '0 - Total = 51 ms'.

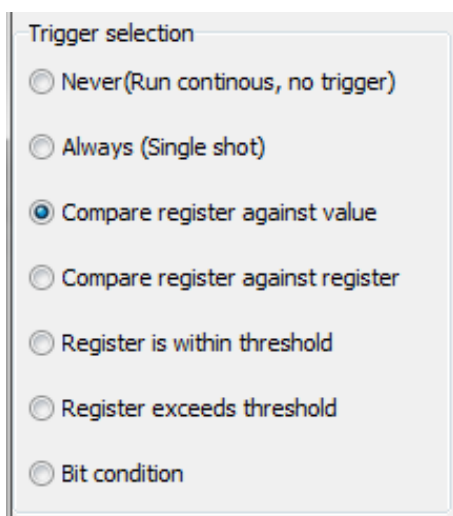
The sampling system is capable of sampling up to 2048 samples on either 4 or 8 channels. The time for each sampling is configured for either 100us or 1.3ms (if internal loop timing is configured for low internal cycle time, then 1ms).

To extend the total sampling time the checkbox “Enable min/max/avg sampling” –can be checked and the internal sampling system will calculate the **Maximum** or **Minimum** or **Average** value between each internal sampling (100us or 1.3/1ms) and store this calculated value into the sampling buffer.

This method is usefull in numerous cases :

- Whenever a certain peak value needs to be tracked in a system over a prolonged period. Exc. Sudden supply dips, torque values that exceeds the specification or simply temperature logging.

## Trigger selection



The screenshot shows a 'Trigger selection' dialog box with seven radio button options: 'Never (Run continous, no trigger)', 'Always (Single shot)', 'Compare register against value' (which is selected), 'Compare register against register', 'Register is within threshold', 'Register exceeds threshold', and 'Bit condition'.

The sampling system can be started (Triggered) in numerous ways.

Data are stored in a circular buffer system which means that the system can run continuous and sample data all the time and stopped by external control exc. By a PLC or another master controller.

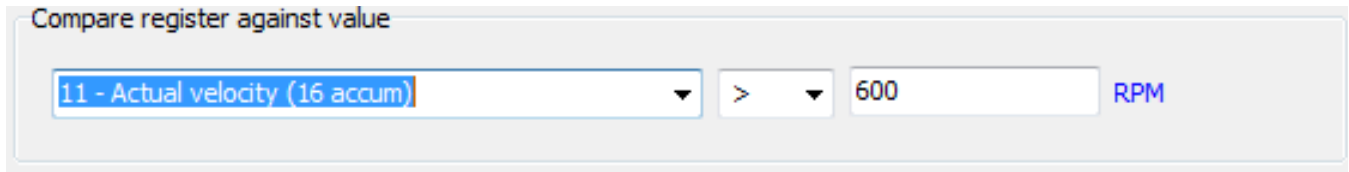
### Never

This selection is used when an external system is used for controlling the triggere.

### Always

This selection is used for a single shot sampling and will be initiated as soon as “Start” is pressed.

### Compare register against value



Compare register against value

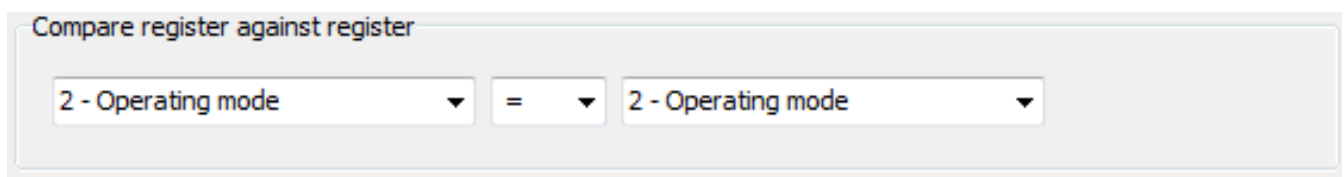
11 - Actual velocity (16 accum) > 600 RPM

A register value can be compared against a constant value and triggered when the register value meets the configured criteria. The comparison operators are:

- = (equal)
- != (not equal)
- > (greater than)
- >= (greater than or equal)
- < (less than)
- <= (less than or equal)

By clicking on the unit (above example is RPM), the value entered will be scaled to and from engineering units and internally used units.

### Compare register against register



Compare register against register

2 - Operating mode = 2 - Operating mode

A register value is compared against another register value and the sampling system is triggered whenever the comparison criteria is met. The comparison operators are:

- = (equal)
- != (not equal)
- > (greater than)
- >= (greater than or equal)
- < (less than)
- <= (less than or equal)

### Register is within value range

Register is within range

2 - Operating mode

Max. Value  
0

Min. Value  
0

When a register value is within a specified value range the sample system will start sampling. This selection is useful for tracking values in a certain situation, for instance while the motor is accelerating or when the motor is operated in a certain temperature range etc.

### Register is outside value range

Register value outside range

2 - Operating mode

Max. Value  
0

Min. Value  
0

When a register value exceeds the specified value range the sample system will start sampling. This trigger type can be used to track values whenever a register value falls outside the specified range, exc. When the internal Bus voltage either falls under the “Min. Value” or rises above the “Max. Value”.

### Bit condition

Bit condition

35 - Error/status

Bit 24

☒ Edge high

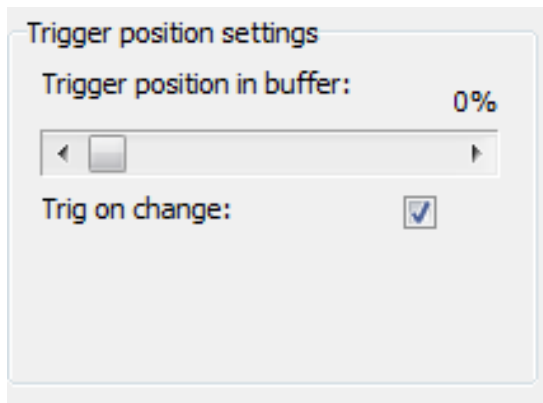
☐ Edge low

A specific bit can be used to trigger the sampling system. A range of registers contains bit for different purposes. The trigger can be configured for either triggering on a rising edge or falling edge.

The above setting monitors bit 24 in register 35. This bit is always set when an error is detected. This triggers the sampling system so that values are sampled when the error occurs. Combined with changing the “Trigger position settings” to a suitable value will reveal exactly what happened prior to the error occurring and following.

Please find the “Trigger position settings” –section for further details.

## Trigger position setting



Trigger position settings

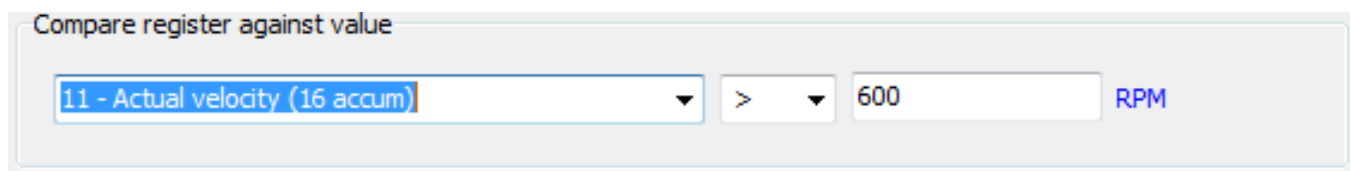
Trigger position in buffer: 0%

◀ ◻ ▶

Trig on change: ☒

The sampling system runs continuously in a circular buffer. When the trigger criteria is met the data displayed will respect the trigger position, so that data sampled just prior to the trigger event, is displayed.

The setting “Trig on change” will wait triggering until the criteria goes from not meet to meet. In other words let's assume that the trigger selection is set as follows:



Compare register against value

11 - Actual velocity (16 accum) > 600 RPM

When we press “Start” the motor is running 800 RPM, when the “Trig on change” is set the trigger system waits until the actual velocity goes below 600 RPM and then is triggered when it exceeds 600 RPM again.

## Channel setup

	Register:	Avg/Min/Max:	First bit: (Optional)	Bit field size: (Optional)
Channel 1:	2 - Operating mode	Average	0	32
Channel 2:	10 - Actual position	Average	0	32
Channel 3:	12 - Actual velocity	Average	0	32
Channel 4:	169 - Actual torque	Average	0	32
Channel 5:	16 - Motorload (mean)	Average	0	32
Channel 6:	18 - Regenerative load	Average	0	32
Channel 7:	29 - Actual temperature	Average	0	32
Channel 8:	198 - Bus voltage	Average	0	32

4 or 8 channels is sampled and the each channel points to a certain register in the motor. The same register can be sampled in more than one channel with different settings.

### Avg/min/Max settings

When the setting “Enable min/max/avg” is checked each channel can be configured for either sampling the **Maximum** or **Minimum** or **Average** value between each internal sampling (100us or 1.3/1ms). A register can be sampled using different settings in more than one channel, if both Min and Max values are of interest.

Example:

Lets assume we have selected 4 channels with 2048 samples over a total sample time of 1min 25s (8500ms). We have selected “Average” for each channel.

The system samples a value every (8500ms / 2048 samples) 4.1 ms the value stored is the **Average** of all the values sampled during the 4.1ms period every 100us, that is 41 samples.

### Average

The value stored is the **Average** of all the values sampled with the 100us/1.3ms sampling time.

### Min

The value stored is the Min. peak of all the values sampled with the 100us/1.3ms sampling time.

### Max

The value stored is the Max. peak of all the values sampled with the 100us/1.3ms sampling time.

### First bit

If a range of bits needs to be sampled this value indicates the start of the bitfield, with the value = 0 for the first bit in the register.

This value is optional.

### Bit field

A specific range of bits in a register can be selected for sampling. This is usually used if a bit field of a certain size and offset is of interest. This value is optional.