 FEATURES

- 20 kHz PWM output, suitable for all permanent magnet d.c. motors, including coreless.
- No audible motor whine. Silent operation.
- Two RC Channel Inputs - Speed and Direction/Inertia Period. Standard 1.0 to 2.0 ms Servo pulse inputs.
- Motor output from zero to 100 % of supply voltage.
- User calibration for Reverser Stop setting, and zero and maximum Speed settings.
- Three user selectable Operating Modes - Standard, Shunt Control [1] and Shunt Control [2].
- User controlled inertia setting from 1 to 50 seconds for zero to full motor voltage, and vice versa.
- Emergency stop feature to over-ride inertia setting. Provision for factory reset to default settings.
- Single LED for user indications.
- Single push button switch for user interaction.

 FACTORY DEFAULT SETTINGS:

- Reverser Stop Setting = 1.50 ms
- Reverser Forward Setting = 1.50 to 2.00 ms
- Zero Speed Input PWM = 1.50 ms.
- Maximum Speed Input PWM = 1.95 ms.
- Reverser Relay is de-energised for Forward.
- Standard - Linear 0 to 100% Output for full input range.

 LED

- In normal operation, the LED flashes in groups of 1, 2 or 3 flashes when the actual output = Stop, to indicate current operating mode.
- 1 Flash = Standard Linear 0 to 100% PWM Output
- 2 Flashes = Shunt Control [1] Non Linear 0 to 100% PWM Output
- 3 Flashes = Shunt Control [2] Linear 0 to 50% PWM Output
- Also, the LED will go fully on when the motor output voltage reaches 100% PWM.
- On Start up, the LED flashes rapidly for 2.5 seconds, before entering normal operation. If, during this time, the SET-UP push button switch is pressed, the unit will enter Calibration Mode to permit:
- Reverser Stop transmitter setting calibration.
- Zero and Full Speed transmitter setting calibrations.
- Reverser Relay direction to be selected [Energised or De-energised for Forward].
REVERSER & INERTIA CONTROL
The setting of the reverser relay and the inertia period is controlled by a separate reverser channel with a centre zero detent control. Small knob on RCS Tx handpieces using Channel # 3.
To correct for errors in transmitted pulse widths, the 1.50 ms stop PWM setting value can be user calibrated. The inertia period quoted is the time to increase from zero to full motor voltage, and vice versa. It is adjustable in units of 1 second, depending on the rotation of the reverser control.
With default settings, the Reverser Relay is de-energised in Forward. If required, this can be changed by the user to be de-energised in Reverse.
REVERSER RELAY
The reverser relay will change state only when the required direction of operation is changed from Forward to Reverse and vice-versa. It will not change state when the reverser control is set to Stop from either direction of operation.
The relay state will only be changed when:
1: The actual motor voltage has reached zero, and has remained at zero for at least one second, and
2: The reverser control has been set to the opposite direction, and
3: The transmitter speed control has first been set to zero [if not already at zero], and
If the reverser control is set the opposite direction with a motor voltage greater than zero, an immediate Emergency Stop will be executed [See below].
OPERATING MODE
The OMEGA-10 has three user selectable operating modes:
1 Standard Linear 0% to 100% PWM Output for zero to maximum speed demand.
2 Shunt Control [1]. Non Linear 0% to 100% PWM Output for zero to maximum speed demand. Decreased output at low settings of the Tx speed control [25% out at 50% in]
3 Shunt Control [2]. Linear 0% to 50% PWM Output for zero to maximum speed demand.
See Page # 1 for graph of operating mode characteristics.
The current operating mode is indicated by LED flash at PWM output = Stop [see above], unless an emergency stop condition is present [see below].
TO CHANGE THE OPERATING MODE.
1. In normal operation, set Speed = zero, and wait until the LED indicates that zero speed has been achieved.
2. Press and hold push button switch for 2.5 seconds. The LED will flash rapidly.
3. When the LED changes to fully on, after 2.5 seconds, release SET-UP push button switch & the unit will immediately change to the next mode. After Mode 3, it will revert to Mode 1. The LED flash sequence will immediately change to the indicate the new mode.
Repeat Steps 1 to 3 to change the operating mode again.
Each time the operating mode is changed, the new settings are stored in non-volatile memory and will be remembered until changed again.
POWER PROTECTOR
If you have turned on the handpiece with the regulator away from the off position, the OMEGA-10 will not give you power until you have returned the regulator to off, then there is a one second delay.
If control is too abrupt or too sluggish, you can adjust the power curve on the OMEGA-10 as shown above.
EMERGENCY STOP.
During normal operation, the inertia control is operational for both increasing and decreasing motor voltages. With high inertia settings, this can result in a significant period to bring the vehicle to rest, even if the transmitter speed control is switched rapidly to zero speed.
For safety reasons, the OMEGA-10 incorporates an emergency stop feature to over-ride the inertia control setting and immediately de-energise the motor.
To activate emergency stop from any speed setting, set the reverser control to the opposite direction. The OMEGA-10 will immediately enter emergency stop mode, and de-energise the motor, indicated by the LED flashing rapidly emergency Stop.
The emergency stop will be maintained until reset manually by the operator by setting the Speed control back to zero speed, and the Reverser control to Stop. Normal operation will then resume automatically.
On initial power up of the OMEGA-10, an emergency stop will be set automatically, to ensure that the motor is held at zero speed, irrespective of the initial transmitter speed setting until the transmitter speed control has first been set to zero speed, and the reverser control to stop.
WIRING UP THE LOCO
The recommended wiring method is shown on Page # 3. The 100W OMEGA-10 requires a suitable fuse for protection. For maximum protection use a 3 amp fast blow fuse for smaller locos. A 6 amp fast blow fuse should be used for larger locos. Fit the supplied Balun core choke in motor leads if an erratic behaviour.
The 3 x wire servo lead is plugged into the Rx Reverser position. Usually Ch # 3. The single white wire is plugged into the Rx Throttle position. Usually Ch # 1.
JST In-Line connector cables are available separately. See the RCS website.
OPERATING A LOCO
Before operation can occur, the Regulator must be fully OFF (CCW) and the Reverser in neutral (the middle).

SET FORWARDS. Twist the Reverser (small knob) to the right. All the way for minimum inertia (1 x second).
To accelerate, twist the large knob to the right (CW). Once the desired speed is reached the loco will stay at the same speed until told to do something else. Twist the large knob to the left to slow down (CCW).

STOPPING LOCO. Twist the large knob fully to the left for OFF (CCW). Twist Reverser to middle Neutral.

SET REVERSE To select reverse the large knob must be fully OFF (CCW) and then the Reverser is twisted to the left (CCW). All the way for minimum inertia (1 x second).
To accelerate, twist the large knob to the right (CW). Once the desired speed is reached the loco will cruise until told to do something else. Twist the large knob to the left to slow down (CCW).

CRUISE CONTROL. If the Rx does not have Failsafe on Ch # 1, the Tx can be switched off during operation and the loco will “cruise” at the same speed until the Tx is turned back on & the Rx is re-linked.

WIRING THE RCS OMEGA-10 ESC by FOSWORKS.

DO NOT ALLOW BACK OF PCB TO TOUCH A METAL SURFACE

Twin Diversity Antennas

Three wire cable. These can come in various combinations such as White/Red/Black or Orange/Red/Brown. Shown below as Black/Orange/Black
Ensure plugs are correctly located. Orange/White wire towards top/front of RX. Be aware that auto bind Rx’s have a different servo pin layout.

SERVO LEADS FROM ESC

THREE WIRE W/WHITE TRACE SETS DIRECTION.

SINGLE WHITE WIRE IS SPEED.

IN-LINE JST CABLES ARE AVAILABLE SEPARATELY SEE WEBSITE

FIT BALUN CORE HERE

OFF - ON

POWER OUT TO THROTTLE & ACCESSORIES.

FUSES
One Orange Polyswitch mean a 3 amp version
Two orange Polyswitches means a 6 amp version.
THE # OMEGA-10 IS PREPROGRAMMED TO WORK AS INTENDED STRAIGHT FROM THE BOX. PLEASE TRY AS IS, BEFORE ATTEMPTING RE-CALIBRATION.

CALIBRATION

The OMEGA-10 can be user calibrated to accommodate transmitter, receiver, speed, reverser stop & direction PWM settings that differ from the standard nominal values within the following limits.

Reverser Stop  [Step 1]
- The reverser stop PWM value must lie within the range 1.45 ms to 1.55 ms

Speed  [Steps 2 and 3]
- The total input PWM value range must lie within 0.70 to 2.30 ms.
- The input PWM value corresponding to max speed may be greater or less than the zero speed value.
- The zero and maximum speed PWM values must differ by at least 256 µs.

Reverser Direction  [Step 4]
- The reverser direction calibration setting [Step 4] must match either the zero or maximum speed setting.

TO PERFORM A CALIBRATION

1. After the Tx and Rx have been bound, turn them both OFF. Then turn the transmitter back ON.
2. Energise the OMEGA-10. The LED will flash rapidly for 2.5 seconds. During this period, press and release the SET-UP push button switch. If the SET-UP push button is NOT pressed during this period, the unit will enter normal operation, on its conclusion.
3. As soon as the Rx has bound to the transmitter, the LED will go fully on, indicating Calibration Step # 1.

CALIBRATION STEP # 1 REVERSER NEUTRAL SETTING

1. The LED will be fully energised [No Flash].
2. Set the transmitter reverser control to the centre detent NEUTRAL position.
3. Then press and release the SET-UP push button. Provided that the NEUTRAL setting is within the constraints listed above, the new reverser NEUTRAL setting will be saved to non-volatile memory.
4. The OMEGA-10 will now automatically proceed to Calibration Step # 2.

CALIBRATION STEP # 2 – ZERO SPEED SETTING.

1. The LED will flash slowly with a 1:1 On:Off ratio [Equal Flash].
2. Set the transmitter speed control to the required Zero Speed position.
3. Then press and release the SET-UP push button.
4. The OMEGA-10 will now automatically proceed to Calibration Step # 3

CALIBRATION STEP # 3 - MAXIMUM SPEED SETTING.

1. The LED will flash with a 7:1 On:Off ratio [Long Flash].
2. Set the transmitter speed control to the required Maximum Speed position.
3. Then press and release the SET-UP push button.
4. The OMEGA-10 will now automatically proceed to Calibration Step # 4.

CALIBRATION STEP # 4 – REVERSER DIRECTION

1. The LED will flash with a 1:7 On:Off ratio [Short Flash].
2. Set the transmitter speed control as follows:
   3. A. Reverser De-energised in Forward. Leave the transmitter speed control set at the required Maximum Speed position
   4. B. Reverser Energised in Forward: Set the transmitter speed control to the required Zero Speed position.
5. Then press and release the SET-UP push button.

You are recommended, where possible, to always use the Reverser De-energised setting as this results in the minimum OMEGA-10 power dissipation. If necessary, reverse the motor rotation direction by reversing the connections to the motor terminals.

Provided that all three calibration steps [Steps 2 to 4] have been completed, & that the settings made are within the constraints above, the new calibration settings will be computed & saved in non-volatile memory. The unit will then restart, as if power had just been applied, with all new calibration settings fully operational. If an attempt has been made to set invalid calibration values, the previous calibration settings will not be changed, and the calibration procedure will automatically revert to calibration Step 2.

There is no exit from the calibration procedure until correctly completed, except power off.

FACTORY RESET

To perform a factory reset:
1. With the OMEGA-10 de-energised, press and hold the SET-UP push button.
2. Then power up the unit, with the push button still pressed.
3. The LED will flash slowly for 10 seconds, and then go fully on.
4. Then release the push button. The unit will reload all factory default calibration values into non-volatile memory, and then restart normally.

If the SET-UP push button is released before the end of ten seconds, the unit will restart with no change to the previous settings.