

# WHAT IS THE ACTUAL SPEED SCALING WHEN PROGRAMMED TO SCALAR MODE

## Description:

What is the actual speed scaling on the fieldbus when the ACS800 is programmed to Scalar mode?

## Answer:

The actual speed scaling on the fieldbus when the ACS800 parameter 99.04 MOTOR CTRL MODE is programmed to Scalar mode.

Actual Speed is defined in 92.02 MAIN DS ACT1 and is programmed to 102 SPEED by default.

92	D SET TR ADDR	
92.01	MAIN DS STATUS WORD	302
92.02	MAIN DS ACT1	102
92.03	MAIN DS ACT2	105

FbEq (Fieldbus equivalent) scaling for 102 is -20000 = -100% or 20000 = 100% of motor abs. max. speed:

No.	Name/Value	Description	FbEq
<b>01 ACTUAL SIGNALS</b>		Basic signals for monitoring of the drive.	
01.01	PROCESS VARIABLE	Process variable based on settings in parameter group 34 PROCESS VARIABLE.	1 = 1
01.02	SPEED	Calculated motor speed in rpm. Filter time setting by parameter 34.04.	-20000 = -100% 20000 = 100% of motor abs. max. speed

In DTC mode the "motor abs. max. speed" is defined by parameter 20.02 MAXIMUM SPEED, which is logical.

In Scalar mode it is also 20.02, but it's not logical since the ACS800 is in frequency control and parameter 20.02 MAXIMUM SPEED should not be available in Scalar.

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Below is how to adjust the speed scaling (the meaning of the 20,000 units) of MAIN DS ACT1 or Actual speed:

1. Program Parameter 99.04 MOTOR CTRL MODE to DTC and program 99 group motor values for the motor wired to the ACS800 drive per the nameplate.
2. The ACS800 drive will then calculate parameter 20.02 MAXIMUM SPEED and 20.08 MAXIMUM FREQ automatically based on the motor nominal speed and frequency programmed into group 99 parameters.
3. Program parameter 99.04 MOTOR CTRL MODE to Scalar mode.
4. Program parameter 20.08 MAXIMUM FREQ to desired value, this will be the frequency where ACT1 = 20,000 units in the Fieldbus.
5. Now program parameter 99.04 MOTOR CTRL MODE back to DTC. The ACS800 drive will calculate a new corresponding RPM value to 20.02 MAXIMUM SPEED based on parameter 20.08 MAXIMUM FREQ. This changes the MAIN DS ACT1 scaling.
6. Program parameter 99.04 MOTOR CTRL MODE back to Scalar mode.
7. If you want to run the motor at >20,000 units reference on the Fieldbus you need to increase 20.08 MAXIMUM FREQ value, **BUT DO NOT** program parameter 99.04 MOTOR CTRL MODE to DTC or the ACS800 drive will automatically recalculate the values and reprogram 20.02 MAXIMUM SPEED value which will change the speed scaling value.

**Notice: Don't change 99 group motor values because the drive will make again some recalculations!**

What makes things a little more difficult is that in Scalar 20.02 MAXIMUM SPEED is displayed <Bad> within DriveWindow software and 20.08 could display <Read-protected>, but these parameters can still be programmed.

Name	Value
01.03: FREQUENCY [Hz]	0.00
01.11: EXTERNAL REF 1 [Hz]	50.0
20.02: MAXIMUM SPEED [rpm]	<Bad>
20.08: MAXIMUM FREQ [Hz]	<Read-protected>
99.04: MOTOR CTRL MODE	SCALAR
99.05: MOTOR NOM VOLTAGE [...]	230
99.06: MOTOR NOM CURRENT [...]	2.0
99.07: MOTOR NOM FREQ [Hz]	50.0
99.08: MOTOR NOM SPEED [rpm]	1360
99.09: MOTOR NOM POWER [kW]	0.4

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**Documents or other reference material:**

Firmware Manual ACS800 Standard Control Program 7.x

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**Corrective Actions:**

Follow the instructions above.

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