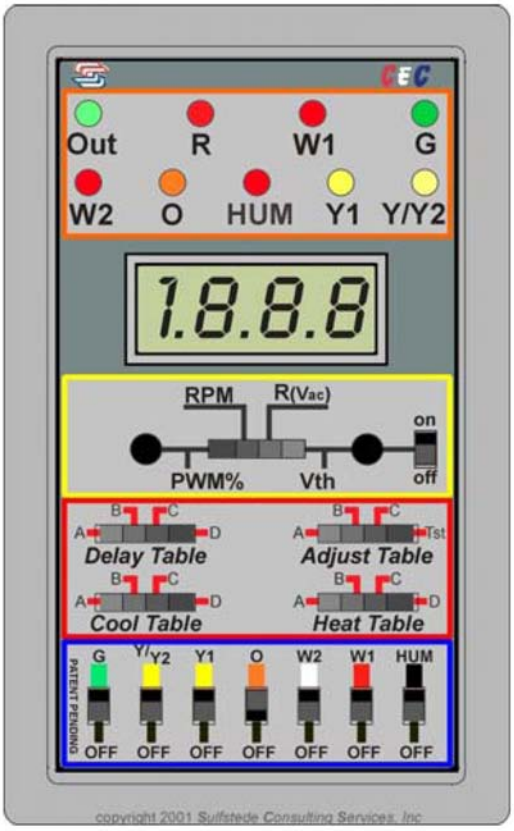
YORK™
Unitary Products Group

Kit #373-25865-000

VARIABLE SPEED MOTOR ANALYZER INSTRUCTIONS

Motor Analyzer 035-18865-000



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VARIABLE SPEED SYSTEM AND MOTOR ANALYZER

These instructions describe how to use the variable speed Analyzer, 373-25865-000, to troubleshoot variable speed UPG furnaces, air handlers, and single package units employing variable speed motors.

DESCRIPTION

The Analyzer is a test and diagnostic instrument suitable for field and laboratory use. It is a system controller that monitors, generates and simulates all control functions that operate the General Electric ECM^{TM} motor used in UPG equipment and competitors with the noted differences below. The use of the analyzer in conjunction with these instructions allows the Service Technician to very quickly diagnose and trouble shoot UPG variable speed products.

The Analyzer exercises all of the control modes and functions of ECM-driven product. It activates on/off delays and airflow settings, granting full access to torque/airflow control as well as the set-up and delay tables programmed into the motor.

The Analyzer has two operating modes. The first, the "SYSTEM" mode, operates the motor while the motor is in-place, installed in the application, and powered by the system. In this mode, the Analyzer operates while the system is operating, monitoring the system's status and verifying the continuity of the control functions. It connects between the motor and the system controls using the systems harness and an auxiliary cable in a simple feed-through configuration

The second mode, the "ANALYZER" mode, independently exercises the motor with or without any connection to the system except for 24 VAC power. By switching between these two modes of operation, with the Analyzer connected in-line with the unit, the technician has a powerful diagnostic tool to determine whether the cfm programming board, the ECM microprocessor, wiring, or the motor is the source of the malfunction.

Analyzer may be use for limited bench testing. Provide external 24vac power to the R and B/C connections on ether side of analyzer with pin tip leads such as 525-31464-000 test leads from Source One. NOTE: The motor must be under a load to work so this has limited use.

ANALYZER OVERVIEW

Refer to Fig # 1 for the location of each of the functions described below.

A. Control Mode Selector –
This switch, located on the right side of the case is the heart of troubleshooting and fault diagnosis. With the switch in the "System" mode the analyzer monitors the information being sent from the unit controls to the motor. With the switch in the "Analyzer" mode the Analyzer supplies the information and controls the operation of the motor.

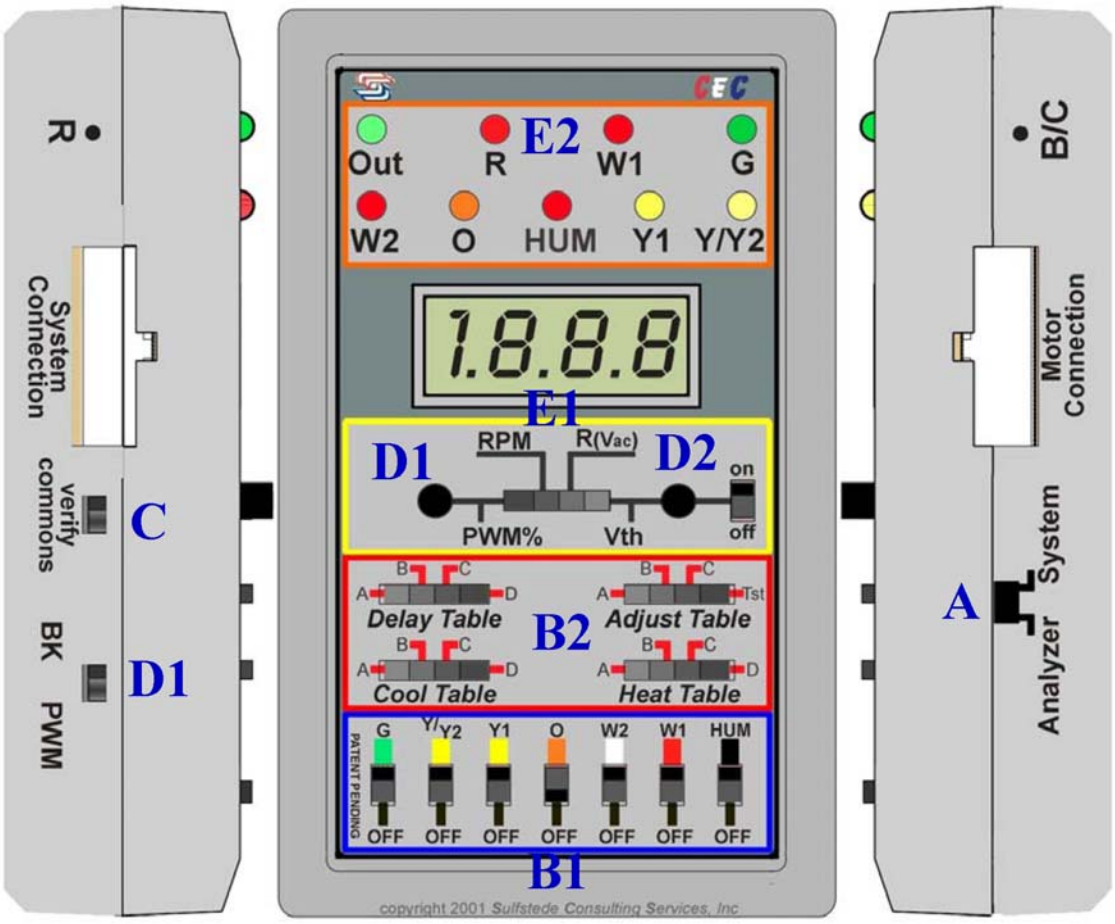

Figure 1. Analyzer

B. Activator Switches -

1. **Control Function Activators –** Seven switches on the face of the Analyzer activate each of the motors control line inputs when the Control Mode Switch is in the "Analyzer" position.

G - Fan only operation.

Y/Y2 - Compressor operation on a single stage system or second stage operation on a two-stage system.

Y1 - 1st Stage compressor operation on a two-stage system.

O - Reversing valve operation. Should be in the "on" position for all cooling units and also for heat pumps in the cooling mode.

W1 -1st Stage of heating for gas furnaces, 2nd stage of heating for an air handler. NOTE: On Non-UPG Boards this may be 2nd stage heat.

W2 -2nd Stage of heating for gas furnaces, 1st stage of heating for an air handler. NOTE: On Non-UPG Boards this may be 1st stage heat.

HUM - With the switch in the "off" position the programmed 1st and 2nd stage cooling airflow is reduced 15%. With the switch in the On 'Up' position the unit should deliver the programmed airflow.

BK/PWM - This switch is on the left side of the analyzer. This allows the analyzer to be used with systems using pulse width modulation. This

switch should always be placed in the "**BK**" position while trouble shooting all current products. (**PWM) -** To control the airflow. This method of control was used on the Triathlon air handler. All current units employ the continuously variable mode of operation. NOTE: Not used in any current production UPG products.

2. **Airflow Programming Switches –** These switches are identified as **COOL, HEAT, ADJUST,** and **DELAY.** Their function is the same as the programming pins on the cfm programming board contained in the unit. When the switch is in the "Analyzer" position the unit cfm is determined by the setting of these switches. At the start of the trouble shooting procedure these switches should be adjusted to match the pin setting on the unit cfm programming board.

C. **Verify Commons** –

This switch is located on the left side of the control. The ECM Microprocessor uses two commons, pin 1 and pin 3 of the 16-pin connector at the motor. In order for the motor to operate properly both of these commons must be connected to the same ground. When the control mode switch is in the "Analyzer" position and the "Verify Commons" is up these two commons are made inside the analyzer. With the "Verify Commons" switch in the down position the connection of the two grounds is determined by the wiring in the unit. NOTE: Not applicable to UPG products but may apply to other manufacturers.

D. **Variable Controls** –

The two knobs in the center of the face of the Analyzer serve the following function.

1. **Pulse Width Modulation Adjust –** the left hand knob on the face of the analyzer controls this feature. This feature is not used with UPG's furnaces, air handlers or single package units employing variable speed motors. This feature could be used to trouble shoot Triathlon air handler variable speed motors.

   The analyzer has an adjustable pulse width modulation generator that is controlled by the knob. As the knob is turned clockwise the on time of the wave increases. This allows the airflow of the motor to be adjusted from no cfm, full off to maximum cfm, fully on. To use this feature set the Analyzer as follows:

   a. Place the **Control Mode Selector** on the right side of the Analyzer in the "**ANALYZER"** position.
   b. Place the **BK/PWM** switch on the left side of the Analyzer in the "**PWM**" position.
   c. Turn the **HUM** switch on the lower right hand corner on the front of the Analyzer to the on position.
   d. Place the sliding switch next to the knob and the front of the analyzer in the full left position.

   In this mode of operation the LCD displays the % of the duty cycle being generated to the motor.