

Overview

The 2731-34 is an option to the standard 2731 module. In addition to the functions shown in the standard 2700 manual, the 2731-34 also measures the time between when an input becomes active and when the resolver's shaft stops rotating. This time value is called the Stopping Time and is useful for monitoring brake wear.

The 2731-34 is different from the standard 2731 in the following ways.

1. Four new displays have been added and are used for the functions that are specific to the 2731-34 module. These are, the Transducer's Stopping Time, the number of counts that output 8 (the Top Stop Limit) is being advanced, the Top Stop Fixed Delay, and the Top Stop variable delay.
2. The + and – Input Terminals, the top two pins on the fourteen pin connector, are used to measure the stopping time.
3. The Length parameter in the Block Transfer Read instruction that is used to read data from the module has been increased from three words to four words. The fourth word is used to report the Stopping Time value to the PLC.
4. The Speed Compensation Advance values do not exist on Outputs 1 to 7. This causes a change to the display and to the BTW programming of the On / Off setpoints.
5. With the use of two new parameters, Fixed Delay and Variable Delay, Output 8 can be used to control the stopped position of the transducer shaft. These two delays are used to advance Output 8 so that it will turn on early to stop the transducer's shaft at the desired position. These parameters can be programmed both from the keypad and from the PLC using BTW instructions.

Display

Eight LEDs above the numeric display are used to indicate the function that is currently being shown on the display. The following table shows the twelve possible display functions.

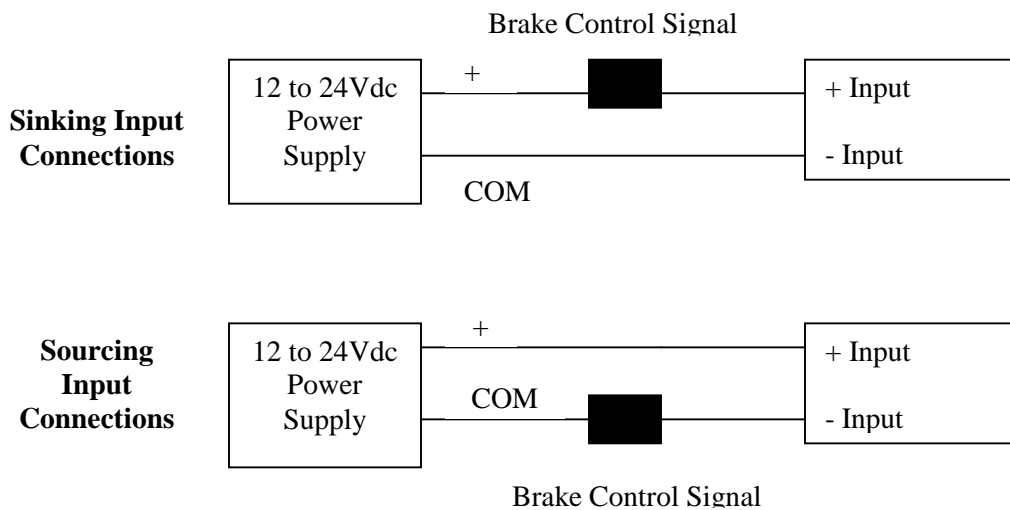
LEDs ON	Function	Range
POS	Transducer's Shaft Position	
TAC	Tachometer (speed of rotation in RPM)	
POS & A	Transducer's Stopping Time	
POS & B	The number of counts that output 8, the Top Stop Limit, is being advanced.	
TAC & A	Tachometer Response Time in ms	32, 60, 120, 240, or 240.0ms
SF	Scale Factor	0 to 1024
SF & A	Circular Offset	0 to (Scale Factor – 1)
O	Limit Inspection and Programming Main Screen	
O & C	Limit Switch On Setpoint	0 to (Scale Factor – 1)
O & D	Limit Switch Off Setpoint	0 to (Scale Factor – 1)
O & B & C	Top Stop Fixed Delay	0 to 255 ms
O & B & D	Top Stop Variable Delay	0 to 9999 ms/RPM

Please note that the Advance Programming patterns of O&A, O&A&C, and O&A&D that are available on the standard 2731 module do not exist on the 2731-34 module.

Stopping Time Input

The Stopping Time input is located on the top two pins of the fourteen pin Limit Switch output connector.

- Optically isolated input
- Input Voltage Range: 12 to 24Vdc
- Input Current Draw: 15mA at 24Vdc
- The 2731-34 module measures the time between when the brake input transitions from OFF to ON, and when the resolver's shaft stops rotating.
- The input can be wired in both sinking and sourcing configurations. A LED will indicate if the input is active when the input is wired in either of the following configurations



Block Transfer Read Data

The 2731-34 module reports its information to the PLC using four Block Transfer Read words. (This is one more word than the standard 2731 module.) These four words have the following format.

16 Bit Word	Function
0	Position
1	Velocity (in RPM)
2	Module and Output Status
3	Stop Time (0 to 9999, measured in milliseconds)

- The Stop Time value will remain in its last state until the next brake operation occurs.
- The Stop Time value will be zero at power up.

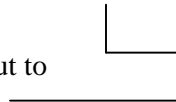
Block Transfer Write Data

The Speed Compensation Advance values do not exist on Outputs 1 to 7. (Output 8 is programmed with the two delay parameters for use in Top Stop applications.) This causes a change to the Command Word / Data Word format that is used by Block Transfer Write instructions to program the 2731-34 module's the On / Off setpoints.

Command Word = C0XY where the X and Y digits are the following

Digit X				Digit Y			
7	6	5	4	3	2	1	0

Use these four bits to enter the number of the limit switch output to be programmed.



Use these four bits to enter the number of On / Off setpoint pairs being defined for this output



The new parameter values are stored as Data Words immediately after the Command Word. All values are stored in BCD format. The order of the Data Words is:

- Word 1: ON Setpoint 1 (0 to Scale Factor – 1)
- Word 2: OFF Setpoint 1 (0 to Scale Factor – 1)
- Word 3: ON Setpoint 2 (0 to Scale Factor – 1)
- Word 4: OFF Setpoint 2 (0 to Scale Factor – 1)

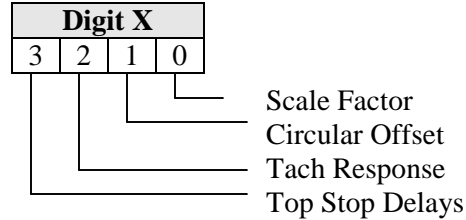
Up to six more setpoint pairs can be specified in Data Words 5 through 16.

For example, the following data would be used to program output 1 with two On / Off setpoint pairs from 10 counts to 20 counts, and from 100 counts to 150 counts. All data is in BCD format.

- Word 0 = Command Word = C012h
- Word 1 = On Setpoint 1 = 10h
- Word 2 = Off Setpoint 1 = 20h
- Word 3 = On Setpoint 2 = 100h
- Word 4 = Off Setpoint 2 = 150h

The two new Top Stop parameters, the Fixed and Variable Delays, are programmed with the Transducer Programming Command Data.

Command Word = 880X where X is the following



The Scale Factor, Circular Offset, and Tach Response are all programmed exactly as shown in the standard 2700 users manual. The Top Stop delays are programmed in two Data Words.

Word 1 = Fixed Delay = 0 to 255h (programmed in ms)

Word 2 = Variable Delay = 0 to 9999h (programmed in ms/RPM)

For example, the following data would be used to program the Scale Factor to 360, the Fixed Delay to 10ms, and the Variable Delay to 100 ms/RPM. All data is in BCD format.

Word 0 = Command Word = 8809h

Word 1 = Scale Factor = 360h

Word 2 = Fixed Delay = 10h

Word 3 = Variable Delay = 100 ms/RPM

Top Stop Function

With the use of two new parameters, Fixed Delay and Variable Delay, Output 8 can be used to control the stopped position of the transducer shaft. These two delays are used to advance Output 8 so that it will turn on early to stop the transducer's shaft at the programmed position.

The Top Stop Advance = Fixed Delay (in ms) + ½ speed (in RPM) * Variable Delay (in ms/RPM)

A new display, indicator LEDs POS & B on, uses the velocity data to calculate the number of counts that output 8 is being advanced.