

Name	Unit	Minimum	Maximum	Default	Actual	Description
Motor						
boost	dig	0	37813	1700	1700	0 Hz Boost in digit. 1000 digit ~ 2.5%
fweak	Hz	0	1000	90	158	Frequency where V/Hz reaches its peak (flux-weakening region)
udcnom	V	0	1000	0	300	Nominal DC bus voltage. Used for adjusting boost and fweak to actual DC link voltage. 0=no adjustment
fpconst	Hz	0	1000	1000	1000	Frequency where slip frequency is derated to form a constant power region. Only has an effect when < fweak
fslipmin	Hz	0	10	1	2	Slip frequency at minimum throttle
fslipmax	Hz	0	10	3	4	Slip frequency at maximum throttle
polepairs		1	16	2	2	Pole pairs of motor (4-pole motor: 2 pole pairs) (Set to 2 in Ranger EV)
ampmin	%	0	100	10	7	Relative sine amplitude at minimum throttle
encflt		0	16	1	1	Filter constant between pulse encoder and speed calculation. Makes up for slightly uneven pulse distribution
encmode		0	1	0	1	0=single channel encoder, 1=quadrature encoder (Set to 1 in Ranger EV)
fmin	Hz	0	400	1	1	Below this frequency no voltage is generated
fmax	Hz	0	400	200	400	At this frequency slip is commanded 0, limit top speed (400 ~ 120km/h)
numimp	Imp/rev	8	8192	60	64	Pulse encoder pulses per turn (Set to 64 in Ranger EV)
dirchrpm	rpm	0	2000	100	100	Motor speed at which direction change is allowed
syncofs	dig	0	65535	0	0	Phase shift of sine wave after receiving index pulse
snsn		2	3	2	2	Motor temperature sensor. 2=KTY83-110, 3=KTY84-130 (Set to 2 in Ranger EV)
Inverter						
pwmfrq		0	3	1	1	PWM frequency. 0=17.6kHz, 1=8.8kHz, 2=4.4kHz, 3=2.2kHz. Needs PWM restart
pwpmpol		0	1	0	1	PWM polarity. 0=active high, 1=active low. Needs PWM restart (ALWAYS!! "active low" in Ranger EV)
deadtime	dig	0	255	63	63	Deadtime between highside and lowside pulse. 28=800ns, 56=1.5µs. Not always linear, consult STM32 manual. Needs PWM restart
ocurlim	A	-65535	65535	100	500	Hardware over current limit. RMS-current times sqrt(2) + some slack
tripmode		0	2	0	0	What to do with relays at a shutdown event. 0=All off, 1=Keep DC switch closed, 2=close precharge relay
minpulse	dig	0	4095	1000	1000	Narrowest or widest pulse, all other mapped to full off or full on, respectively
il1gain	dig/A	0	4095	4.68	4.9 (4.87)	Digits per A of current sensor L1
il2gain	dig/A	0	4095	4.68	4.9 (4.87)	Digits per A of current sensor L2
udcgain	dig/V	0	4095	6.15	10.3 (10.28)	Digits per V of DC link
udcofs	dig	0	4095	0	0	DC link 0V offset
udclim	V	0	1000	540	540	High voltage at which the PWM is shut down

snshs		0	1	0	0	Heatsink temperature sensor. 0=JCurve, 1=Semikron
Charger						
chargemode		0	4	0	0	0=Off, 3=Boost, 4=Buck
chargecur	A	0	50	0	0	Charge current setpoint. Boost mode: charger INPUT current. Buck mode: charger output current
chargekp	dig	0	100	80	35	Charge controller gain. Lower if you have oscillation, raise if current set point is not met
chargeflt	dig	0	10	8	10	Charge current filtering. Raise if you have oscillations
chargemax	%	0	99	90	90	Charge mode duty cycle limit. Especially in boost mode this makes sure you don't overvolt you IGBTs if there is no battery connected.
Throttle						
potmin	dig	0	4095	0	810	Value of "pot" at minimum throttle
potmax	dig	0	4095	4095	3670	Value of "pot" at maximum throttle
pot2min	dig	0	4095	4095	4095	Value of "pot2" when regen (BRK_PS) is minimum
pot2max	dig	0	4095	4095	4095	Value of "pot2" when regen (BRK_PS) is maximum
potmode		0	2	0	0	0=Pot 1 is throttle and pot 2 is regen strength preset, (Set to 0 in Ranger EV) 1=Pot 2 is proportional to pot 1 (redundance) 2=Throttle controlled via CAN
throtramp	%/10m	1	100	100	100	Max positive throttle slew rate
throtramprpm	rpm	0	20000	20000	20000	No throttle ramping above this speed
Regen						
brknompedal	%	-100	0	-50	0	Foot on break pedal regen torque
brkpedalramp	%/10ms	1	100	100	100	Ramp speed when entering regen. E.g. when you set brkmax to 20% and brkpedal to -60% and brkpedalramp to 1, it will take 400ms to arrive at brake force of -60%
brknom	%	0	100	30	0	Regen padel travel
brkmax	%	0	100	30	0	Foot-off regen torque
brkrampstr	Hz	0	400	10	10	Below this frequency the regen torque is reduced linearly with the frequency
brkout	%	-100	-1	-50	-50	Activate brake light output at this amount of regen braking force
Automation						
idlespeed	rpm	-100	1000	-100	1000	Motor idle speed. Set to -100 to disable idle function. When idle speed controller is enabled, brake pedal must be pressed on start.
idlethrotlim	%	0	100	50	50	Throttle limit of idle speed controller
idlemode		0	2	0	1	Motor idle speed mode. 0=always run idle speed controller, 1=only run it when brake pedal is released, 2=like 1 but only when cruise switch is on
speedkp		0	100	0.25	0.03	Speed controller gain (Cruise and idle speed). Decrease if speed oscillates. Increase for faster load regulation
speedflt		0	16	5	5	Filter before cruise controller
cruisemode		0	1	0	1	0=button (set when button pressed, reset with brake pedal), 1=switch (set when switched on, reset when switched off or brake pedal)

Derating						
bmslimhigh	%	0	100	50	50	Positive throttle limit on BMS under voltage
bmslimlow	%	-100	0	-1	-1	Regen limit on BMS over voltage
udcmin	V	0	1000	450	200	Low voltage warning light comes on (NC in Ranger EV)
udcmax	V	0	1000	520	400	High voltage warning light comes on (NC in Ranger EV)
Contactor Control						
udcsw	V	0	1000	330	270	Voltage at which the DC contactor is allowed to close
udcswbuck	V	0	1000	540	540	Voltage at which the DC contactor is allowed to close in buck charge mode
Aux PWM						
pwmfunc		0	3	0	3	Quantity that controls the PWM output. 0=tmpm, 1=tmphs, 2=speed, 3=speedfrq (Set to "speedfrq" in Ranger EV)
pwmgain		-10000	100000	100	73964	Gain of PWM output
pwmofs	dig	-65535	65535	0	0	Offset of PWM output, 4096=full on
speedgain	rpm/kHz	0	65535	6000	6000	
Communication						
canspeed		0	3	0	0	Baud rate of CAN interface 0=250k, 1=500k, 2=800k, 3=1M
canperiod		0	1	0	0	0=send configured CAN messages every 100ms, 1=every 10ms
Testing						
fslipsnt	Hz	-100	100	0	1.78	Slip setpoint in mode 2. Written by software in mode 1
ampnom	%	0	100	0	22.06	Nominal amplitude in mode 2. Written by software in mode 1
