ENCODER – RG355603

MMI Menu Map (from ENCODER 1)

1 CONFIGURE DRIVE
- ENCODER LINES
- ENCODER RPM
- ENCODER SIGN

This block allows the Speed Feedback to be measured using a quadrature encoder when a Speed Feedback Option is fitted - refer to Chapter 3: Speed Feedback and Technology Options.

FUNCTION BLOCKS\MOTOR CONTROL\ENCODER\ENCODER 1

	UNFIL. ENCODER [59]	0 RPM
	ENCODER [206]	0 RPM
	SPEED FEEDBACK [1227]	0.0 %
1000	[24] ENCODER LINES	
POSITIVE	[49] ENCODER SIGN	
1000 RPM	[22] ENCODER RPM	
QUADRATURE	[1267] ENCODER TYPE	

FUNCTION BLOCKS\MOTOR CONTROL\ENCODER\ENCODER 2

	UNFIL. ENCODER [1235]	0 RPM
	ENCODER [1236]	0 RPM
	SPEED FEEDBACK [1237]	0.0 %
1000	[1230] ENCODER LINES	
POSITIVE	[1231] ENCODER SIGN	
1000 RPM	[1232] ENCODER RPM	
QUADRATURE	[1268] ENCODER TYPE	

MMI Menu Map (from ENCODER 1)

1 DIAGNOSTICS
- ENCODER
- UNFIL. ENCODER

The ENCODER 1 function block is associated with the speed feedback option.

The ENCODER 2 function block is associated with Digital Input 2 (terminal C7) and Digital Input 3 (terminal C8) where:

- Digital Input 2 provides the clock.
- Digital Input 3 is used as a direction input.

MMI Menu Map

1 FUNCTION BLOCKS
2 MOTOR CONTROL
3 ENCODER
4 ENCODER 1
4 ENCODER 2
- SPEED FEEDBACK
- ENCODER TYPE

ENCODER

Parameter	Tag	Range
ENCODER LINES	**24, 1230**	**10 to 5000**
The number of lines must be set to match the type of encoder being used. Incorrect setting of this parameter will result in an erroneous speed measurement. The 5901 Microtach has 1000 lines per revolution as standard. Proprietary encoders of other specifications can be normalised by setting this parameter as appropriate.		
ENCODER SIGN	**49, 1231**	**NEGATIVE / POSITIVE**
Since the encoder feedback cannot be reversed electrically, the signal polarity can be reversed by the control software. *It is necessary to set up this parameter when in CLOSED-LOOP VEC mode, as the encoder direction must be correct for this mode to operate.*		
ENCODER RPM	**22, 1232**	**0 to 6000**
Motor top speed setting (100%) when using encoder feedback.		
UNFIL. ENCODER	**59, 1235**	**—. RPM**
Unfiltered encoder speed in RPM		
ENCODER	**206, 1236**	**—. RPM**
Encoder speed in RPM		
SPEED FEEDBACK	**1227, 1237**	**—.x %**
Encoder speed in %. A speed of 100% indicates that the encoder is rotating at the value set in the ENCODER RPM parameter.		

ENCODER

Parameter	Tag	Range
ENCODER TYPE	**1267, 1268**	**See below**

Selects the operating mode of the encoder input. Both of these encoder function blocks can be used in either QUADRATURE or CLOCK/DIRECTION modes of operation. When in CLOCK/DIRECTION mode, the CLOCK input is applied to terminal A on the speed feedback option (for ENCODER 1) or to Digital Input 2 (for ENCODER 2), and every rising edge of the CLOCK is counted.

0 : CLOCK/DIRECTION
1 : QUADRATURE

Functional Description

You must configure Digital Input 2 and 3 which, by default, provide "Ramp Hold" and "Current Demand Isolate" functionality. In the default configuration they are linked using LINK 21 and LINK 22 respectively. The Encoder blocks are connected to terminals C7 and C8 internally and thus don't require these links. Use the Configurator Tool to delete the links.

Alternatively when the default configuration is loaded, this can be done using the Keypad as shown below:

Navigate to the SYSTEM::CONFIGURE I/O menu. Select the CONFIGURE ENABLE parameter and set to ENABLED. All LEDS on the Keypad will flash. Press the E key. Use the ▼ key to navigate to the DIGITAL INPUTS menu.

In this menu, select the DIGIN 2 (C7) menu. Navigate to the DESTINATION TAG parameter and set this value to 0 (zero). Repeat this operation for the DIGIN 3 (C8) parameter.

Remember to perform a Parameter Save.

ENCODER TYPE = CLOCK/DIRECTION

This (pulse-counting mode) Encoder Type can be set in the ENCODER 2 function block only.

Digital Input 2 (terminal C7) is used to provide the clock - the pulses are applied on C7

Digital Input 3 (terminal C8) is used as a direction input:

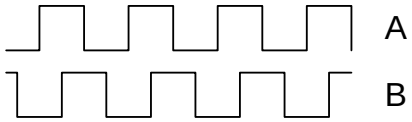
- When C8 is high, (24V), the count is incremented
- When C8 is low, (0V), the count is decremented

Each full pulse received increments the encoder count.
A full pulse is the pulse input going from low to high, and then back to low.
Speed is calculated using the following function:

$$\text{SPEED HZ} = \text{filter}\left[\frac{\text{CountsPerSecond}}{\text{Lines}}, \text{FilterTime}\right]$$

ENCODER TYPE = QUADRATURE

A quadrature encoder uses 2 input signals (A and B), phase shifted by a quarter of a cycle (90°).



Digital input 2, (C7) = Encoder A phase

Digital input 3, (C8) = Encoder B phase

Direction is obtained by looking at the combined state of A and B.
Each edge received from the encoder increments the encoder count. There are 4 counts per line.
Speed is calculated using the following function:

$$\text{SPEED HZ} = \text{filter}\left[\frac{\text{CountsPerSecond}}{\text{Lines x 4}}, \text{FilterTime}\right]$$