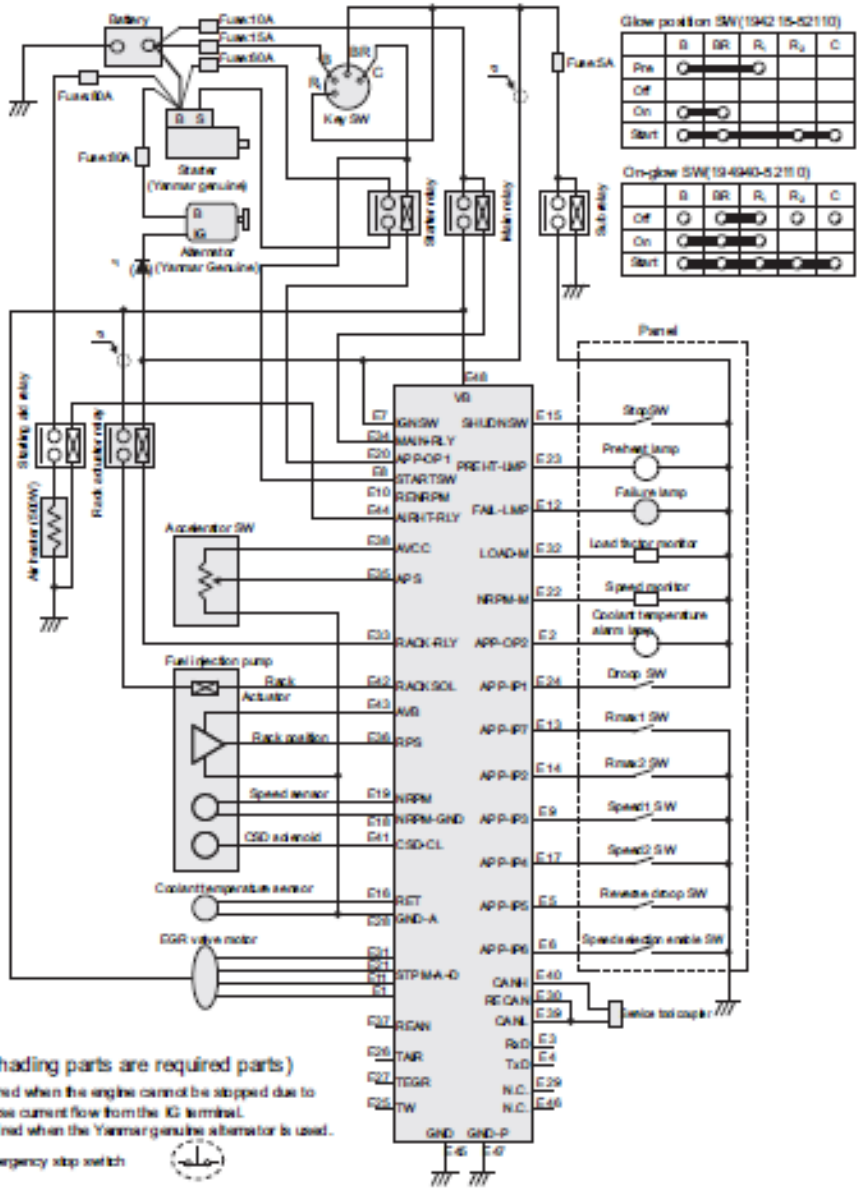
Electrical Connection Diagram

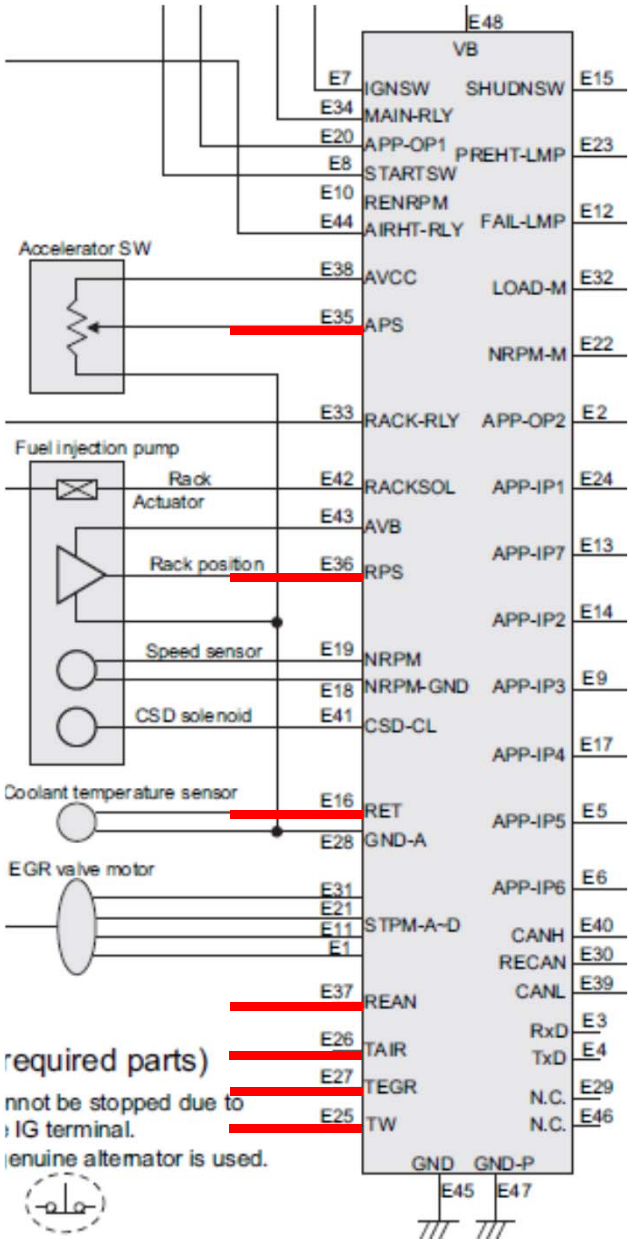


(The shading parts are required parts)

*1 Required when the engine cannot be stopped due to the reverse current flow from the IG terminal.
Not required when the Yanmar genuine alternator is used.

*2,*3 Emergency stop switch

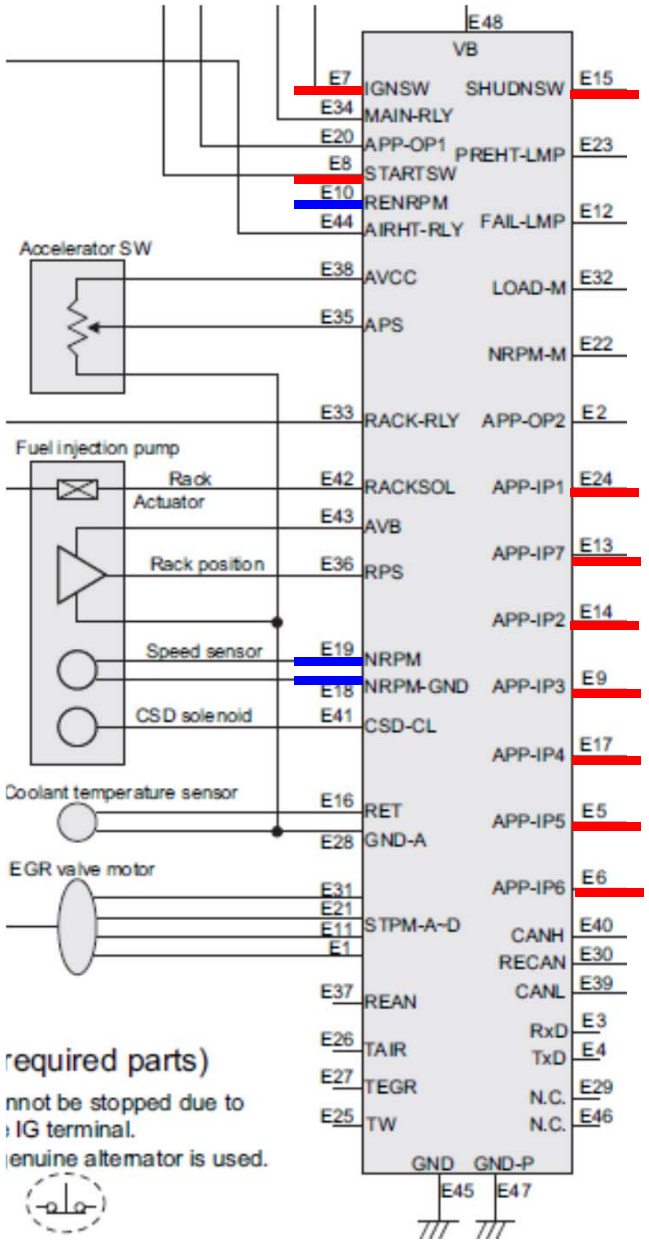
YANMAR E-ECU Input



Analog

Input	Analog			
		Accelerator position sensor	APS	E35
		Rack position sensor	RPS	E36
		Coolant temperature (Unused)	TW	E25
		Intake air temperature (reserve)	TAIR	E26
		EGR temperature (reserve)	TEGR	E27
		Backup temperature	RET	E16
		Backup analog (Optional)	REA N	E37

E-ECU Input



Contact

	Contact	Engine start recognition	STARTSW	E8
		Engine emergency stop	SHUDNSW	E15
		Key switch	IGNSW	E7
		Application input 1	APP-IP1	E24
		Application input 2	APP-IP2	E14
		Application input 3	APP-IP3	E9
		Application input 4	APP-IP4	E17
		Application input 5	APP-IP5	E5
		Application input 6	APP-IP6	E6
		Application input 7	APP-IP7	E13

High side
Pull down

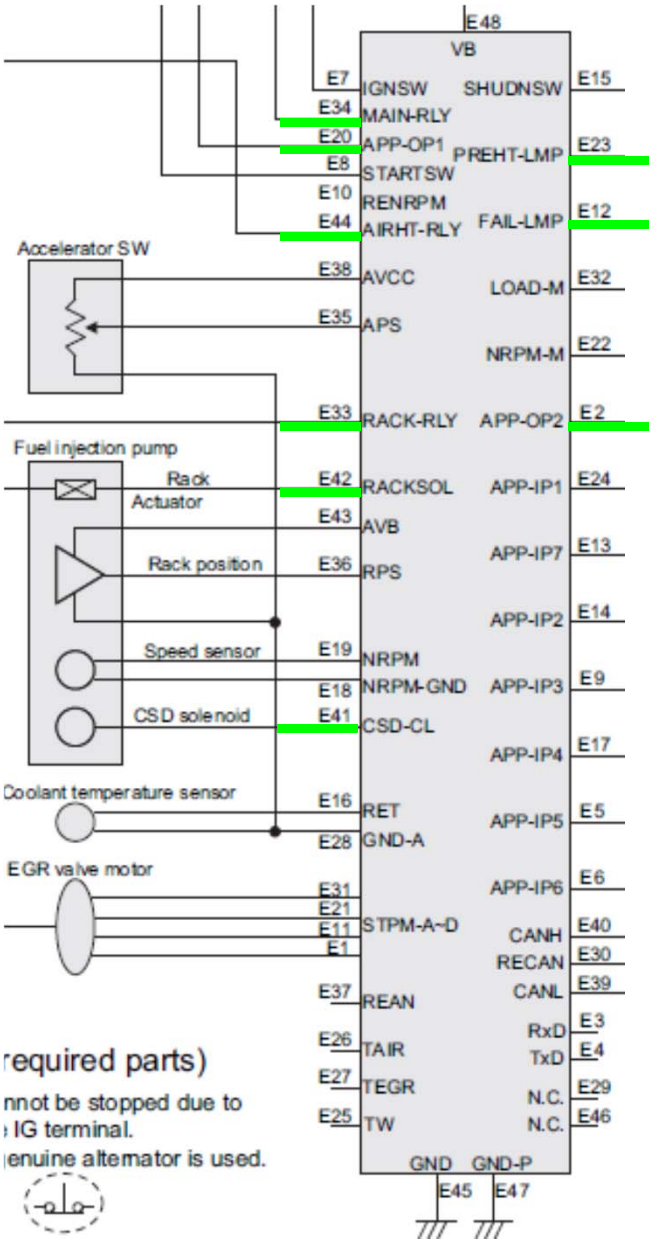
Low side
Pull Up

Pulse

Input	Pulse	Speed input (-)	NRPM-GND	E18
		Speed input (+)	NRPM	E19
		Backup speed sensor	RENRPM	E10

Low side
Pull Up

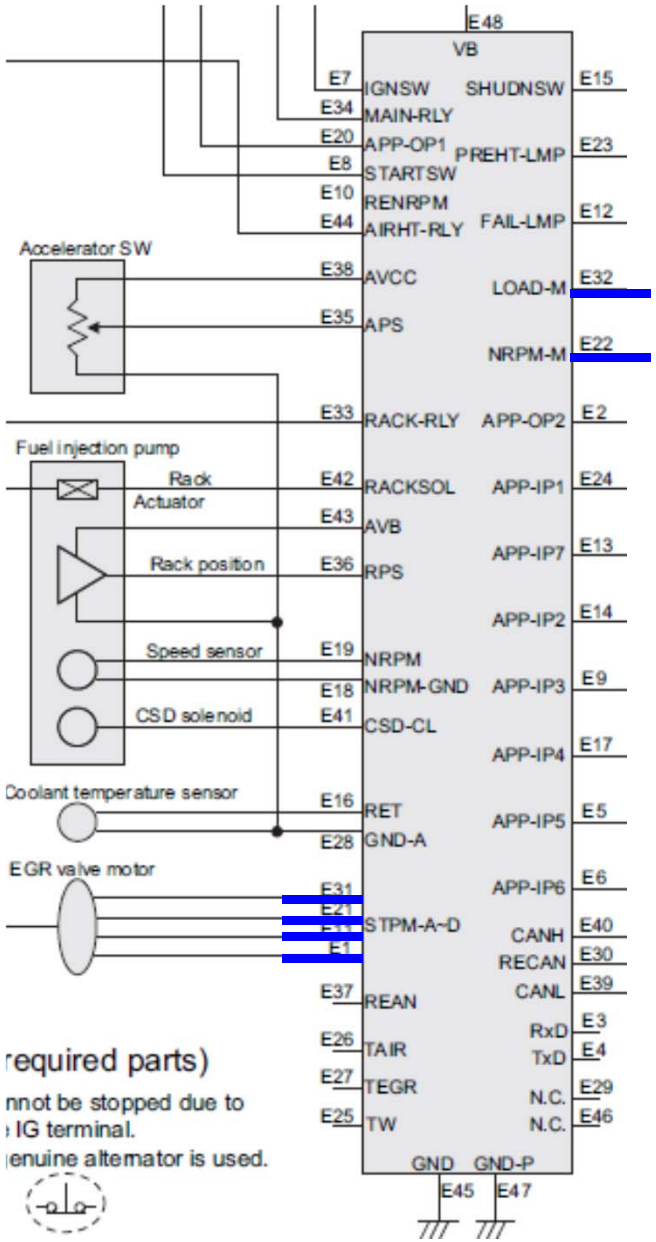
E-ECU Output



Contact

Output	Contact				
		Rack actuator	RACKSOL	E42	High side
		Main relay	MAIN-RLY	E34	
		Rack actuator relay	RACK-RLY	E33	
		Air heater relay	AIRHT-RLY	E44	Low side
		CSD solenoid coil	CSD-CL	E41	
		Trouble Monitor Lamp	FAIL-LMP	E12	High side
		Preheat lamp	PREHT-LMP	E23	
		Application output 1	APP-OP1	E20	
		Application output 2	APP-OP2	E2	

E-ECU Output

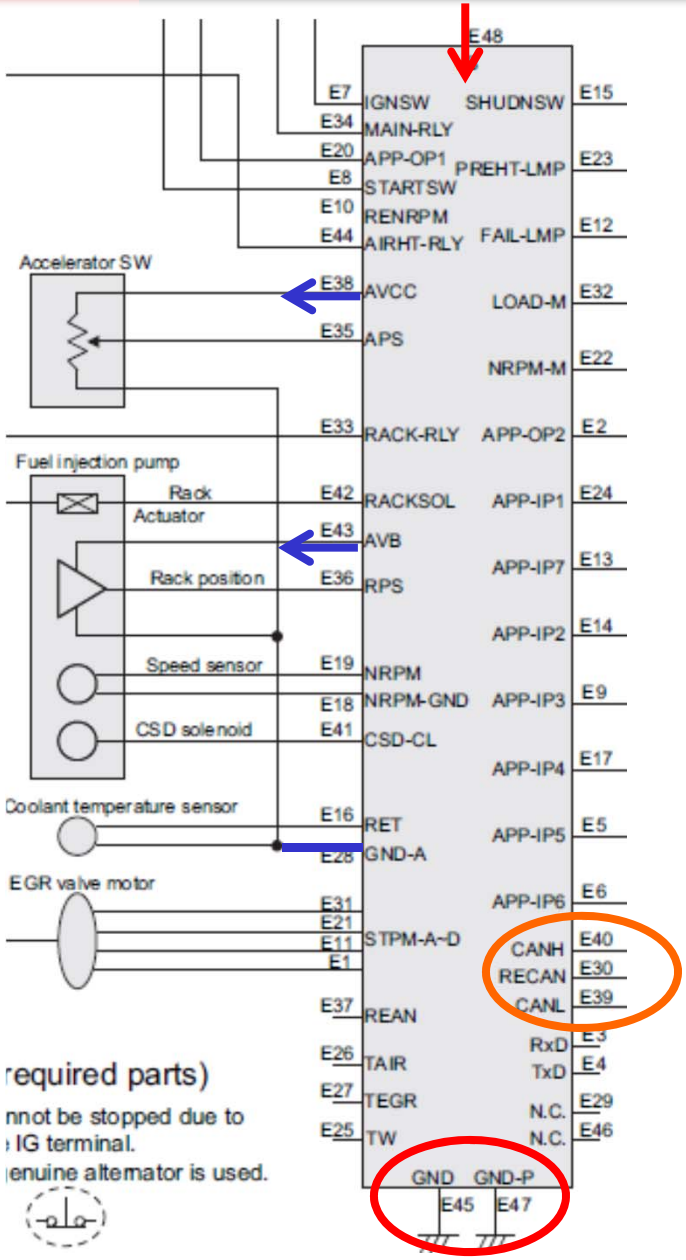


Pulse

	Pulse	Speed monitor	NRPM-M	E22
		Load factor monitor	LOAD-M	E32
		Stepping motor phase A	STPM-A	E31
		Stepping motor phase B	STPM-B	E21
		Stepping motor phase C	STPM-C	E11
		Stepping motor phase D	STPM-D	E1

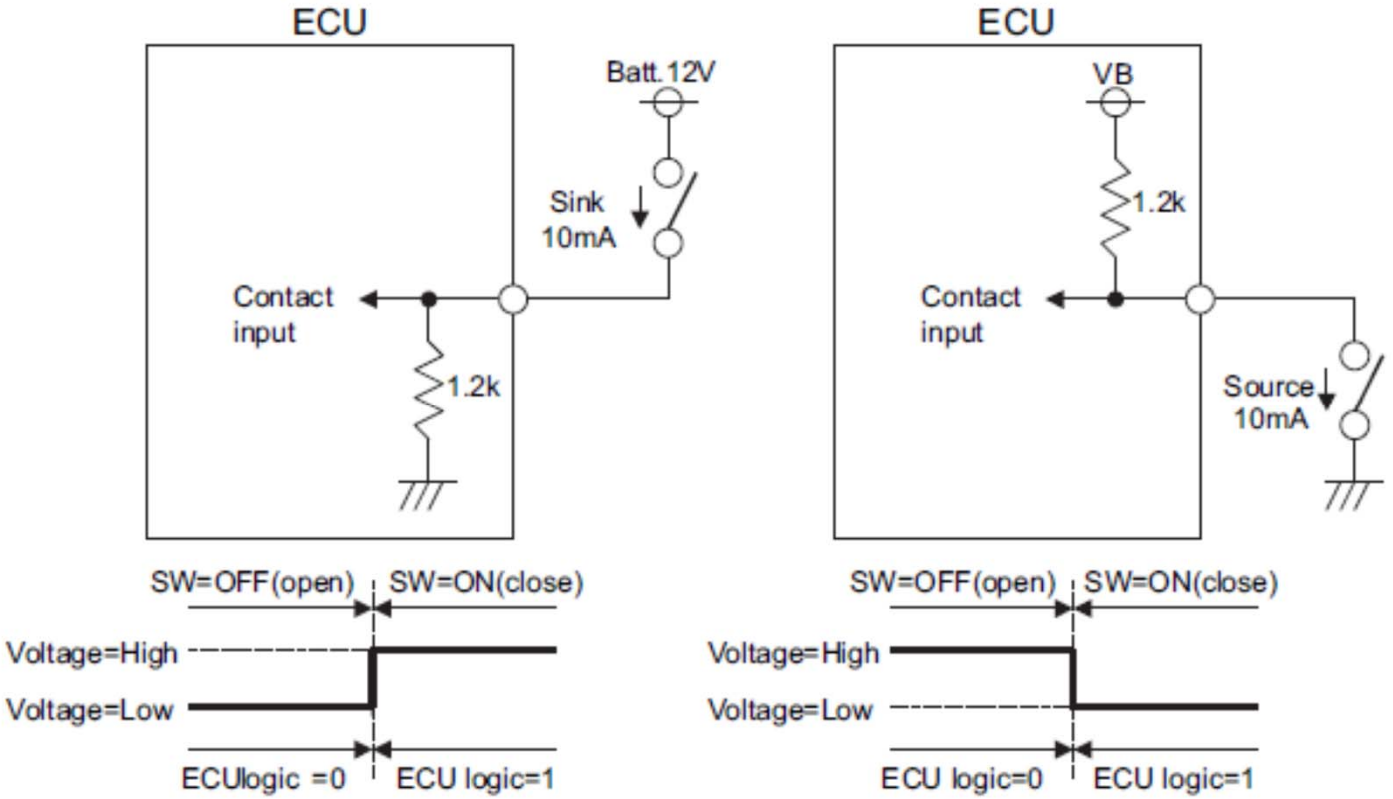
High side

E-ECU Communication / Power Supply



Com-munication	Network	CANL	CANL	E39
		CANH	CANH	E40
		CAN terminator	RECA N	E30
	Serial	RxD1	RxD	E3
		TxD1	TxD	E4
Power supply	Output	Sensor 5V	AVCC	E38
		Sensor GND	GND-A	E28
		Sensor 12V	AVB	E43
	Input	Power supply 12V	VB	E48
		Power supply GND	GND	E45
		Power GND	GND-P	E47
Misc.	Misc.	Boot mode	BOOTSW	E29
		-	-	E46

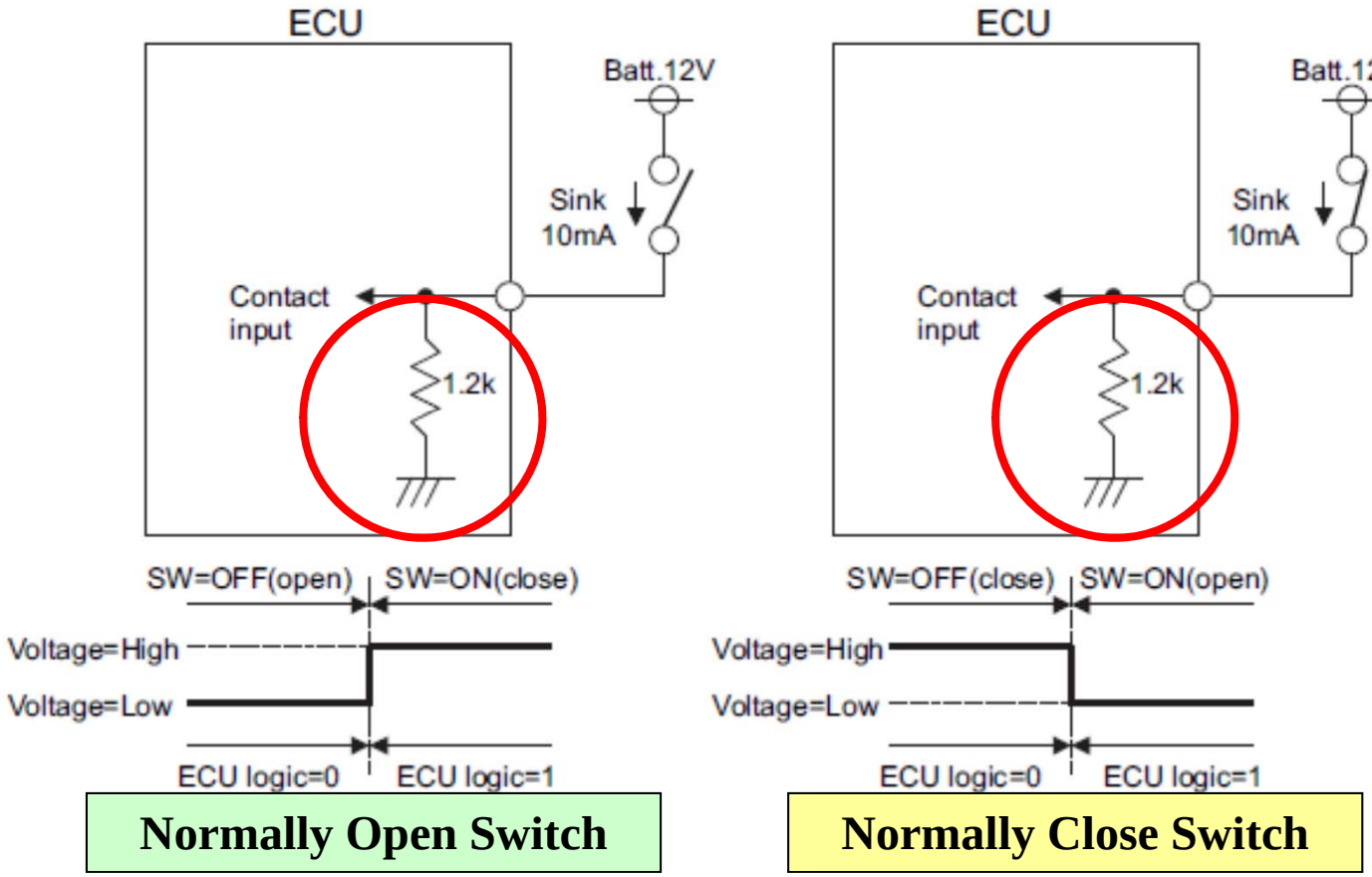
Contact Input



High side Contact Input **Low side Contact Input**

High-side Contact Input

Pull Down Resistance

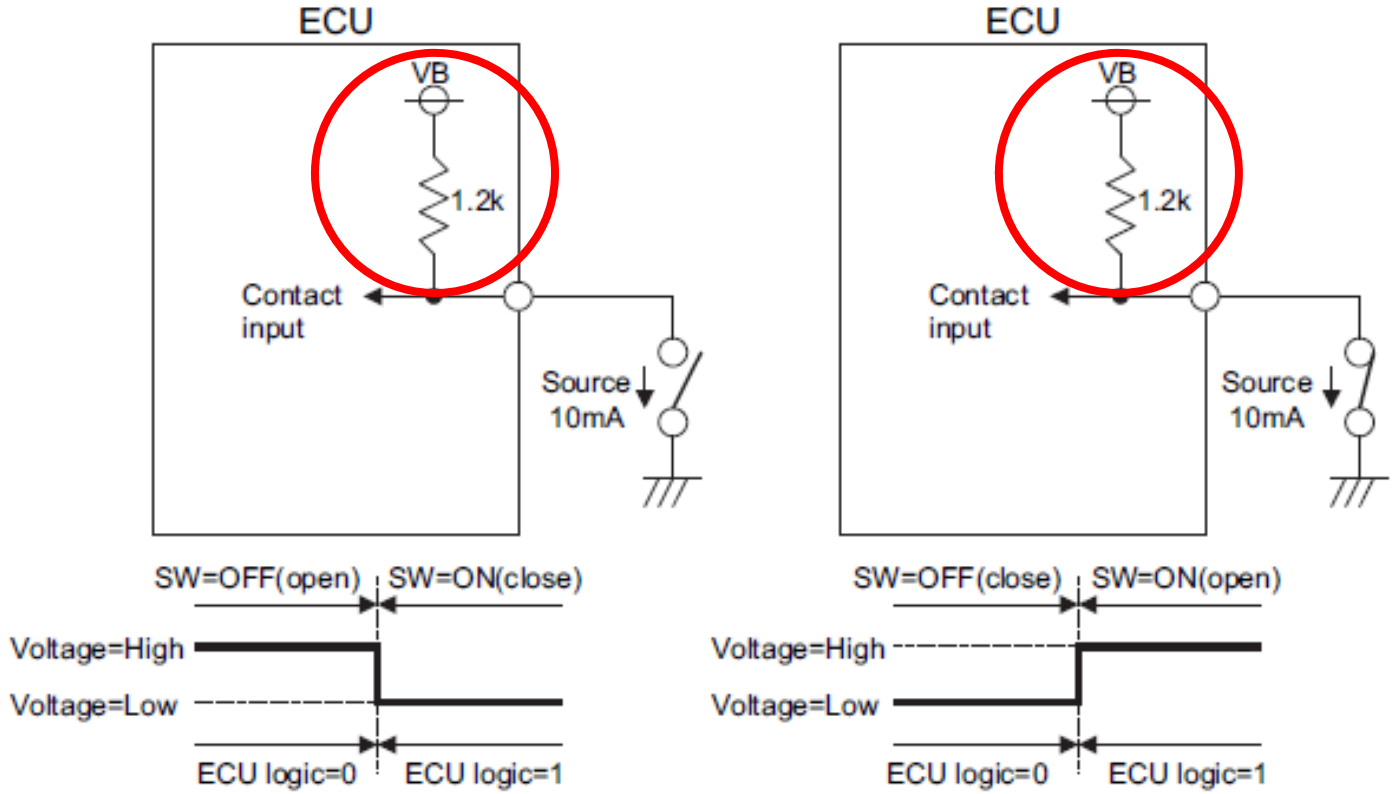


Normally Open Switch

Normally Close Switch

Low-side Contact Input

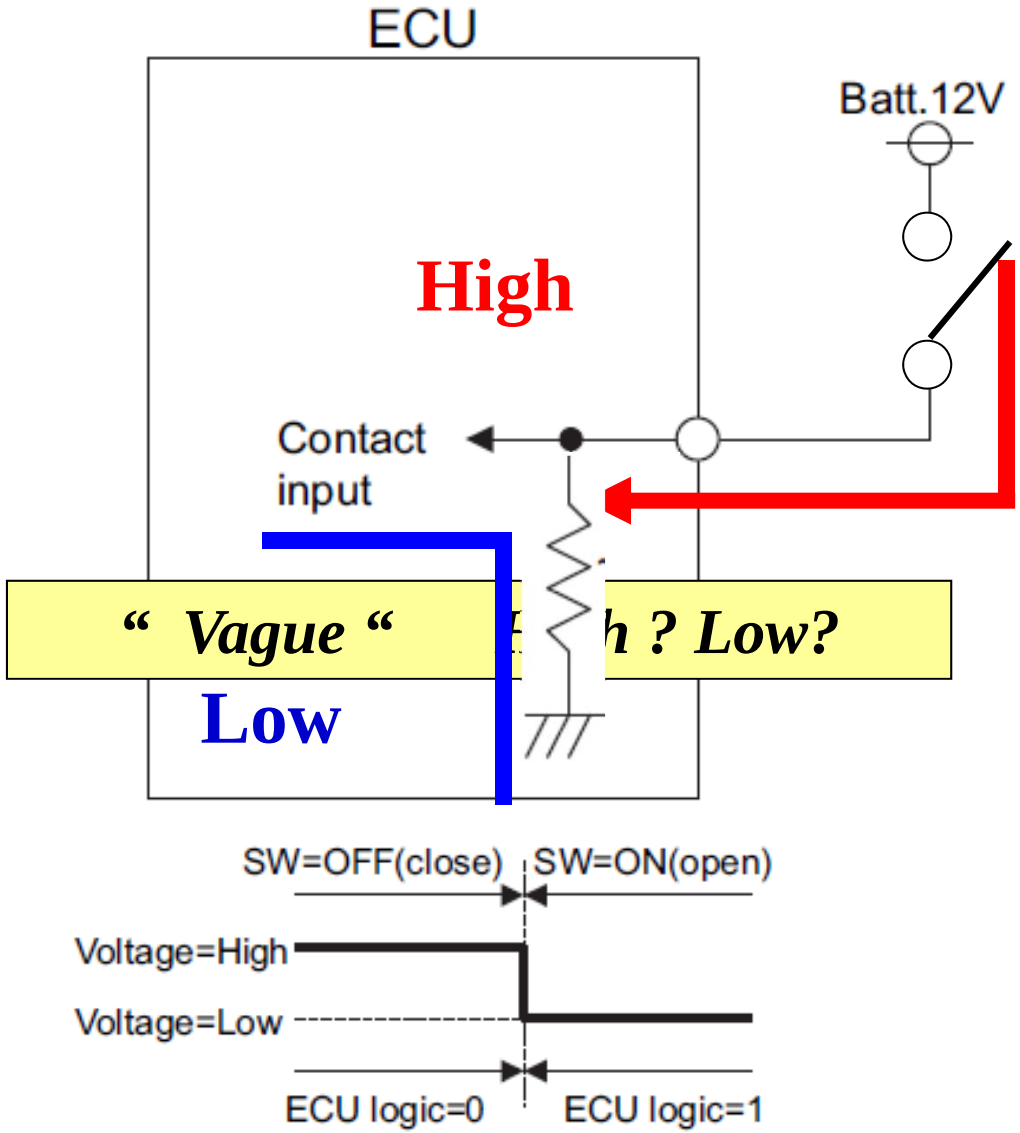
Pull Up Resistance



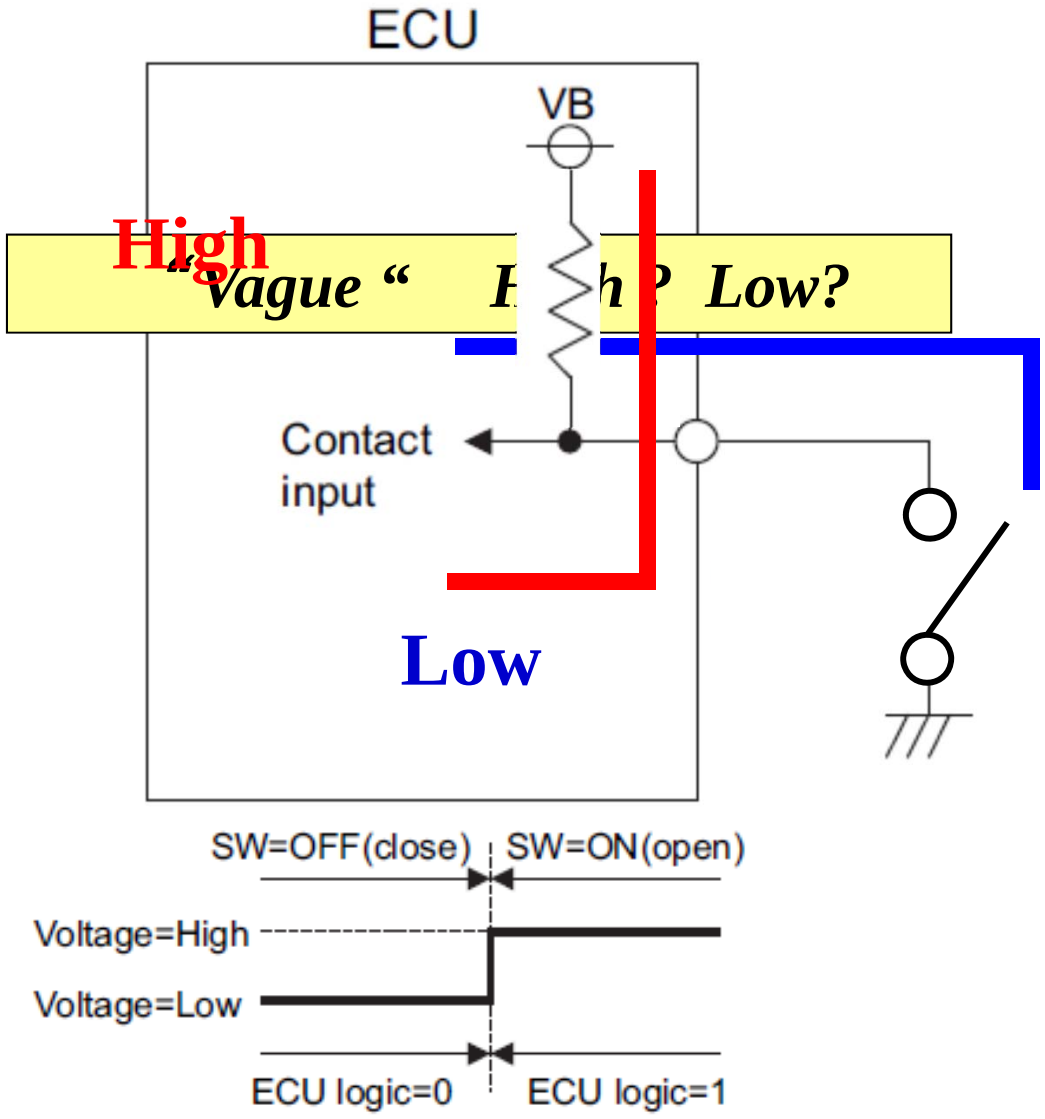
Normally Open Switch

Normally Close Switch

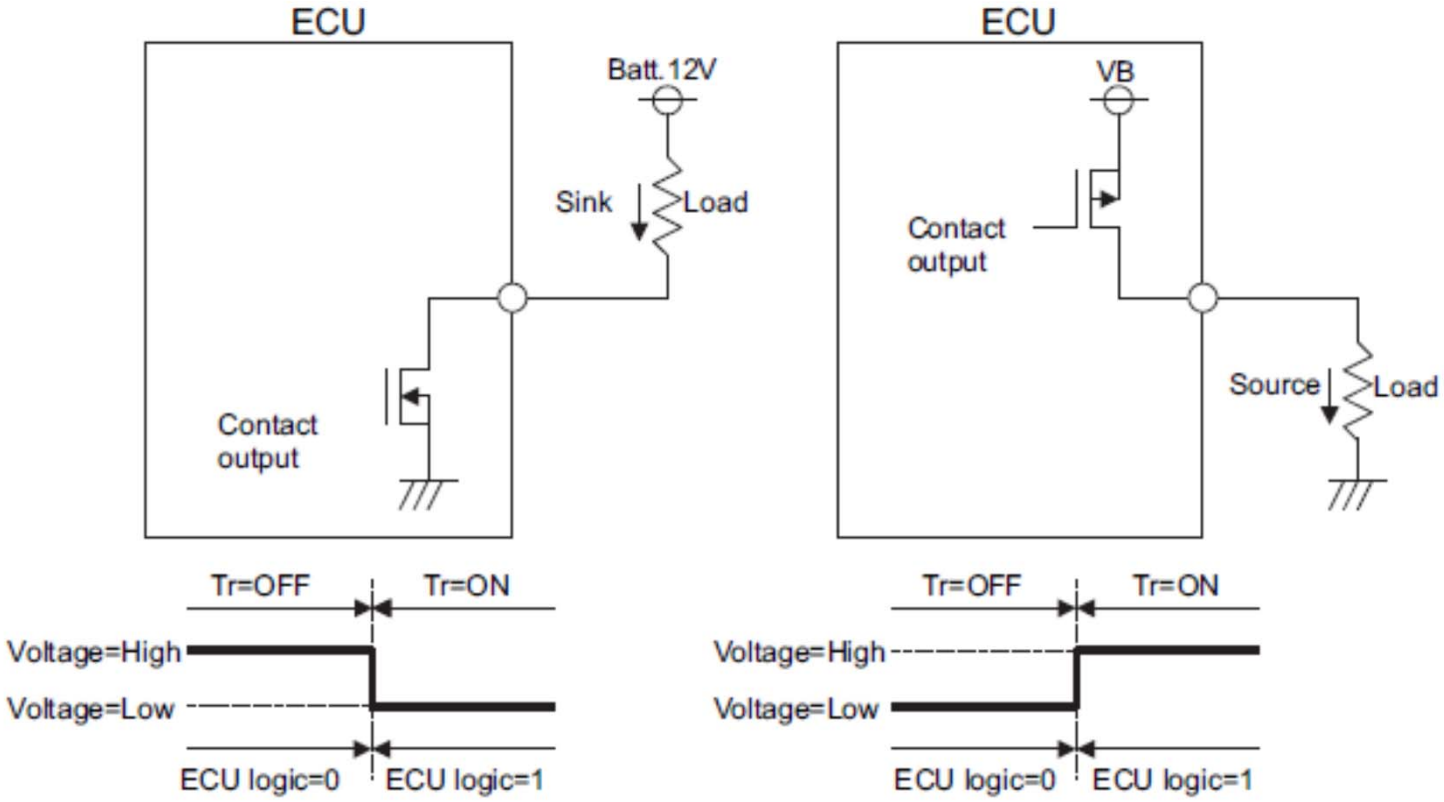
Pull Down Resistance



Pull Up Resistance



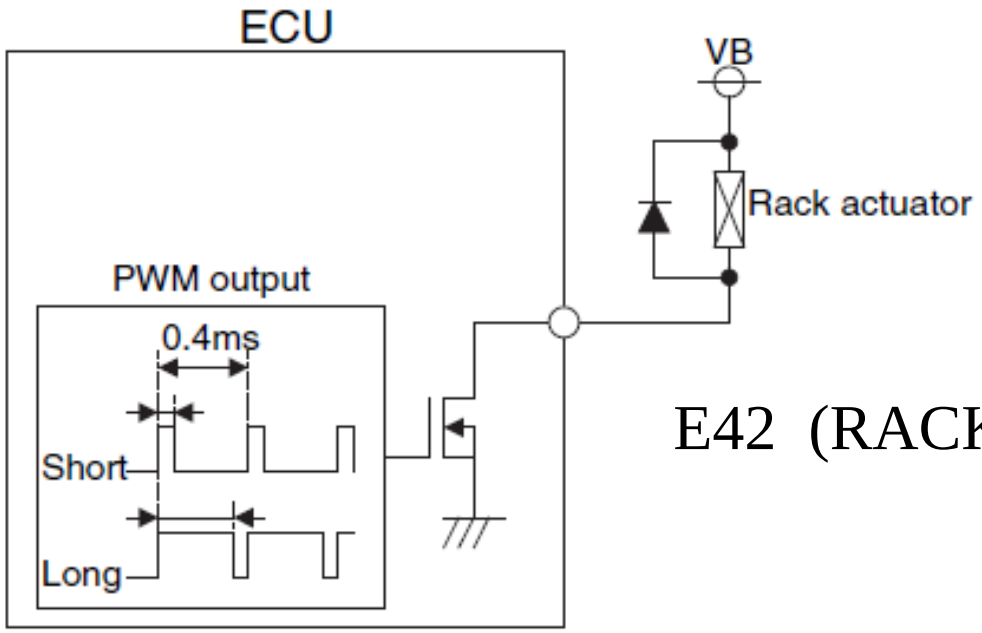
Contact Output



High side Contact Output **Low side Contact Output**

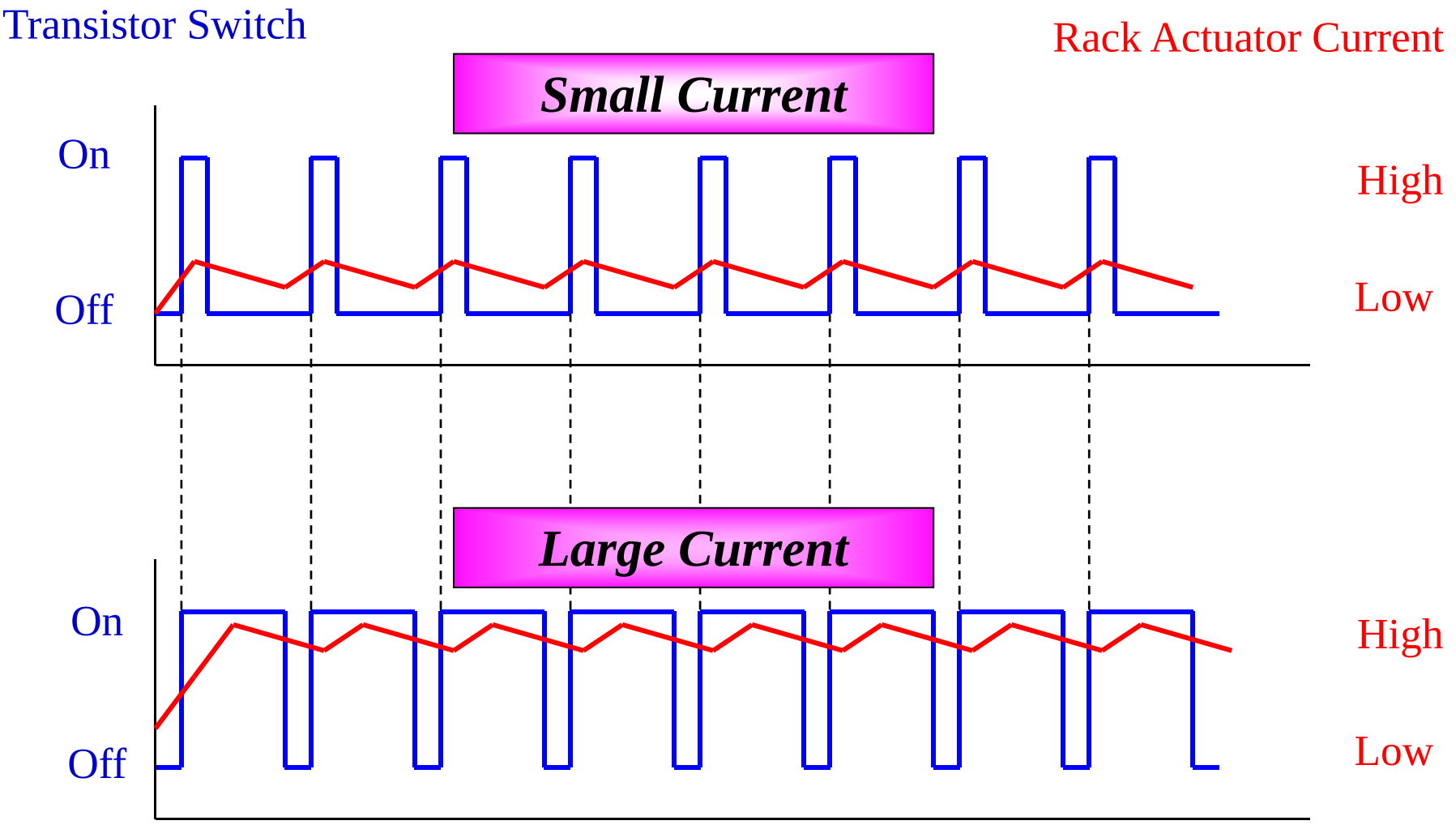
Rack Actuator Output

PWM （Pulse Width Modulation)



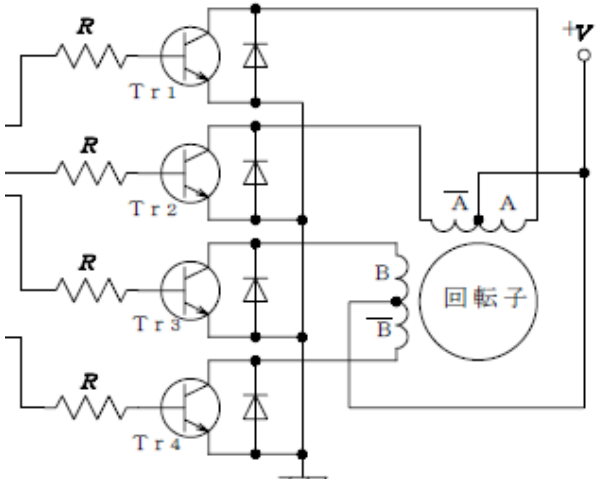
E42 (RACKSOL)

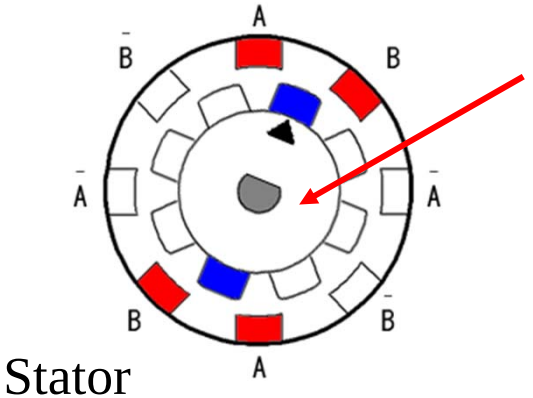
PWM Control

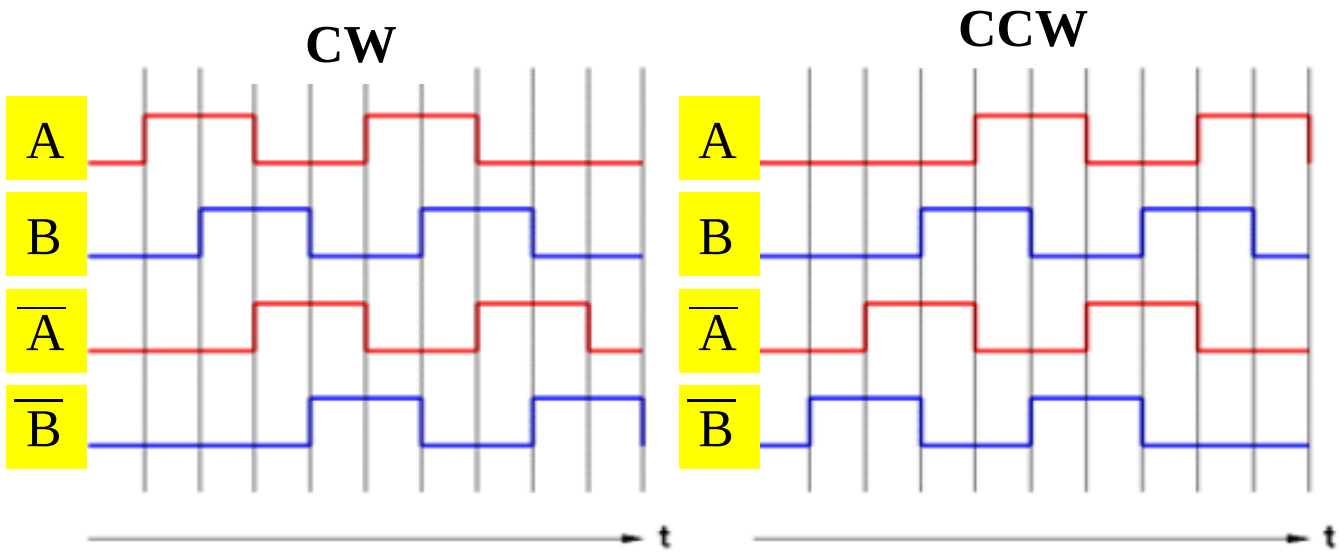

Transistor Switch
Rack Actuator Current
Small Current
On
Off
High
Low
Large Current
On
Off
High
Low

EGR Valve Control

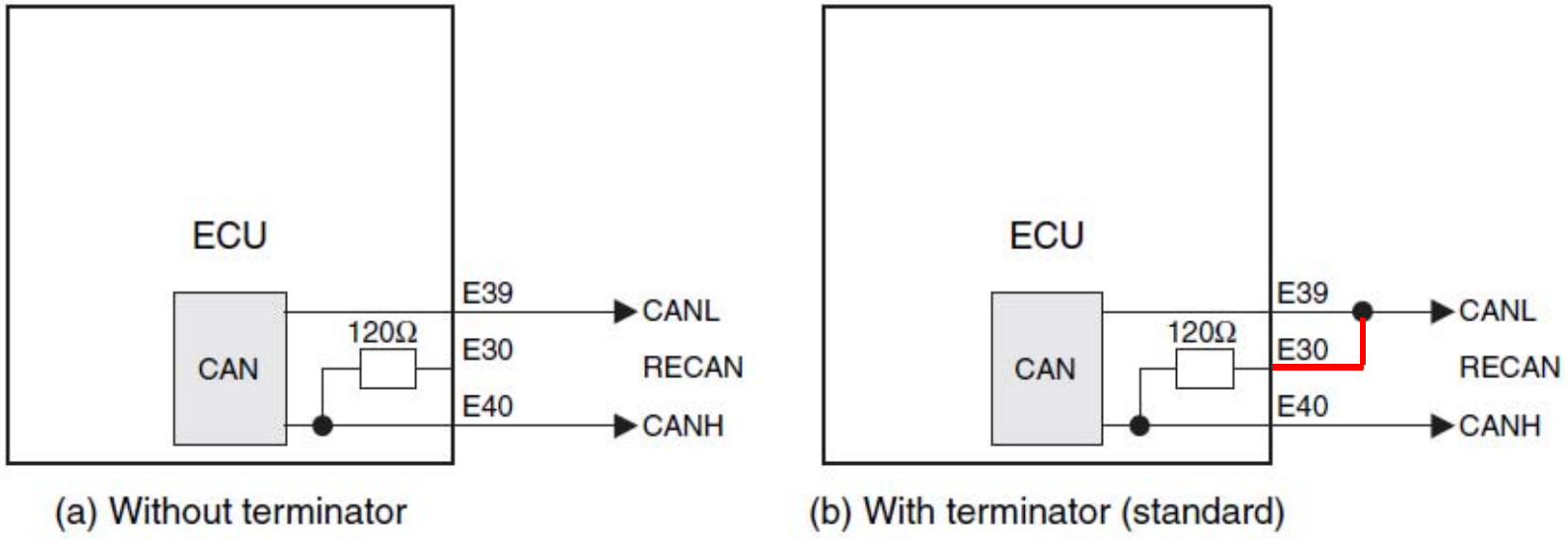
2 Phase Excitation Stepping Motor Type







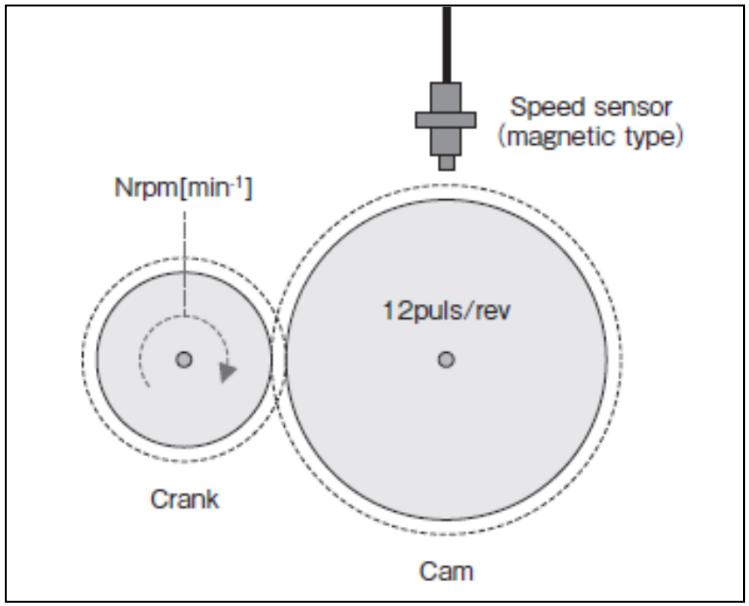
CAN bus Termination

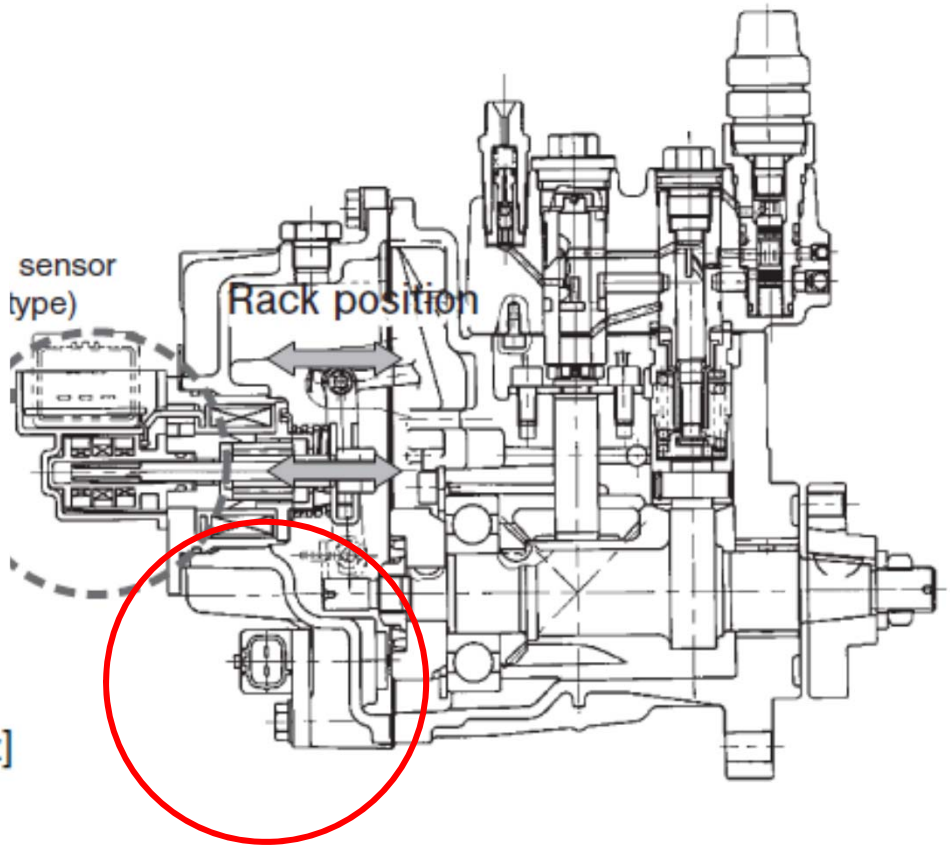


(a) Without terminator

(b) With terminator (standard)

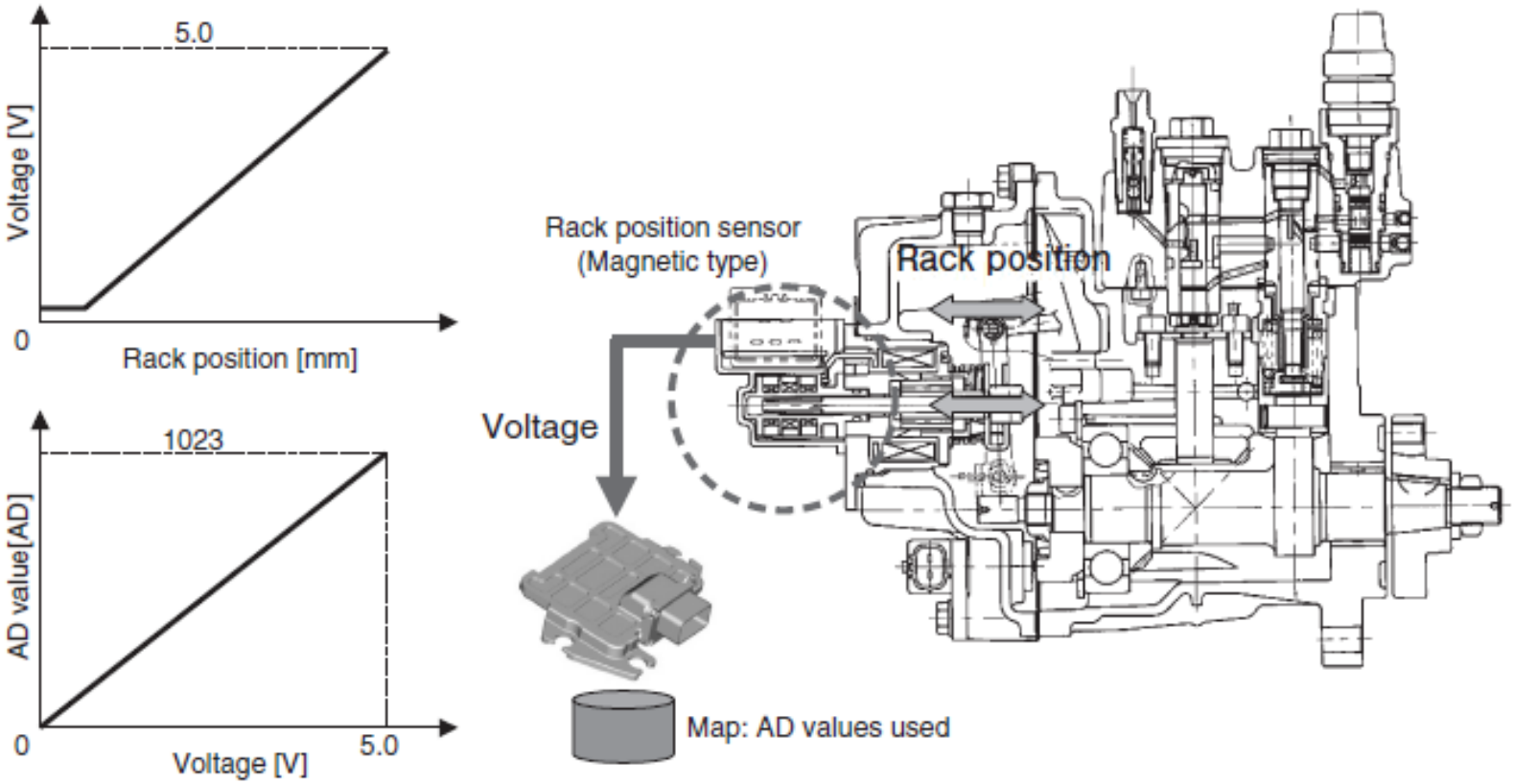
Speed Sensor Input



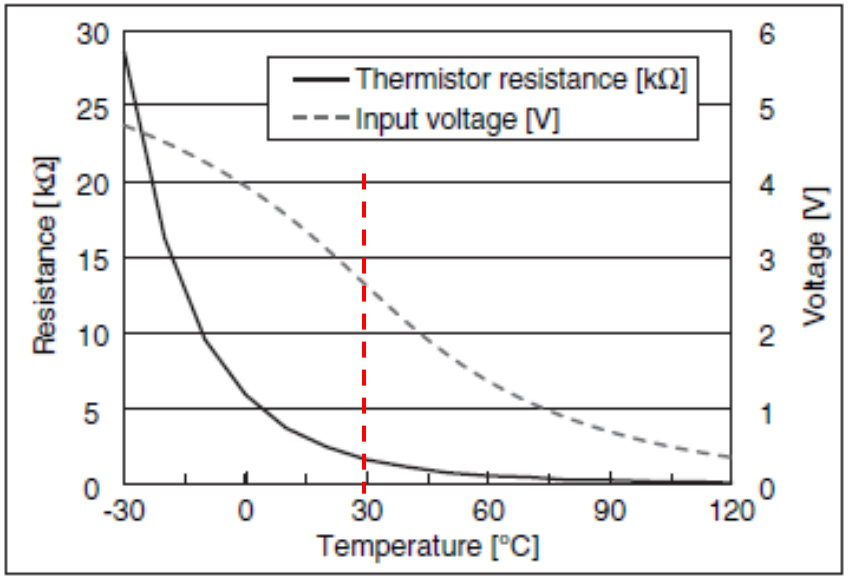


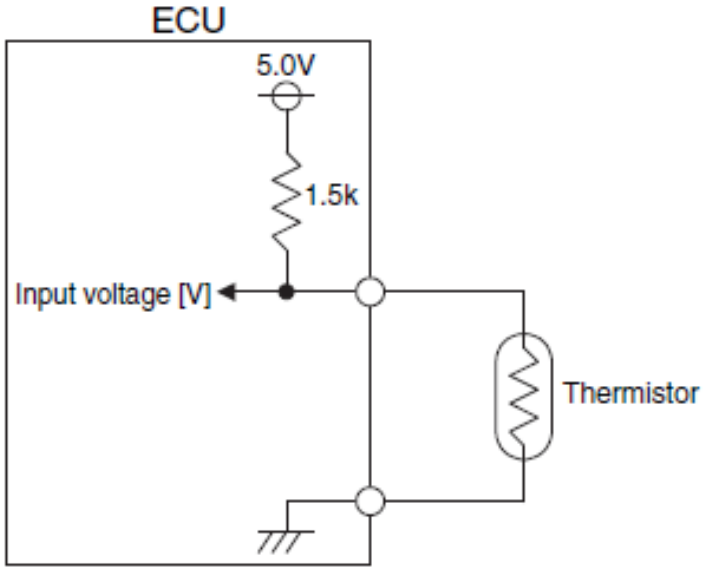
$$Nrpm\ [min^{-1}] = (fp \times 2/12) \times 60 = 10 \times fp\ [Hz]$$

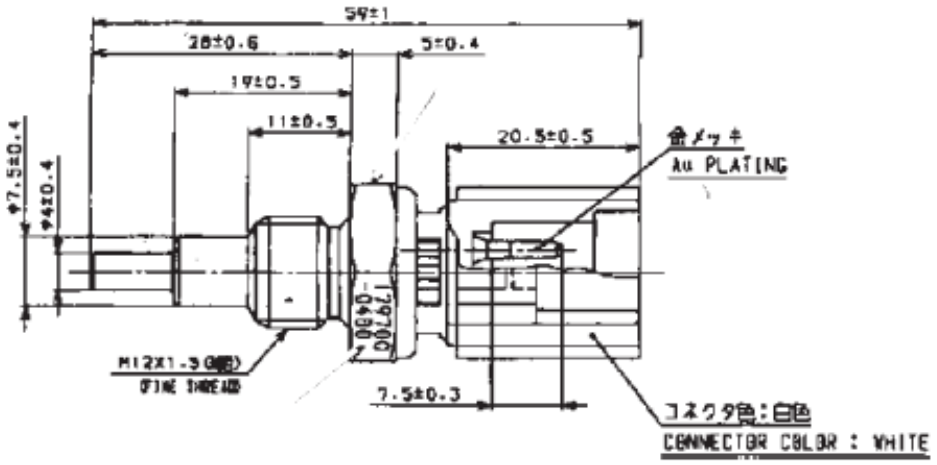
Rack Position Sensor Input



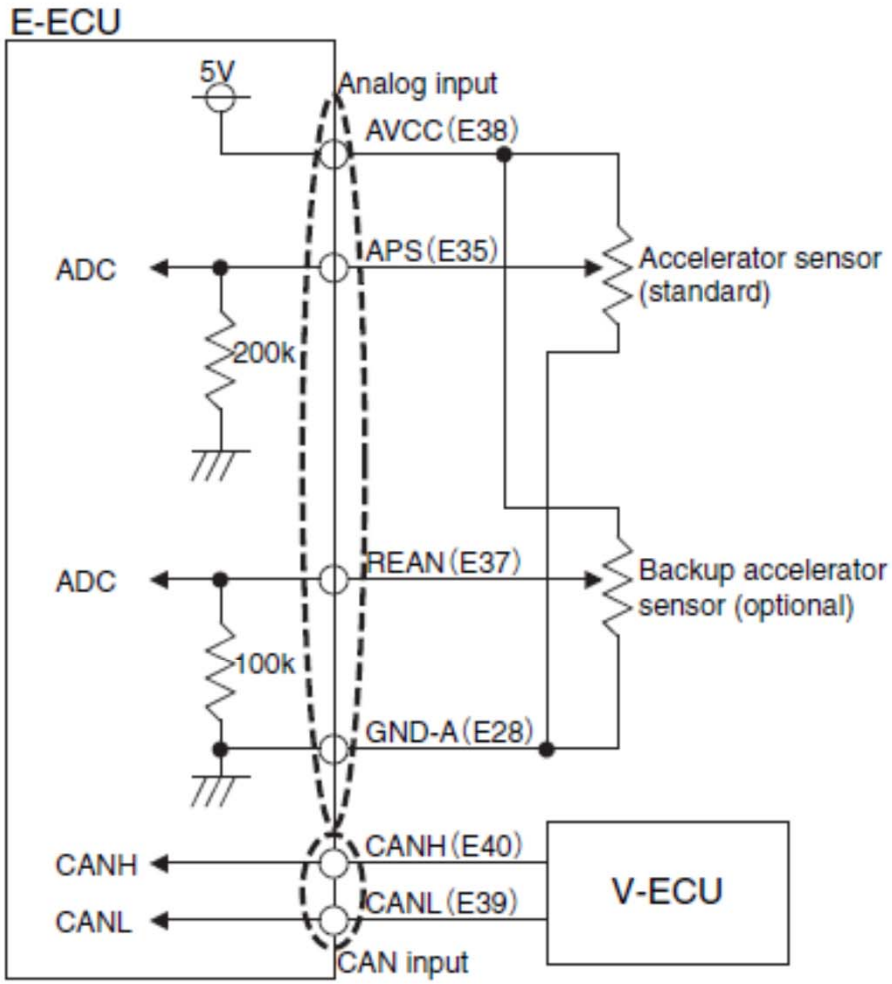
CW Temperature Sensor Input



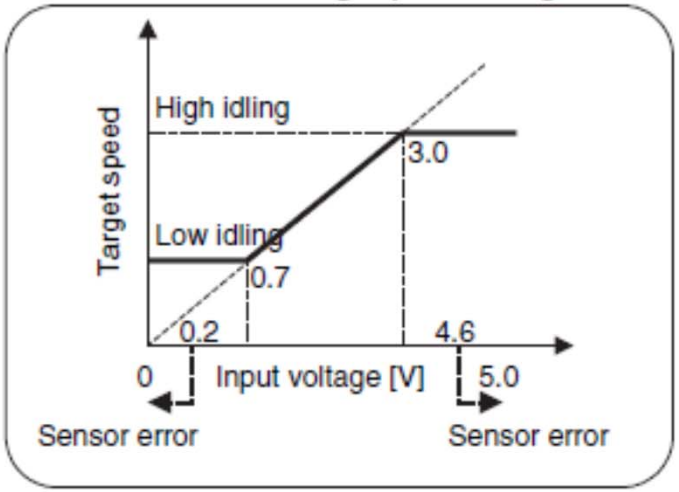




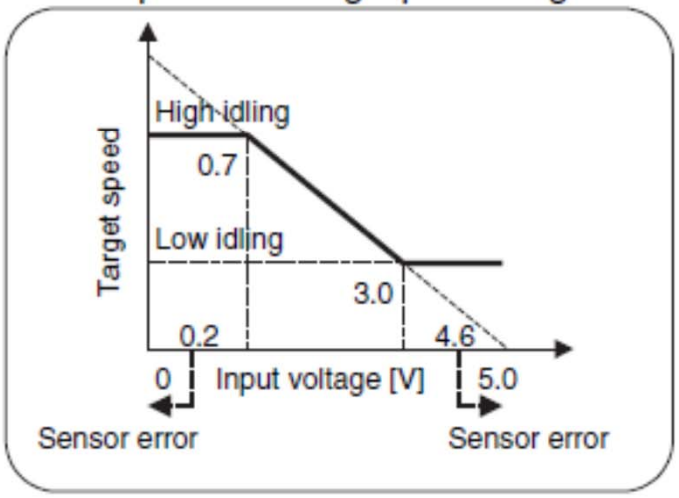
Accelerator Sensor Input



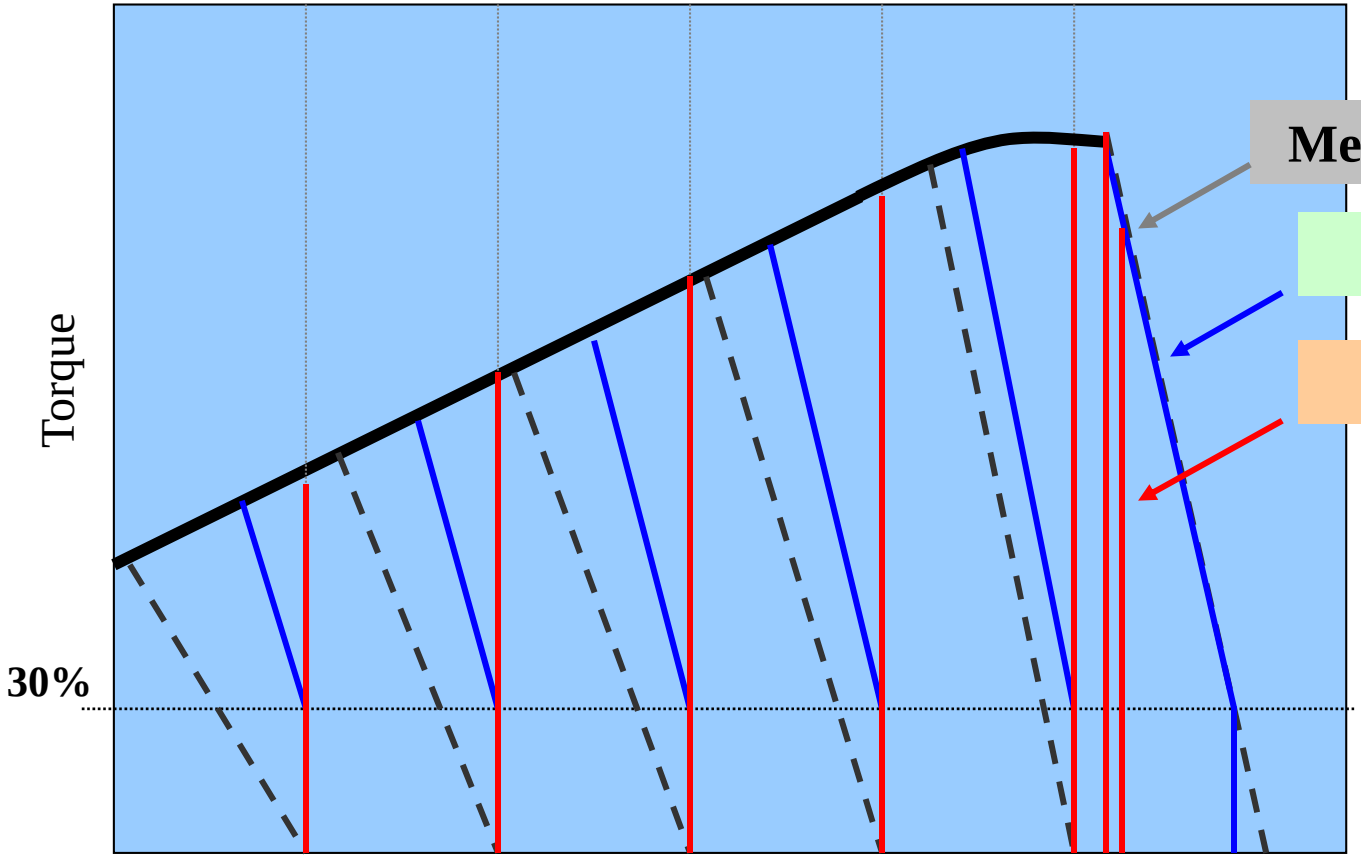
Default analog input setting



Optional analog input setting



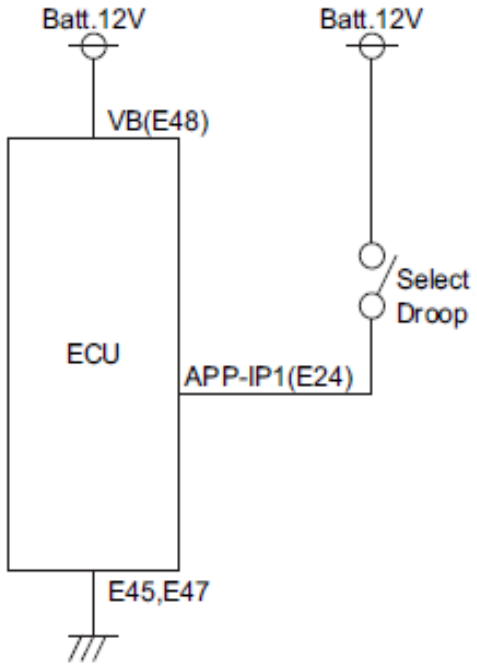
Eng Torque Curve Control



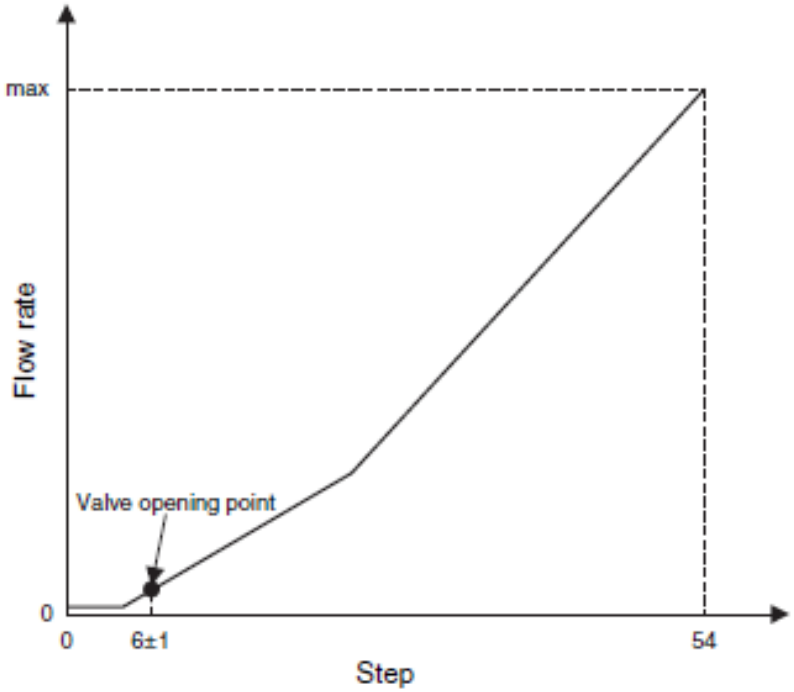
Mech. Governor Droop

Virtual Droop

Isochronous



EGR Valve Control



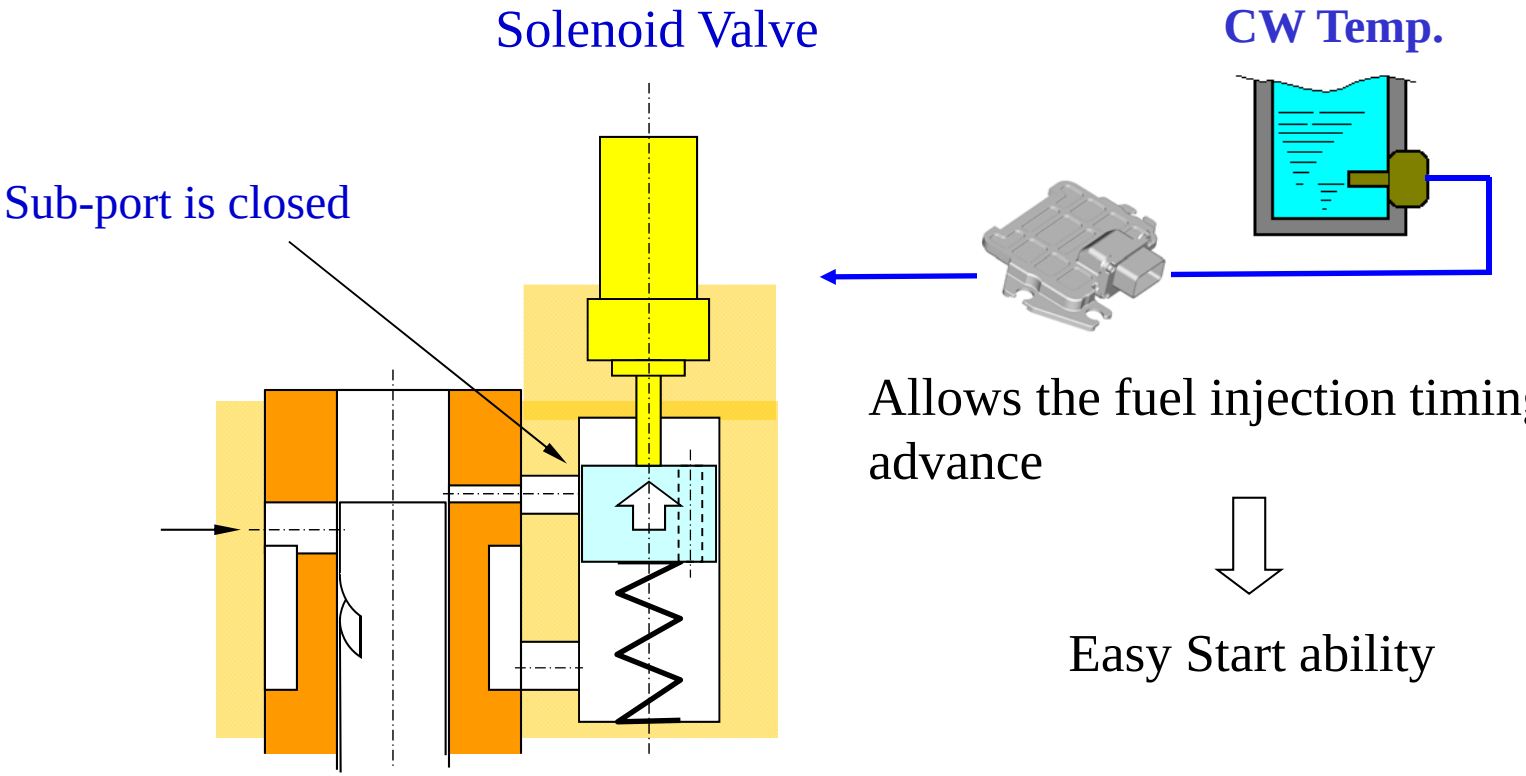
Driven by Stepping Motor （Step　0 – 54）

Working Condition

Cooling Water Temperature ： More than 60 ℃

Engine Load ： Low load （by PWM output）

CSD (Cold Start Device) Control



Allows the fuel injection timing to advance

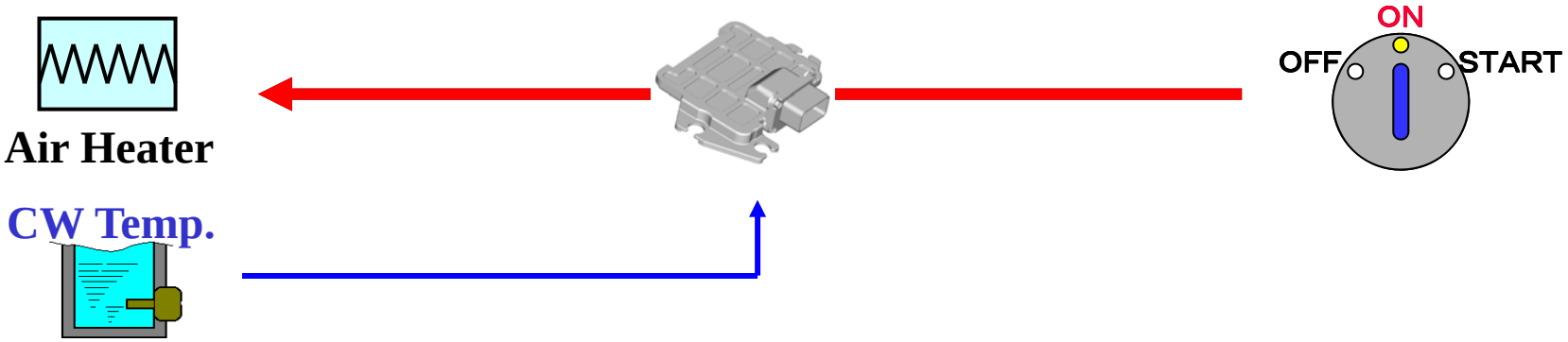
⇩

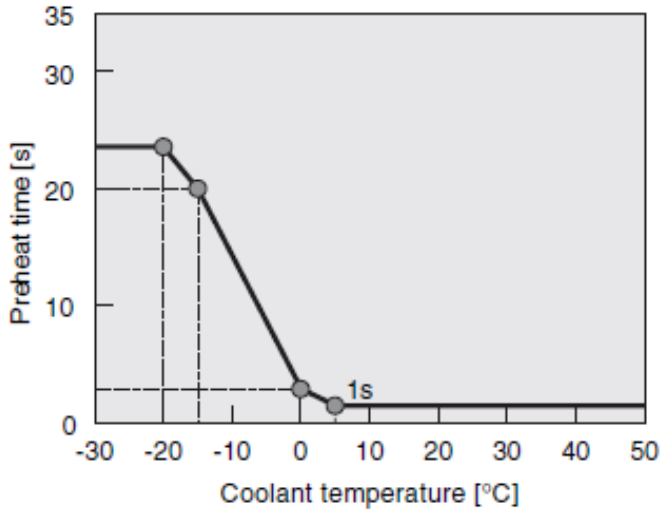
Easy Start ability

	CSD actuation stop temperature	CSD actuation maximum time	CSD actuation speed increase
NV2 engine	5°C or lower	5 minutes	50min^{-1}
NV3 engine	10°C or lower	5 minutes	75min^{-1}

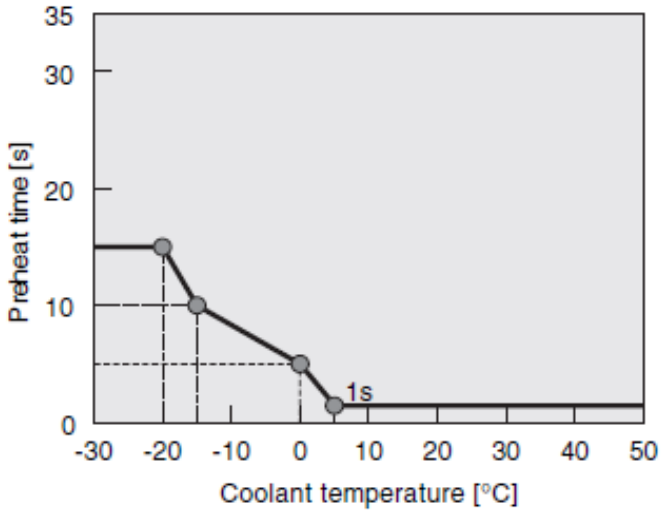
ON-Glow Control

After Heat (option)
（t=80s or CW Temp≦10℃）



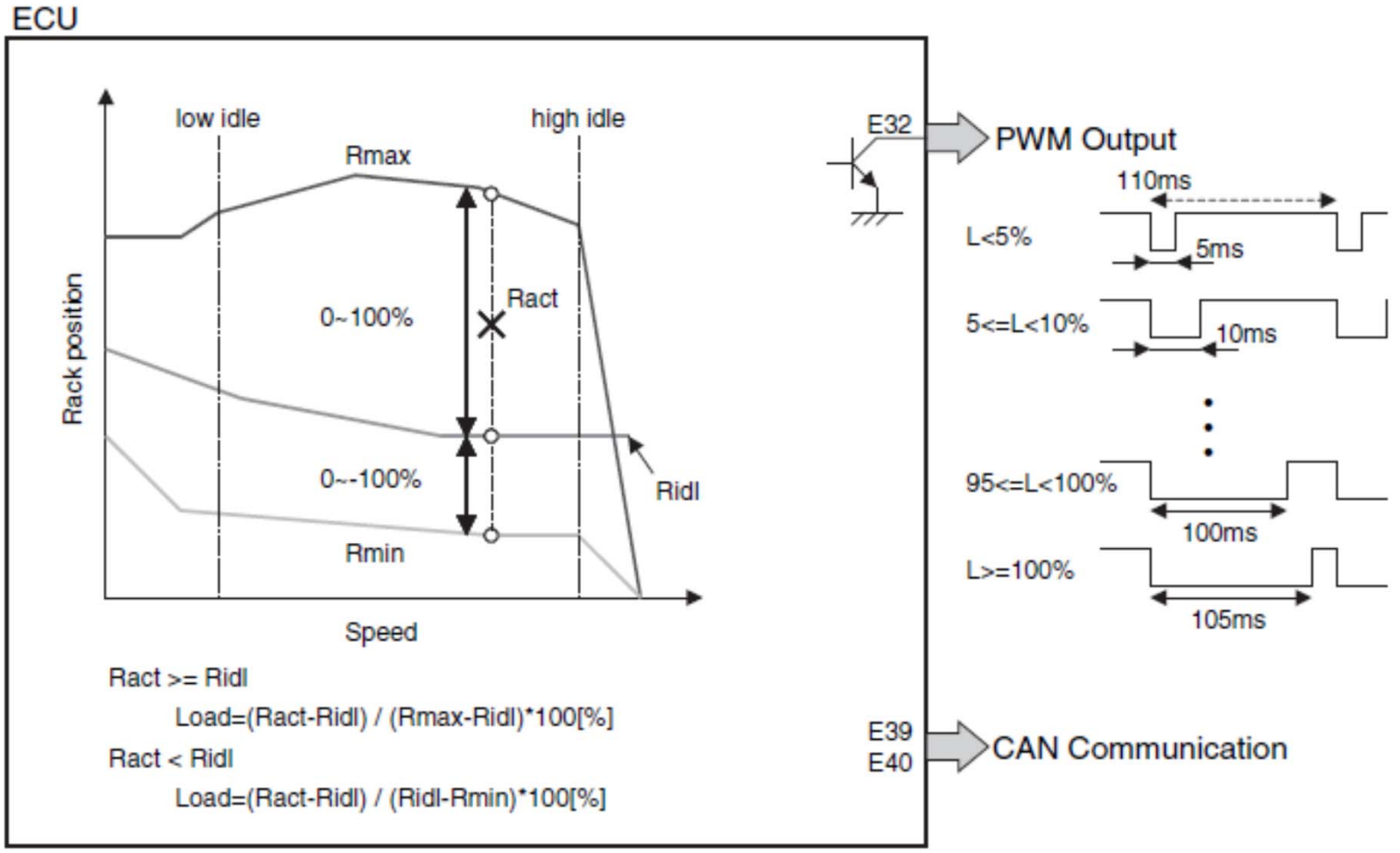


a) Preheat time for air heater



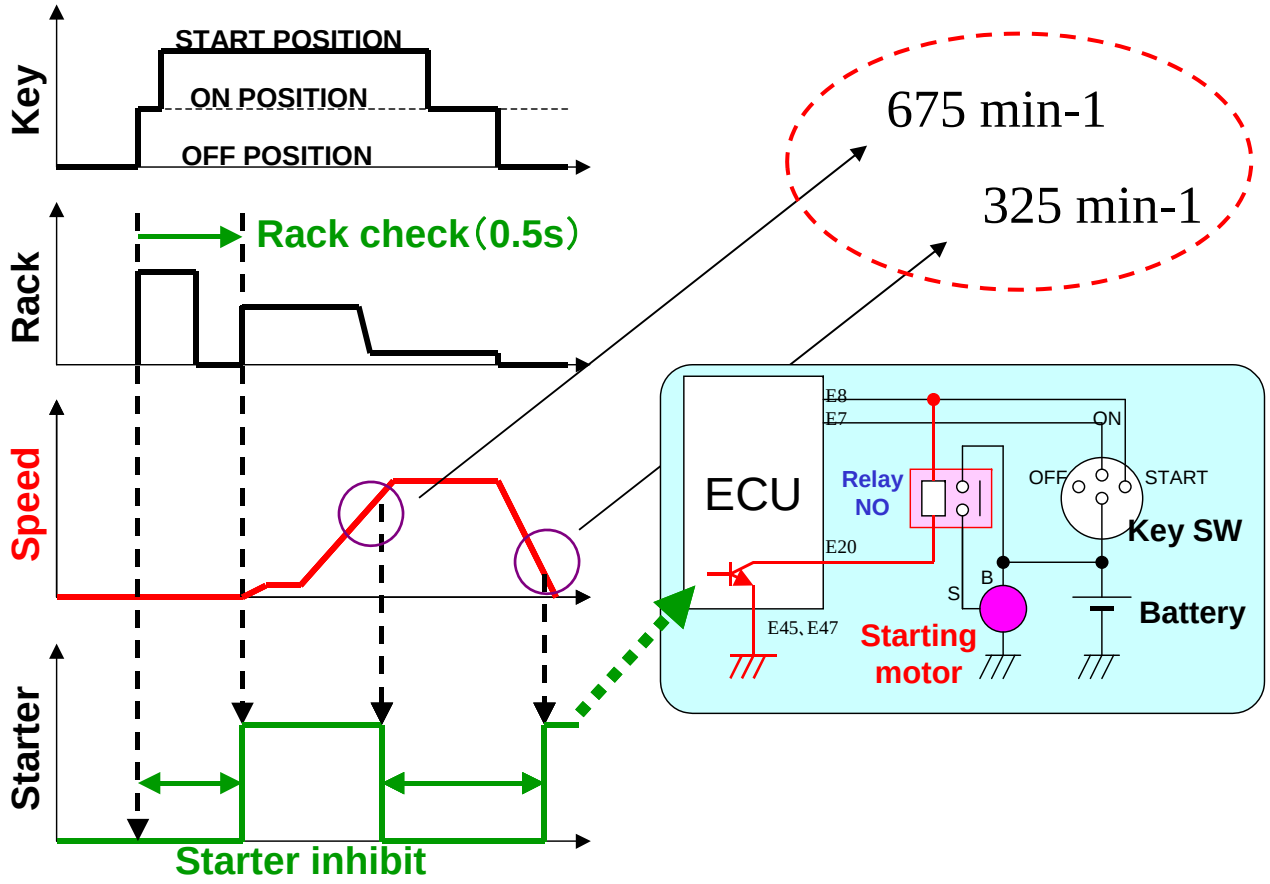
b) Preheat time for glow plug

Calculation Load Factor



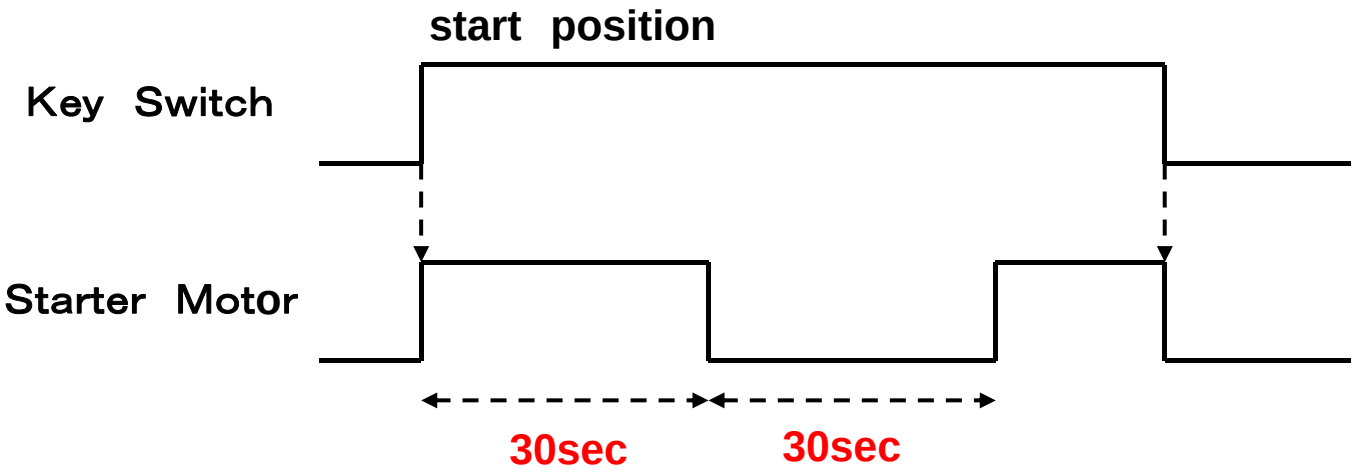
Start Prevention Control

Safety Relay (Standard)



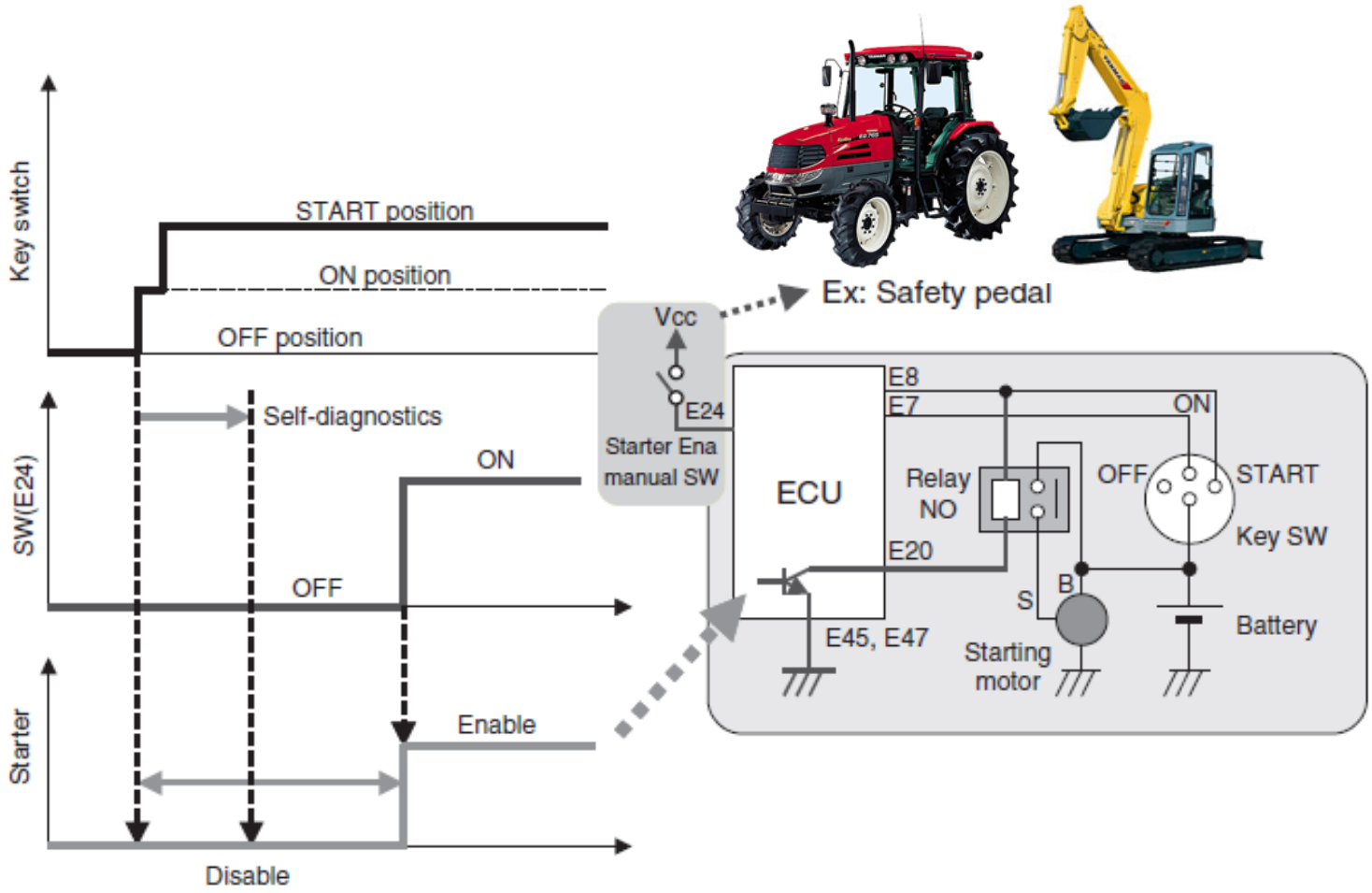
Start Prevention Control

Starter Disable (Optional)

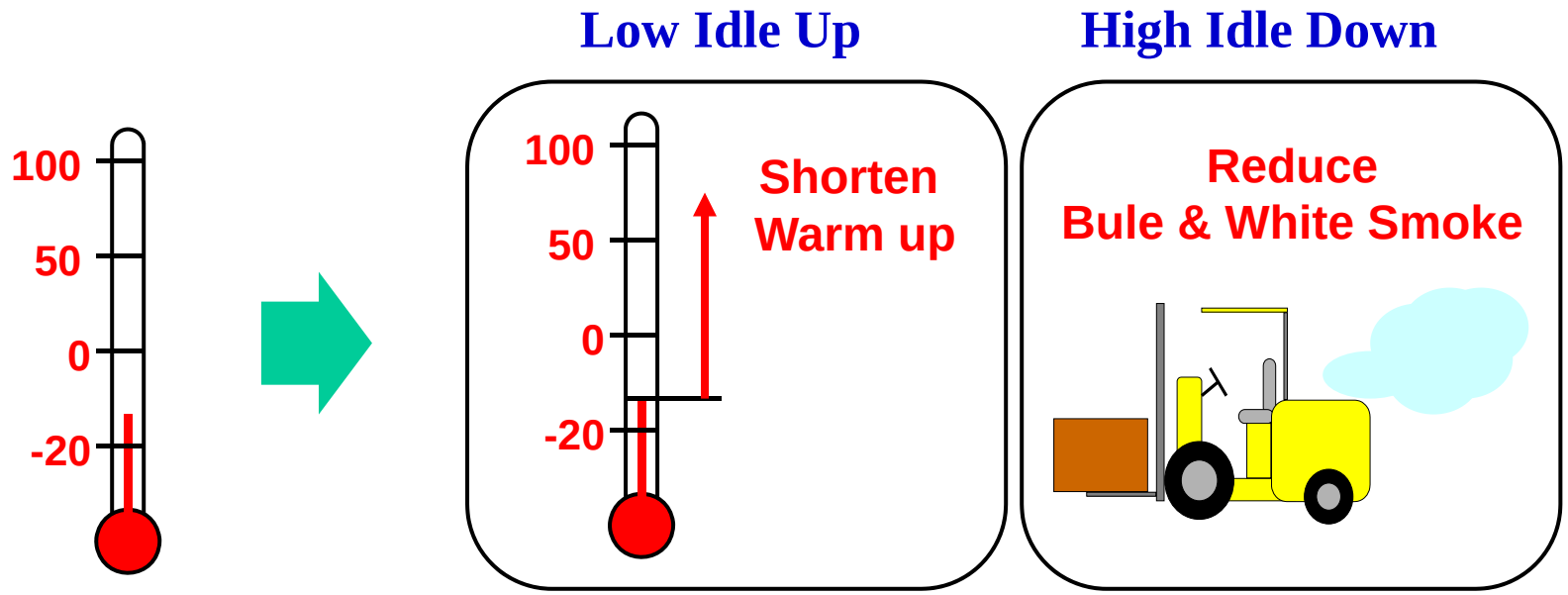


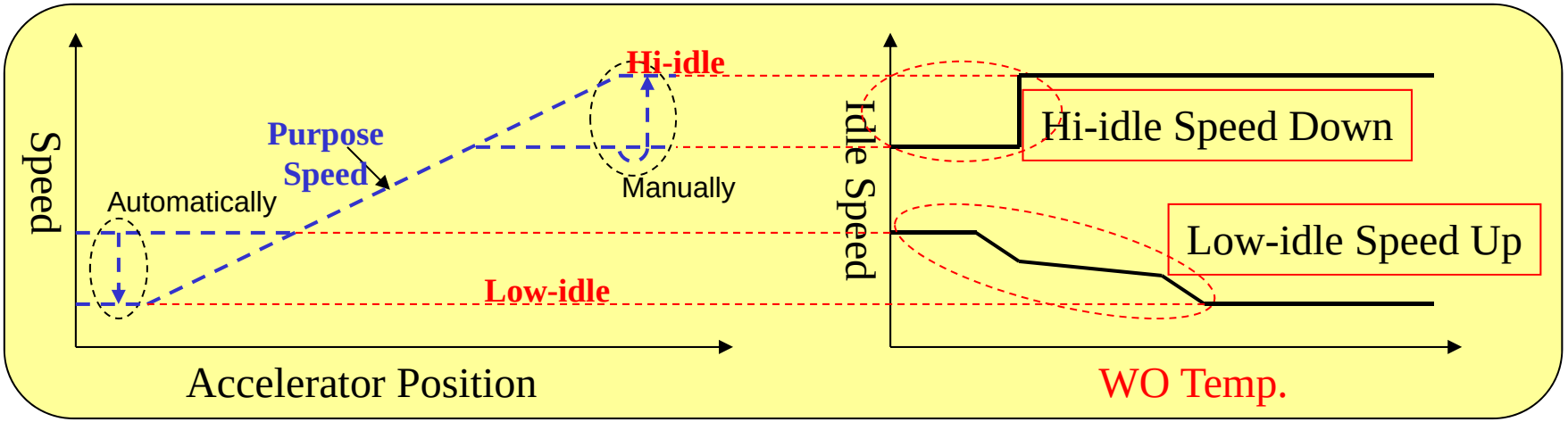
Start Prevention Control

External Switch E24 / E17 (Optional)



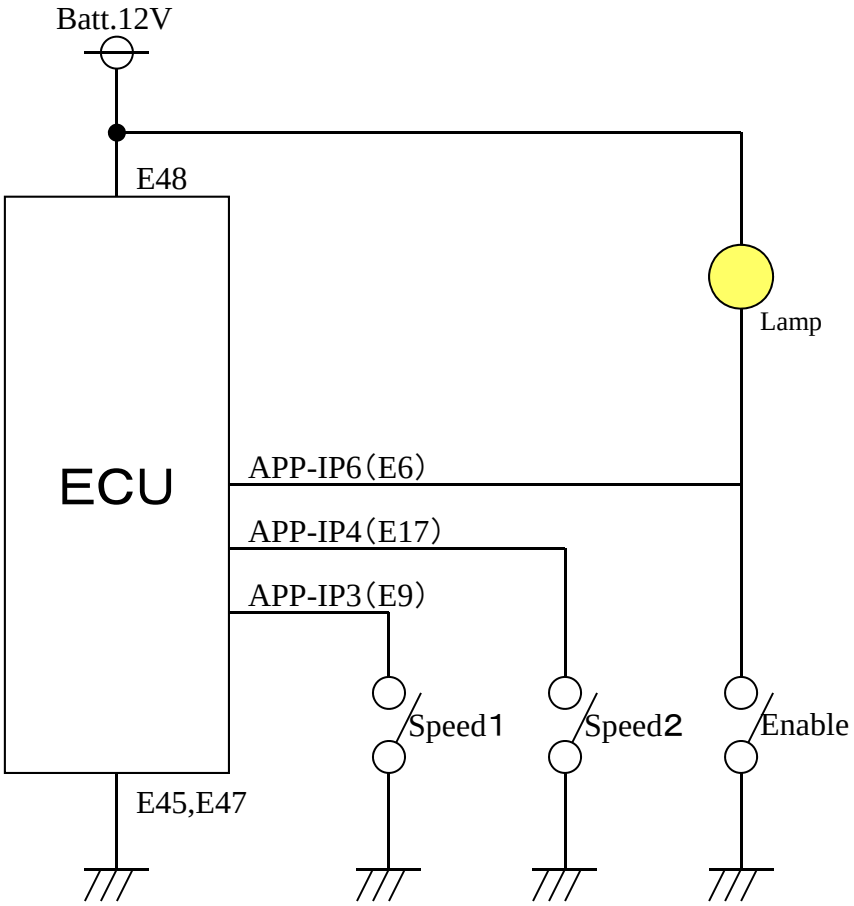
Idle Speed Control (Option)





Speed Selection

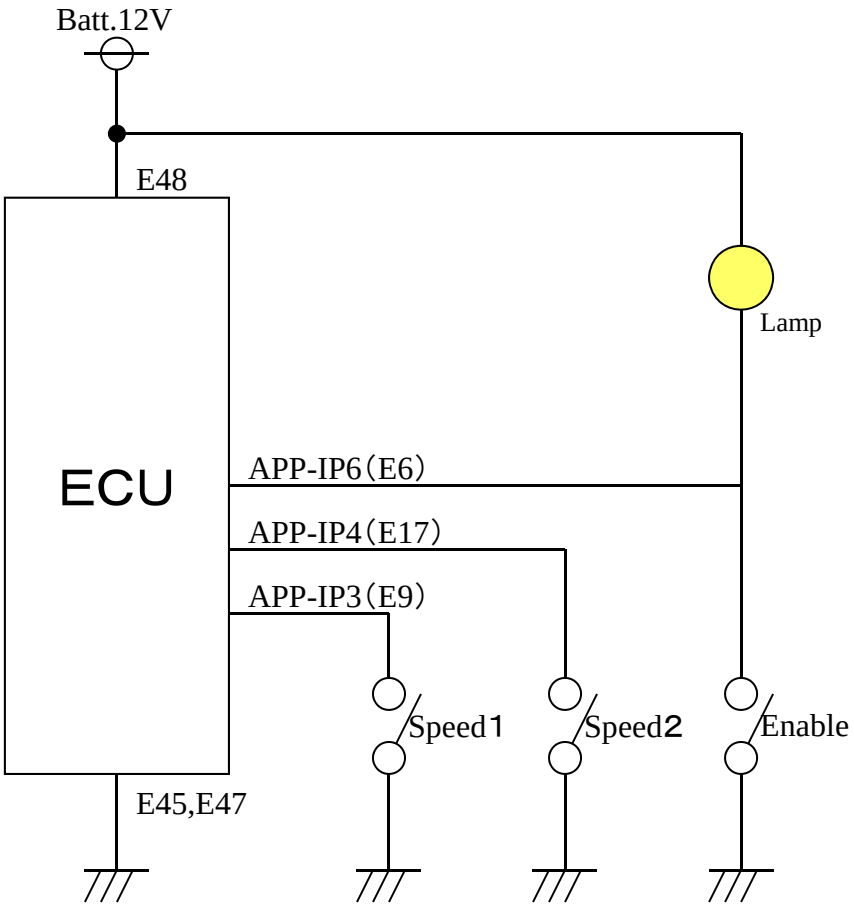
Constant Speed (Standard)



Enable SW	Speed 1 SW	Speed 2 SW	Speed Control
off	–	–	**Normal**
on	off	off	**1500min^{-1}**
	off	on	**Low idle**
	on	off	**1800min^{-1}**
	on	on	**High idle**

Speed Selection

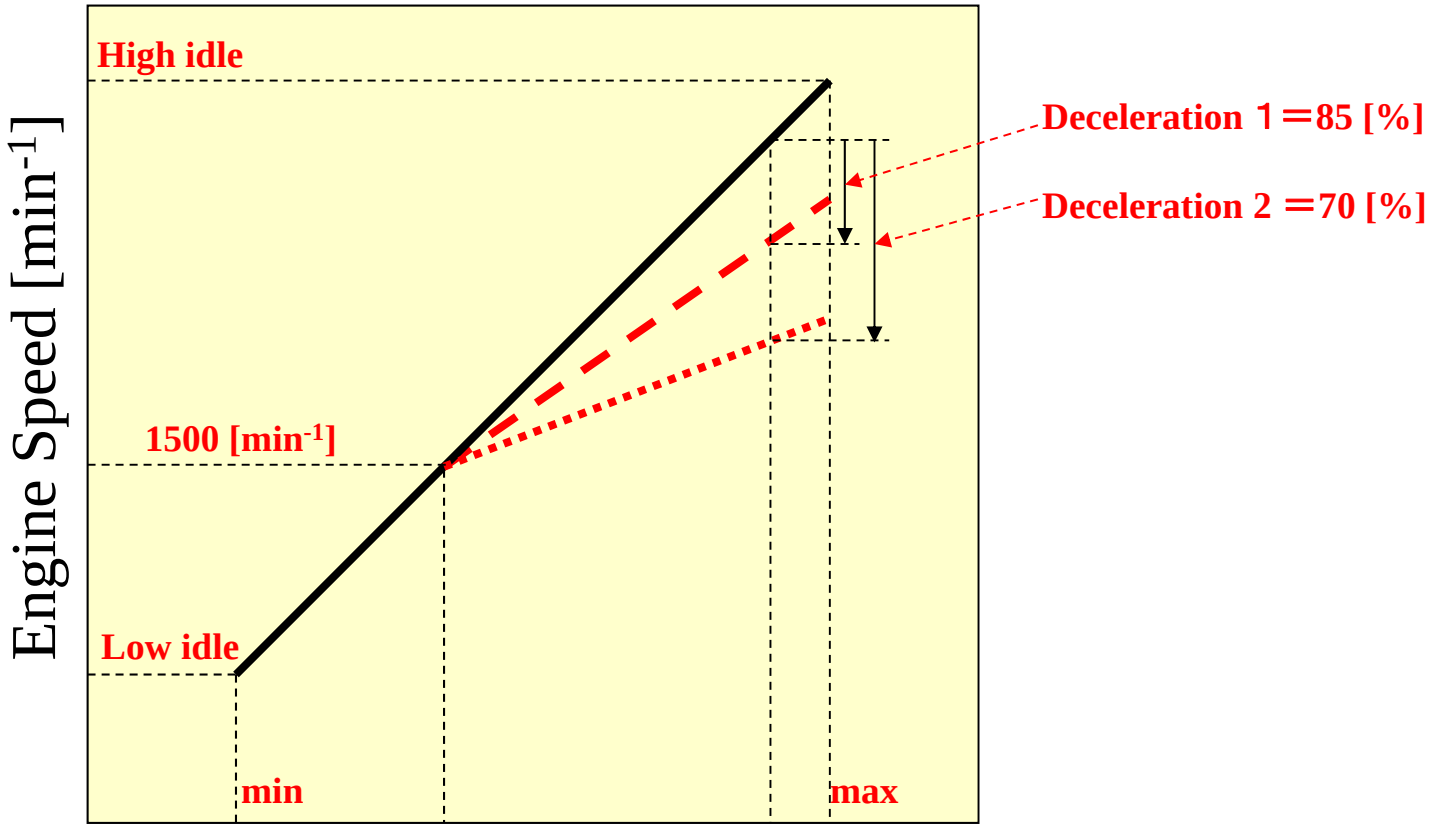
Constant Deceleration (Optional)



Enable SW	Speed 1 SW	Speed 2 SW	Speed Control
off	—	—	**Normal**
on	off	off	**70%**
	off	on	**Normal**
	on	off	**85%**
	on	on	**Normal**

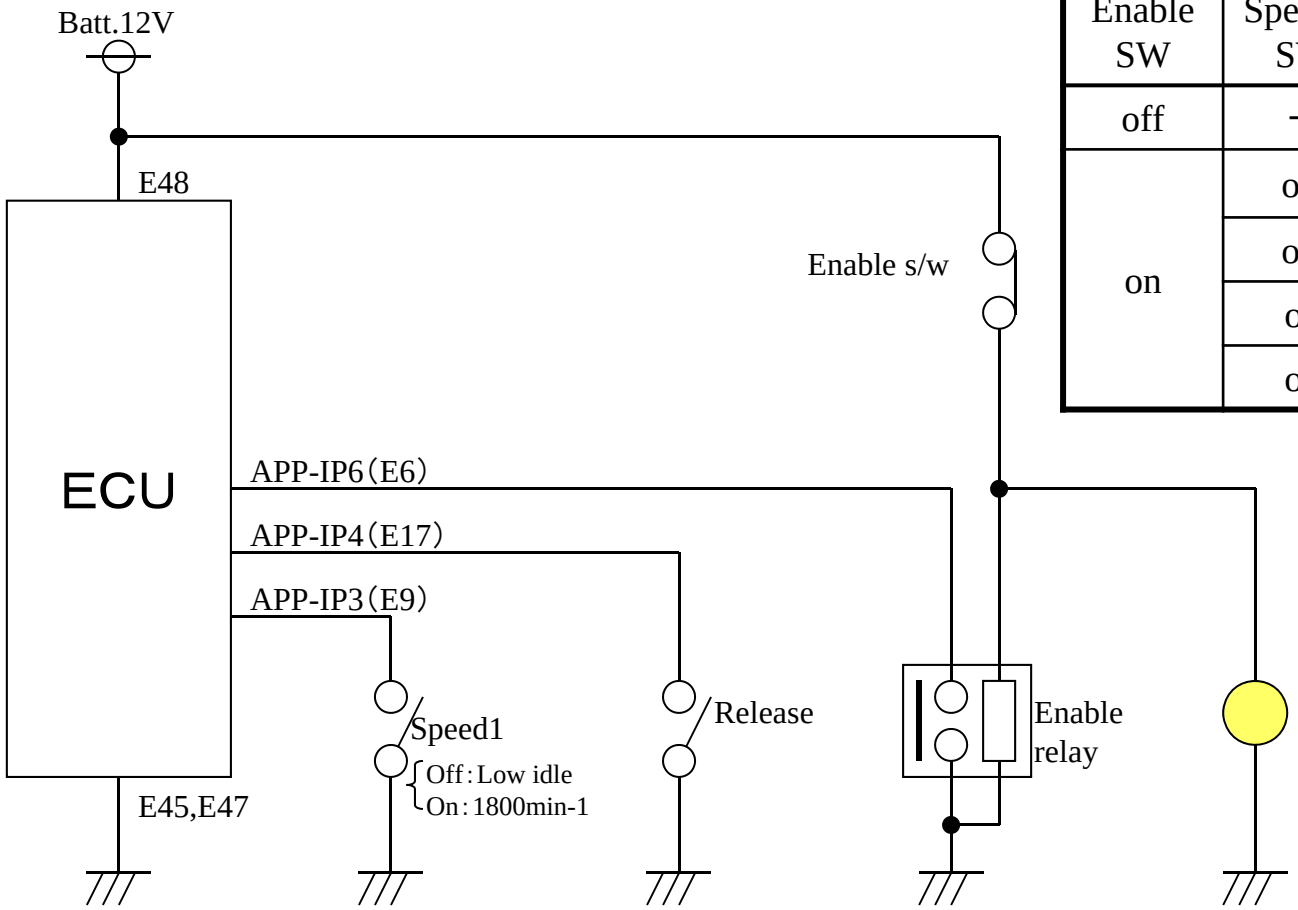
Speed Selection

Constant Deceleration (Optional)



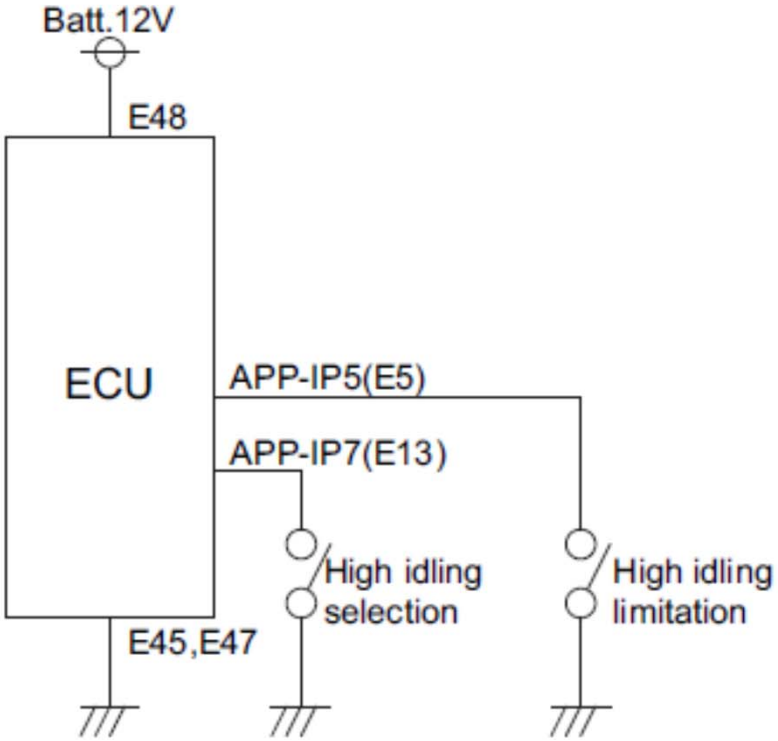
Speed Selection

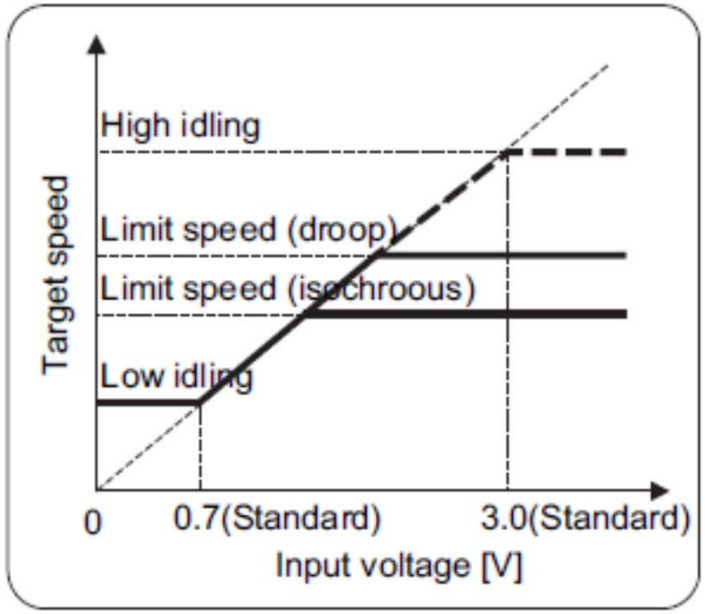
Auto Deceleration (Optional)



Enable SW	Speed 1 SW	release SW	Speed Control
off	–	–	**Normal**
on	off	off(4s)	**Low idle**
	off	on	**Normal**
	on	off(4s)	**1800min^{-1}**
	on	on	**Normal**

High Idling Limitation





High idling limitation SW APP-IP5(E5)	High idling selection SW APP-IP7(E13)	Limit speed (standard set value)	
		Droop	Isochroous
OFF	-	Speed command from the accelerator	
ON	OFF	1900 [min^{-1}]	1900 [min^{-1}]
	ON	1700 [min^{-1}]	1700 [min^{-1}]