TO SET CURRENT LIMIT 1 - WITH THE VFx PROGRAMMER CONNECTED, SET THE REQUIRED VALUE ON THE 'CURRENT LIMIT' ADJUSTMENT, THEN PRESS AND RELEASE THE 'SET-UP' BUTTON.

TO SET CURRENT LIMIT 2 - WITH THE VFx PROGRAMMER CONNECTED, SET THE REQUIRED VALUE ON THE 'CURRENT LIMIT' ADJUSTMENT THEN PRESS AND HOLD THE 'SET-UP' BUTTON UNTIL THE MOTOR 'BEEPS' AND ALL THE LED'S TURN OFF THEN ON, THEN RELEASE THE 'SET-UP' BUTTON.

TO SET THE CURRENT RAMP - WITH THE VFx PROGRAMMER CONNECTED SET THE REQUIRED VALUE ON THE 'CURRENT RAMP' ADJUSTMENT, THEN PRESS AND RELEASE THE SET-UP BUTTON.

THROTTLE DAMPER

THE 'THROTTLE DAMPER' ADJUSTMENT SETS THE MAXIMUM RATE AT WHICH THE VFx WILL ALLOW THE THROTTLE TO BE INCREASED. THE 'THROTTLE DAMPER' CAN MAKE THE CAR RESPONSE SMOOTHER AND WILL HELP TO INCREASE BATTERY DURATION. THE THROTTLE DAMPER IS USEFUL FOR TAMING 'THROTTLE JAMMERS'.
0 IS DAMPING OFF, 100 IS MAXIMUM DAMPING. NOTE: THE DAMPER DOES NOT ALTER THE BRAKE RESPONSE.

TO SET THE THROTTLE DAMPER - WITH THE VFx PROGRAMMER CONNECTED, SET THE 'THROTTLE DAMPER' ADJUSTMENT TO THE REQUIRED VALUE, THEN PRESS AND RELEASE THE 'SET-UP' BUTTON.

BRAKE MAXIMUM AND BRAKE MINIMUM

THE 'BRAKE MAX' AND 'BRAKE MIN' ADJUSTMENTS SET THE RANGE OF BRAKES THE THROTTLE CONTROL CAN PRODUCE. 'BRAKE MAX' SETS THE MAXIMUM BRAKE POWER, 'BRAKE MIN' SETS THE MINIMUM BRAKE POWER. SETTING 'BRAKE MAX' AND 'BRAKE MIN' THE SAME WILL GIVE FIXED BRAKING AT THE VALUE SET.
ADJUST BRAKING FOR PERFECT CAR CONTROL. 0 IS MINIMUM BRAKE POWER, 100 IS MAXIMUM BRAKE POWER.

TO SET BRAKE MAXIMUM AND BRAKE MINIMUM - WITH THE VFx PROGRAMMER CONNECTED SET THE 'BRAKE MAX' AND 'BRAKE MIN' ADJUSTMENTS TO THE REQUIRED VALUES, THEN PRESS AND RELEASE THE 'SET-UP' BUTTON.

START RESPONSE

THE 'START RESPONSE' WHEN ACTIVATED INHIBITS THE CURRENT LIMITER AND INCREASES OR DECREASES THE THROTTLE RESPONSE OFF OF THE START LINE. NORMAL SETTINGS FOR THE THROTTLE RESPONSE AND CURRENT LIMITER WILL RESUME AFTER THE THROTTLE HAS BEEN TAKEN FROM NEUTRAL TO FULL THROTTLE AND THEN BACKED OFF FROM FULL THROTTLE.
APPLYING FULL BRAKES FOR 4 SECONDS ACTIVATES THE 'START RESPONSE' (THE MOTOR WILL 'BEEP' TO INDICATE THAT 'START RESPONSE' IS SET). SETTING THE 'START RESPONSE' ADJUSTMENT TOWARDS 'TURBO' WILL CAUSE THE THROTTLE TO REACH FULL POWER EARLIER THAN NORMAL, USE IT TO GET AWAY FIRST FROM THE START LINE. SETTING THE 'START RESPONSE' ADJUSTMENT TOWARDS 'DAMP' WILL CAUSE THE THROTTLE RESPONSE TO BE MORE DAMPED THAN NORMAL, USE IT IF THE GRIP IS LOW, OR TO TAME 'POWER WHEELIES'.

TO SET THE START RESPONSE - WITH THE VFx PROGRAMMER CONNECTED SET THE 'START RESPONSE' ADJUSTMENT TO THE REQUIRED VALUE, THEN PRESS AND RELEASE THE 'SET-UP' BUTTON.

ANTI-LOCK BRAKES

WHEN ANTI-LOCK BRAKES ARE SELECTED, THE VFx WILL RELEASE THE BRAKES AUTOMATICALLY WHEN THE MOTOR SPEED REDUCES TO A LOW LEVEL. BRAKING WILL BE MORE CONTROLLABLE ON A SLIPPERY TRACK.

TO SET THE ANTI-LOCK BRAKES ON OR OFF CONNECT THE PROGRAMMER, THEN PRESS AND HOLD THE 'SET-UP' BUTTON. AFTER 2 SECONDS THE MOTOR WILL 'BEEP' AND ALL THE LED'S WILL TURN OFF THEN ON AGAIN, CONTINUE HOLDING THE 'SET-UP' BUTTON FOR A FURTHER 2 SECONDS, THE MOTOR WILL THEN REPEATEDLY GIVE A DOUBLE 'BEEP' AND THE RED LED WILL TOGGLE ON AND OFF.
WHEN THE RED LED IS ON, ANTI-LOCK BRAKES ARE SELECTED, WHEN THE RED LED IS OFF ANTI-LOCK BRAKES ARE DESELECTED. RELEASING THE 'SET-UP' BUTTON WILL LEAVE ANTI-LOCK BRAKES SET AS REQUIRED.

VFx SPECIFICATIONS

Case Size	40x29x16mm	Brake On-Resistance	0.00375Ω
Weight (no wires)	Approx. 34g	†Braking Current	120A
Voltage Input	4 - 10 cells	Regenerative Brakes	Yes
Drive On-Resistance	0.000875Ω	Anti-lock Brakes	Selectable
PWM Frequency	Optimised	Brake Minimum Setting	Adjustable
PWM Resolution	10-bit	Brake Maximum Setting	Adjustable
†Drive Current	600A	Neutral Braking	Adjustable
Current Limiter 1 & 2	20A - 140A	Internal FET Servo Choke	Yes
Current Ramp	Adjustable	Rx Supply Output Voltage	5.1V
Start Response Turbo	Adjustable	Rx Supply Output Current	1.0A
Start Response Damped	Adjustable	Rx Supply Protection	Yes
Minimum Start Speed	Adjustable	Rx Supply Priority	Yes

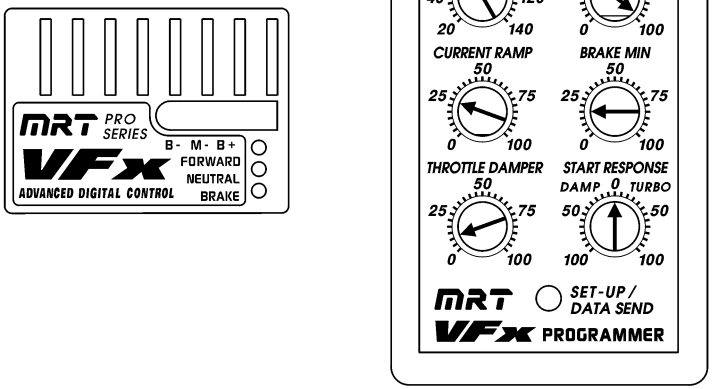
†Transistor Rating at 25°C Junction Temperature.

MODEL RACING TECHNOLOGY

VFx

ELECTRONIC SPEED CONTROL

INSTRUCTIONS



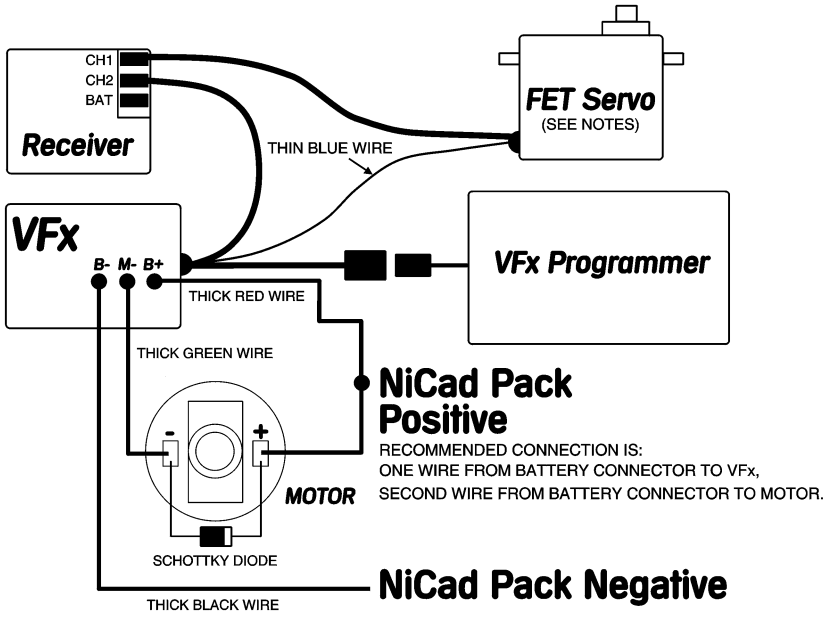
MODEL RACING TECHNOLOGY
258 DOVER ROAD, FOLKESTONE, KENT, CT19 6NS, ENGLAND.
TELEPHONE/FAX (UK) 01303 259196

IMPORTANT Please Read! . . . .

BEFORE WIRING UP YOUR NEW ELECTRONIC SPEED CONTROLLER PLEASE READ THE INSTRUCTIONS CAREFULLY AND LOOK AT THE WIRING DIAGRAM.

It is important that you do not short out or reverse connect any of the wires on your VFx as this could DAMAGE YOUR SPEED CONTROLLER AND THE EQUIPMENT CONNECTED TO IT.

VFx WIRING DIAGRAM



a) When using a FET servo, connect the thin blue wire from the VFx to the thin blue wire from the servo. The VFx contains a FET servo choke so an external choke is not required.

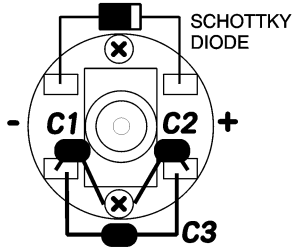
b) When using a non-FET servo the thin blue wire from the VFx is not used and should be insulated.

CONNECTION OF WIRES

BLACK WIRE - BATTERY NEGATIVE
RED WIRE - BATTERY POSITIVE
GREEN WIRE - MOTOR NEGATIVE
THIN BLUE WIRE - FET SERVO LEAD

CAPACITORS: C1, C2 AND C3 0.1uF

INSTALLATION OF CAPACITORS AND SCHOTTKY DIODE



VFx INSTALLATION

- ALWAYS USE A MOTOR WITH CAPACITORS AND SCHOTTKY DIODE FITTED TO AVOID ANY POSSIBLE RADIO GLITCHES AND IMPROVE EFFICIENCY. (SEE DIAGRAM ON OPPOSITE PAGE)
- ALWAYS KEEP RECEIVER AND AERIAL AWAY FROM ALL POWER WIRES.
- IF USING A SEPARATE RECEIVER BATTERY DISCONNECT RED RX WIRE FROM VFx RX PLUG AND INSULATE.
- INSTALL VFx IN CAR WITH VELCRO OR SERVO TAPE - FIT IN A SAFE DRY POSITION.
- ENSURE PROGRAMMER SOCKET IS KEPT FREE FROM DIRT AND WATER.

NOTE: MOTOR MUST BE CONNECTED TO VFx FOR BEEPS TO BE HEARD.

USING THE VFx PROGRAMMER

THE VFx PROGRAMMER IS USED TO SET ALL OF THE VFx SPEED CONTROLLER ADJUSTMENTS. IT HAS 2 MODES OF OPERATION, 'TRANSMITTER SET-UP' AND 'NORMAL'. ALL SETTINGS ARE STORED IN THE VFx SPEED CONTROLLER MEMORY WHILE IT IS SWITCHED OFF.
IF THE VFx PROGRAMMER IS CONNECTED TO THE VFx SPEED CONTROLLER 'NORMAL' MODE WILL BE USED, UNLESS 'TRANSMITTER SET-UP' MODE IS ENTERED AS DESCRIBED BELOW.

MODE 1

'TRANSMITTER SET-UP', THIS MODE IS NORMALLY USED INITIALLY TO ADJUST THE VFx SPEED CONTROLLER TO THE TRANSMITTER, SET THE MINIMUM STARTING SPEED OF THE VFx AND SET NEUTRAL BRAKES IF REQUIRED. - SEE 'ADJUSTING THE VFx TO YOUR TRANSMITTER' BELOW.

'TRANSMITTER SET-UP' IS ONLY ENTERED IF THE VFx PROGRAMMER IS CONNECTED AND THE 'SET-UP' BUTTON IS PRESSED AND HELD WHEN THE VFx SPEED CONTROLLER IS SWITCHED ON.

MODE 2

'NORMAL SET-UP' - WITH THE VFx PROGRAMMER CONNECTED PRESS AND RELEASE 'SET-UP'BUTTON, ADJUSTMENTS SET: CURRENT LIMIT 1, THE CURRENT LIMITER RAMP, THE THROTTLE DAMPER, THE BRAKE MAXIMUM AND BRAKE MINIMUM AND ALSO THE START RESPONSE. - SEE BELOW AND NEXT PAGE FOR A DESCRIPTION OF THE ABOVE FUNCTIONS AND HOW TO SET CURRENT LIMIT 2 AND ANTI-LOCK BRAKES.

NOTE: WHEN ALL THE LED'S ARE LIT ON THE VFx IT IS READY TO RECEIVE DATA FROM THE PROGRAMMER.

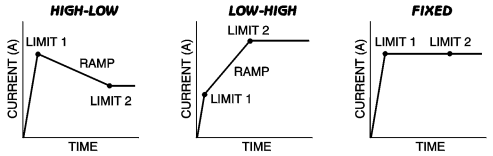
ADJUSTING THE VFx TO YOUR TRANSMITTER

THE PROCEDURE BELOW IS USED TO PROGRAM THE VFx WITH THE TRANSMITTERS NEUTRAL POSITION AND THROTTLE END POINT LIMITS, ALSO THE MINIMUM START SPEED AND NEUTRAL BRAKES IF REQUIRED.

1 TURN YOUR TRANSMITTER ON AND SET THE THROTTLE TRIM TO NEUTRAL.
2 CONNECT THE VFx TO THE BATTERY PACK WITH THE VFx SWITCHED OFF.
3 CONNECT THE VFx PROGRAMMER, SET THE 'BRAKE MIN' ADJUSTMENT TO THE MINIMUM START SPEED REQUIRED, IE THE SLOWEST FORWARDS SPEED OF THE CAR. 0 IS THE MINIMUM START SPEED, 100 IS THE MAXIMUM START SPEED.
4 PRESS AND HOLD THE VFx PROGRAMMER 'SET-UP' BUTTON WHILE SWITCHING THE VFx ON.
5 AFTER 1 SECOND THE MOTOR WILL 'BEEP' AND THE AMBER LED WILL LIGHT CONTINUOUSLY. (THE NEUTRAL POSITION HAS NOW BEEN SET) THE GREEN AND RED LED'S WILL BE FLASHING.
6 IF NEUTRAL BRAKES ARE NOT REQUIRED RELEASE THE 'SET-UP' BUTTON AND JUMP TO STEP 8.
7 IF NEUTRAL BRAKES ARE REQUIRED CONTINUE HOLDING THE 'SET-UP' BUTTON. AFTER 5 SECONDS THE MOTOR WILL 'BEEP', THE AMBER AND RED LED'S WILL FLASH TO INDICATE THAT NEUTRAL BRAKES HAVE BEEN SELECTED. RELEASE THE 'SET-UP' BUTTON.
8 HOLD THE TX THROTTLE AT THE POSITION FULL POWER IS REQUIRED, THEN PRESS AND RELEASE THE 'SET-UP' BUTTON, THE GREEN LED WILL NOW LIGHT CONTINUOUSLY.
9 HOLD THE TX THROTTLE AT THE POSITION FULL BRAKES ARE REQUIRED, THEN PRESS AND RELEASE THE 'SET-UP' BUTTON, THE RED LED WILL NOW LIGHT CONTINUOUSLY.
10 RADIO SET-UP IS NOW COMPLETE. THE VFx IS NOW READY TO RECEIVE PROGRAM SETTINGS.

CURRENT (TORQUE) LIMITER

THERE ARE THREE WAYS TO SET THE CURRENT LIMITING:



THE 'CURRENT LIMIT' ADJUSTMENT IS USED TO SET LIMIT 1 AND LIMIT 2, THEIR RANGE IS 20A TO 140A.

THE 'CURRENT RAMP' ADJUSTMENT IS USED TO SET THE CURRENT RAMP. THE 'RAMP' IS THE RATE OF CHANGE IN CURRENT BETWEEN LIMIT 1 AND LIMIT 2. IE: 50 IS 12A PER SECOND, 100 IS 6A PER SECOND. THE ADJUSTMENT RANGE IS 0 (RAMP OFF) TO 100. AT NEUTRAL THROTTLE POSITION THE RAMP IS RESET.

1 'HIGH-LOW': SETTING LIMIT 1 HIGHER THAN LIMIT 2 - USED WITH A SUITABLE RAMP SETTING WILL EFFECTIVLEY MODIFY A MOTORS PERFORMANCE CHARACTERISTICS TO ALLOW MAXIMUM MOTOR PERFORMANCE TO BE USED WHILE MAINTAINING EXTENDED BATTERY DURATION. IT ALSO GIVES A MORE 'PUNCHY' FEEL TO THE THROTTLE.
2 'LOW-HIGH': SETTING LIMIT 1 LOWER THAN LIMIT 2 - PRODUCES A SMOOTHER FEEL TO THE THROTTLE AND IS GENERALLY BETTER WHEN MAXIMUM BATTERY DURATION IS REQUIRED.
3 'FIXED': SETTING LIMIT 1 AND LIMIT 2 THE SAME - CAN BE USED TO PRODUCE 'NORMAL' CURRENT LIMITING.