M2600 Shut Down Unit Manual

Contents

1 Introduction

The M2600 Shut Down Unit has been designed as a safety shut down device for protection of marine engines e.g. in generator, propulsion or pump applications.

Together with the SELCO M2500 or M2000 or other Engine Controllers it can build up a complete Control, Alarm and Safety System for Marine Engines. However it can also be used as standalone safety device.

In order to meet the restrictions of the classification societies with regards to safety functions, the unit has been designed entirely on discreet logic. There is no microprocessor or programmable electronic circuit involved.

The module includes 10 shut down inputs for digital sensors. All sensor inputs are cable monitored.

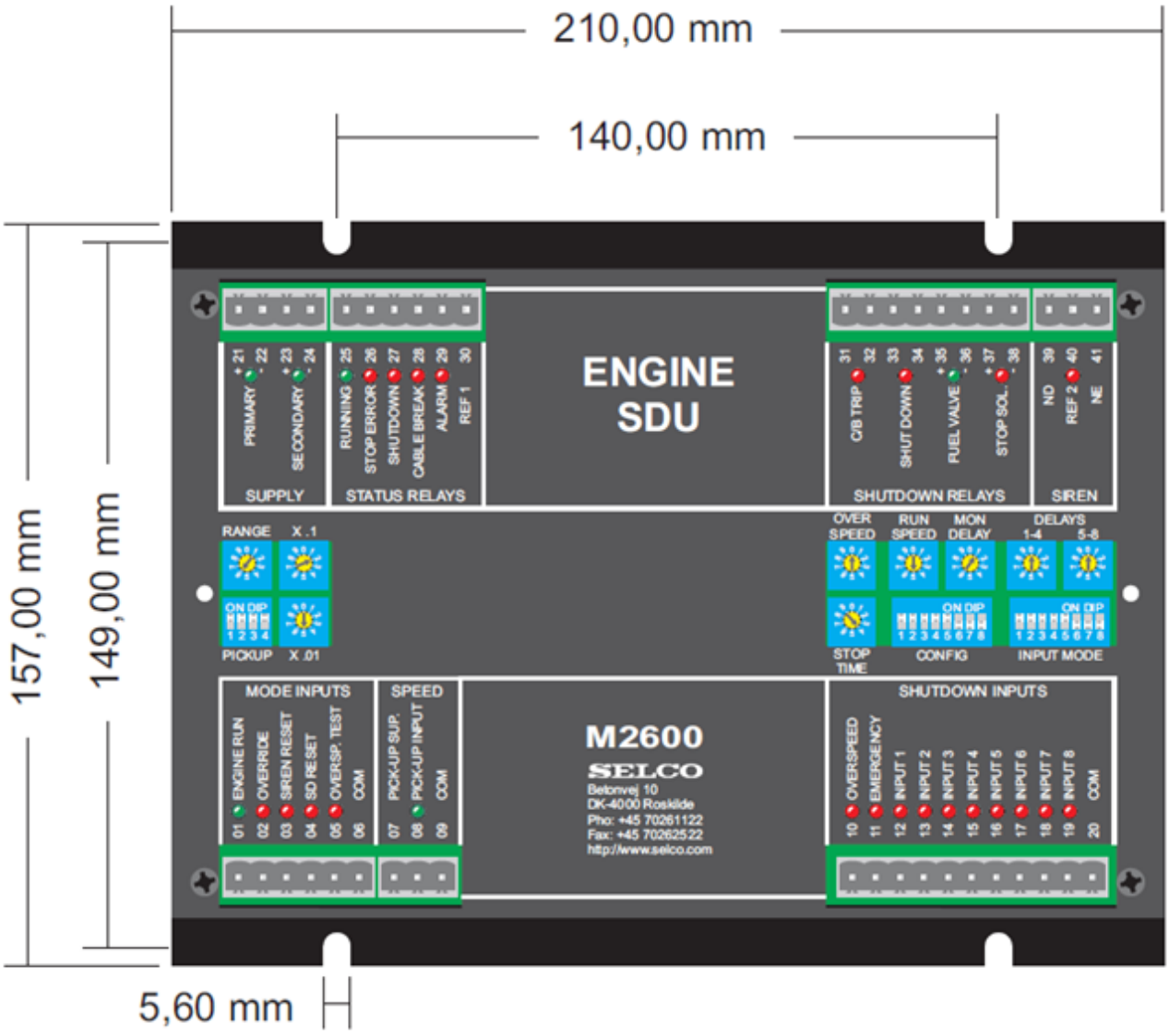
The speed can be detected either from a magnetic pick up or from a digital input.

Shut Down outputs are available for stop and run solenoid. Both outputs are cable monitored. Additionally there are some status outputs for common alarms and shut downs.

2 Installation

The M2600 module is secured to the rear of the switch board using four 5 mm screws.

Please ensure that enough space is given around the module so that the plug-in terminals can be removed and reinserted. The length of the cables should also allow for the easy removal and insertion of the plug-in terminals.

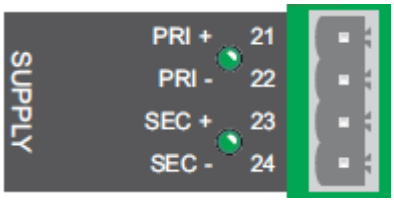


3 Power Supply

The M2600 includes a redundant 24V DC power supply. The voltage tolerance is +/-30 % (16,8V – 31,2V).

Primary and secondary minus are internally connected to COM. The power supplies are protected in a way that a short circuit between primary supply +24V and minus will not pull down the secondary supply and vice versa.

Terminal No.	Description
21	Primary Supply +
22	Primary Supply -
23	Primary Supply +
24	Primary Supply -



In case any power supply fails an alarm will be generated on the common alarm output and the siren relay will be de-energized (normally energized). Power supply failure alarm disappears automatically when the power supply returns.

In case both power supplies fail, only the siren relay will be de-energized, as there is no supply to the module anymore.

It is possible to adjust the power supply alarm to be only monitored when the engine is running (for details see 8.9). This function is used in generator applications, where the secondary supply is driven by the generator voltage.

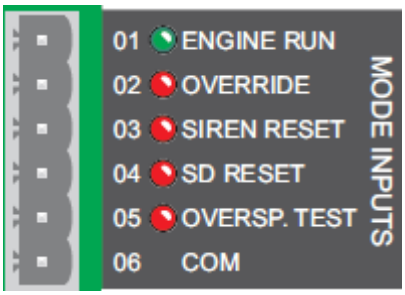
The power supply LEDs are lit when the power supplies are active and off when the power supplies are off.

Note:
The M2600 should never be powered on into a running engine because the over speed detection is triggered already with the first pick-up pulse. Depending on flywheel position, this could cause over speed shut down.

4 Inputs

4.1 Mode/ Control Inputs

Nr.	Description	Logic (NO/NC)
1	Engine Run	NO
2	Override	NO
3	SIREN RESET	NO
4	SD RESET	NO
5	Oversp test	NO
6	COM	



A LED is dedicated to each input. The LED is lit when the input is active, off when the input is inactive.

4.1.1 Engine Running (terminal 1)

This input is considered active when connected to COM, inactive when open.

This input is only used in case there is no pick-up for speed detection. The input is a contact from a tacho-relay that signals that the engine is running (speed of the engine is above ignition speed).

4.1.2 Override (terminal 2)

This input is considered active when connected to COM, inactive when open.

When activated all shut downs except those on terminal 10 and 11 (Overspeed and Emergency Stop) will be disabled. This means the engine will continue running despite of a shut down.

Note:
In case override is being deactivated while a shutdown is present (a not reset shutdown, regardless of shut down input state), the shutdown will be executed immediately.

4.1.3 Siren Reset (terminal 3)

This input is considered active when connected to COM, inactive when open. It silences the siren. It does not reset the alarm (alarm output relay and LED) or shut down.

4.1.4 SD Reset (terminal 4)

This input is considered active when connected to COM, inactive when open.

It is intended for resetting of siren and alarms (siren relay, alarm output relay and LED) and shut downs.

The first reset will only reset the siren; the second reset will reset alarm and shutdown (shut down only provided the engine has stopped).

Note:
A shut Down can only be reset in case the engine is stopped (detected by pick-up or crank disconnect) and the stop time has expired.

Overridden shut downs can be reset as soon as the shutdown condition has disappeared from the shutdown sensor input.

4.1.5 Overspeed Test (terminal 5)

This input is considered active when connected to COM, inactive when open. It is used for testing of the overspeed shut down. When activated it will decrease the overspeed shut down setting to 50% of its setting, thus provoking an overspeed shut down).

4.1.6 COM (terminal 6)

Common reference for all control inputs. This terminal is the same as the power supply that is currently used for supply of the unit.

4.2 Speed detection

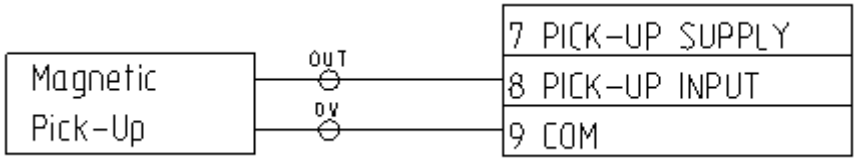
In most applications the engine speed is detected via a magnetic or an inductive pick-up.

The connections are as follows:

Nr.	Description
7	Pick-Up Supply
8	Pick-Up Input
9	COM

The pick-up LED is on when a pick-up signal is received (engine turning), off when the engine is stopped and flashing when the connection to the pick-up is lost (frequency 1,25Hz, duty cycle 10%).

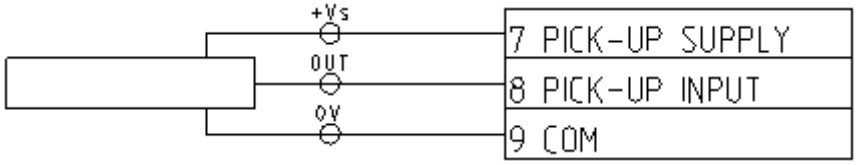
4.2.1 Connection of magnetic pick-up



The minimum Voltage from the pick-up is Umin, pk-pk = 6V

Umax, pk-pk, all pick-ups = 200V

4.2.2 Connection of PNP or NPN pick-up



4.3 Shut Down Inputs

All shut down inputs are normally open binary contacts.

Nr.	Description	Logic (NO/NC)	Remark
10	Overspeed	NO	Cable monitoring / no override possible
11	Emergency stop	NO	Cable monitoring / no override possible
12	Spare	NO	Cable monitoring
13	Spare	NO	Cable monitoring
14	Spare	NO	Cable monitoring
15	Spare	NO	Cable monitoring
16	Spare	NO	Cable monitoring
17	Spare	NO	Cable monitoring
18	Spare	NO	Cable monitoring
19	Spare	NO	Cable monitoring
20	COM		Common reference

The shut down inputs are considered active when connected to COM, inactive when open.

When activated, these inputs generate shut downs. Delay times can be configured by rotary switch adjustments (see Configuration). The switches are hidden below the cover of the unit in order to avoid unintentional changes of the settings.

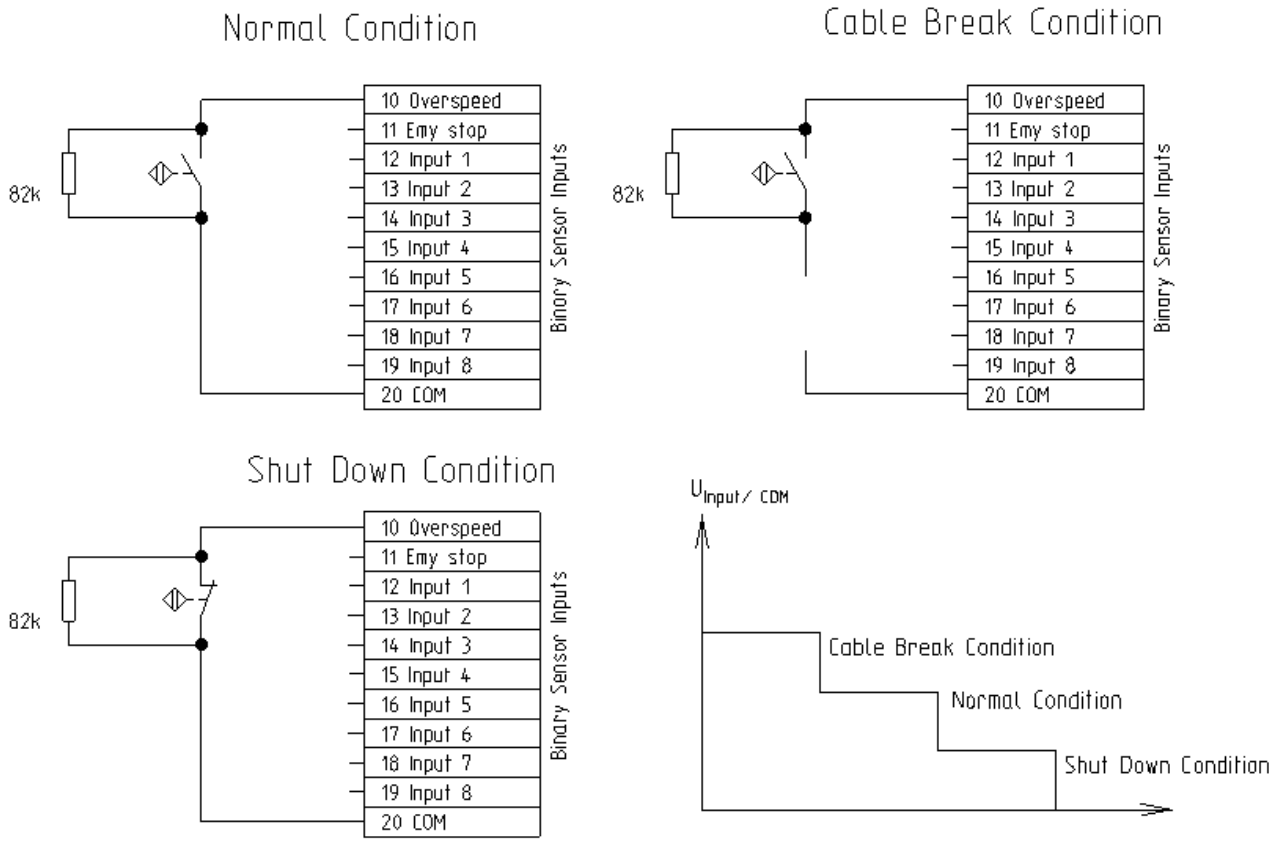
The shut down inputs are monitored for cable break. For this it is necessary to connect a parallel resistor of 82k across the sensor contacts. This resistor must be mounted as close to the resistor as possible.

Inputs 3 to 10 (terminals 12 to 19) can be configured to continuous monitoring or running only (see Conditional Monitoring/ Unconditional Monitoring).

Inputs 1 and 2 (terminals 10 and 11, Over Speed and Emergency Stop) are always monitored without delay. They cannot be overridden.

Each input has a LED that is lit when the input is active, off when the input is inactive and flashing (frequency = 1,25Hz, duty cycle 10%) when the connection to the sensor is lost (cable fault).

There can be 3 different conditions on the shut down inputs:



5 Outputs

5.1 Status Outputs

Nr.	Description	Type	Rating
25	Running	NO Relay	1A
26	Stop Error	NO Relay	1A
27	Shut Down	NO Relay	1A
28	Cable	NO Relay	1A
29	Common	NO Relay	1A
30	REF1	Common reference for status outputs	

Each output has a LED that is lit when the output is active and off when the output is inactive.

5.1.1 Running (terminal 25)

Normally open relay output. This output indicates that the engine is running.

The relay is normally de-energized.

5.1.2 Stop Error (terminal 26)

Normally Open Relay output. This output is activated in case the stop procedure has expired (stop time expired), but the engine is still running (speed detection from pick-up or crank disconnect input).

The relay is normally de-energized.

5.1.3 Shut Down (terminal 27)

Normally Open Relay output. This output becomes active for each shut down and remains activated until the stop procedure has expired and the shut down has been reset.

The relay is normally de-energized.

5.1.4 Cable break (terminal 28)

Normally Open Relay output. This output becomes active for each cable break at the shut down Inputs a pick-up fault or loss of a power supply.

In case a new cable fail appears while the output already is active, the output de-activates briefly (2s) and then activates again.

The relay is normally de-energized.

5.1.5 Alarm (terminal 29)

Normally Open Relay output. This output becomes active for each alarm and remains activated until the alarm has been reset.

In case a new alarm appears while the output already is active, the output de-activates briefly (2s) and then activates again.

The relay is normally de-energized.

Alarms could be:

- Overridden Shut Downs
- Stop Fault

5.1.6 REF 1 (terminal 29)

Common reference for all output relays terminals 19 to 22.

6 Shut Down Relays

Nr.	Description	Type	Rating	Remark
31	C/B Trip	NO contact	1A	
32	C/B Trip	REF	1A	
33	Shut Down	NO contact	8A	
34	Shut Down	REF	8A	
35	Fuel Valve	NO contact	8A	Cable monitoring
36	Fuel Valve	REF	8A	Cable monitoring
37	Stop Solenoid	NO contact	8A	Cable monitoring
38	Stop Solenoid	REF	8A	Cable monitoring

6.1 C/B trip (terminals 31 and 32)

Normally Open Relay output. This output trips the circuit breaker at shut down. It is a pulse signal of 2s.

The C/B trip output LED is lit when the output is active and off when the output is inactive.

The relay is normally de-energized.

6.2 Shut Down (terminal 33 and 34)

Normally Open Relay output. This is a stop output only for Shut Down. The output is activated immediately with each shut down. The Output remains activated until the engine has stopped and the shut down reset.

The shut down output LED is lit when the output is active and off when the output is inactive.

The relay is normally de-energized.

6.3 Fuel Valve (terminal 35 and 36)

Terminals 35 and 36 are a normally open contact for control of the fuel valve. This output will be activated during start and operation of the engine (energized to run). For engine stop the output will be de-activated.

The fuel valve output LED is lit when the output is active and off when the output is inactive.

In case cable monitoring is enabled and the connection to the fuel valve is lost the LED is flashing (frequency = 1,25Hz, duty cycle 10%) (cable fault).

The relay is normally de-energized.

Note:
This output can only be used with 24V DC

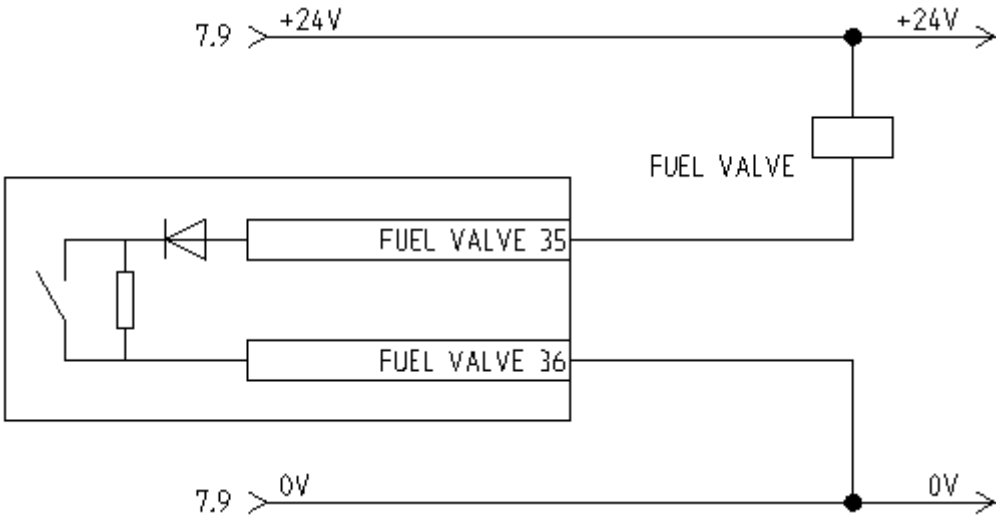
This can be either the same supply as for the controller or a separate power supply.

Note:
Correct polarity must be observed when connecting the fuel valve.

When deactivated there will be a current of **5mA** on this output due to the cable monitoring circuit inside the unit.

Note:
The coil connected to this output must require a current > 5mA for activating. Otherwise the fuel valve could be activated by the cable monitoring circuit.

In case the connection to the fuel valve is lost a cable fault alarm will be activated.



6.4 Stop Solenoid (terminal 37 and 38)

Terminals 37 and 38 are a normally open contact for control of the stop solenoid. This output will be activated for the stop procedure until the stop time has expired (energized to stop).

The stop solenoid output LED is lit when the output is active and off when the output is inactive.

In case cable monitoring is enabled and the connection to the stop solenoid is lost the LED is flashing (frequency = 1,25Hz, duty cycle 10%) (cable fault).

The relay is normally de-energized. Emergency engine applications use this output.

Note:
This output can only be used with 24V DC

This can be either the same supply as for the controller or a separate power supply.

Note:
Correct polarity must be observed when connecting the stop solenoid.

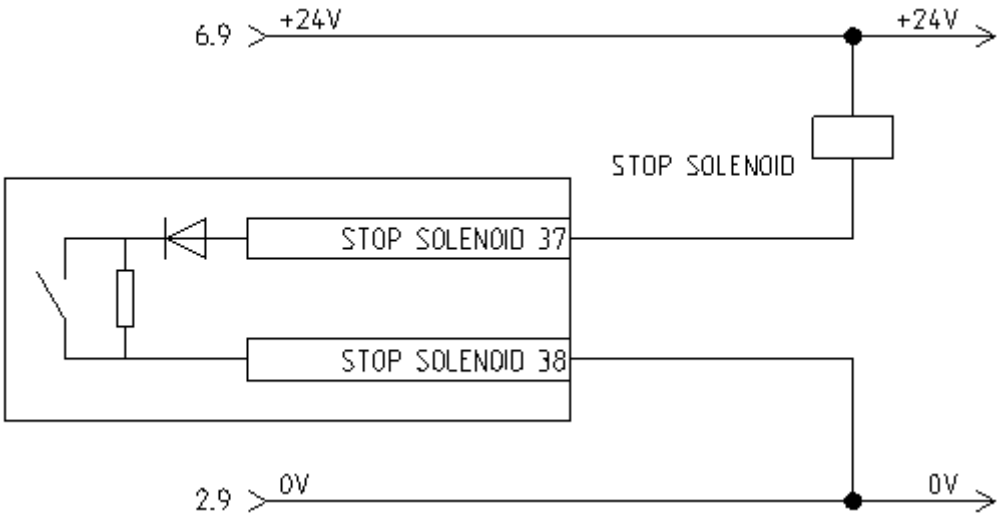
When deactivated there will be a current of **5mA** on this output due to the cable monitoring circuit inside the unit.

Note:
The coil connected to this output must require a current > 5mA for activating. Otherwise the stop solenoid could be activated by the cable monitoring circuit.

This is especially important in case the stop solenoid is not activated directly by the M2500 output but by an intermediate relay, that typically requires a much lower current to activate than the stop solenoid.

The cable monitoring on this output can be disabled in the configuration, however even then the 5mA limit still applies.

In case the connection to the stop solenoid is lost a cable fault alarm will be activated.



7 Siren Relay

Nr.	Description	Type	Rating	Remark
39	ND	NO contact	1A	
40	REF	REF	1A	
41	NE	NC contact	1A	

This Relay is normally energized. It will de-energize for any shut down or alarm or the loss of one or both power supplies.

The relay will be energized again after Reset regardless if the engine is stopped or not.

8 Configuration

A number of dip and rotary switches are available for configuration of the M2600. The switches are hidden below the cover of the unit in order to avoid unintentional changes of the settings.

8.1 Pick Up Type

Magnetic, NPN and PNP type pick-ups can be used. The M2600 must be configured for the pick-up type. This is done via dipswitches:

DIP switch No.	1	2	3	4
PNP	1	0	1	0
NPN	0	1	0	1
Magnetic	1	0	0	1

8.2 Adjustment of rated speed

The pick-up frequency range is between 25Hz and 15000Hz

Adjustment of rated frequency can be done by rotary switches.

The rated speed adjustment is done by three rotary switches with 10 positions (0-9)each:

Range Switch

The first switch is to be set to the frequency that is **closest and below** the rated pick up frequency of the engine. Following settings are possible:

Position	Frequency
0	12800 Hz
1	6400 Hz
2	3200 Hz
3	1600 Hz
4	800Hz
5	400 Hz
6	200 Hz
7	100 Hz
8	50 Hz
9	25 Hz

Switch X0.1 and Switch X.01

The second and third switch set a factor, the frequency set point of switch 1 is to be multiplied with, in order to match the rated pick up frequency of the engine.

Thus, when the switch settings are known, the rated pick up frequency setting can be calculated as follows:

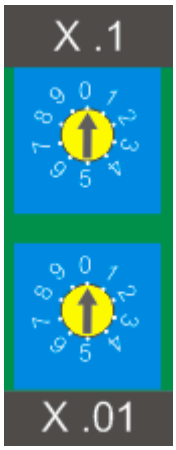
$$f_{Pick-Up} = (\text{frequency setting of switch 1}) \times 1,xy$$

With x = setting of switch X0.1

y = setting of switch X0.01

Position X 0.1	Factor
0	0,0
1	0,1
2	0,2
3	0,3
4	0,4
5	0,5
6	0,6
7	0,7
8	0,8
9	0,9

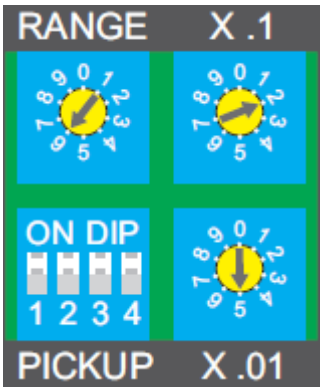
Position X 0.01	Factor
0	0,00
1	0,01
2	0,02
3	0,03
4	0,04
5	0,05
6	0,06
7	0,07
8	0,08
9	0,09



Example:

Following switch setting give a rated frequency of 250Hz:

Range switch	Position 6	200Hz
Switch X.1	Position2	Factor 1,2
Switch X.01	Position 5	Factor 1,05



$$f_{Pick-Up} = 200 \text{ Hz} \times 1,25$$

$$f_{Pick-Up} = 250 \text{ Hz}$$

8.3 Example of adjustment of the rated speed of the engine

Usually the nominal rpm (revolutions per minute) and the number of teeth on the flywheel are known.

In our example they are:

Nominal rpm: **1500rpm**

Flywheel teeth count: **150**

The nominal speed adjustment on the shut down unit is not expressed as engine rpm, but as pick-up frequency.

Calculation of pick up frequency:

The pick-up frequency is calculated as follows:

$$f_{Pick-Up} = \frac{(\text{nominal rpm of the engine}) \times (\text{number of teeth on the flywheel})}{60\frac{s}{\text{min}}}$$

$$f_{Pick-Up} = \frac{1500\frac{1}{\text{min}} \times 150}{60\frac{s}{\text{min}}} = 3750 \text{ Hz}$$

Range switch

The range switch is adjusted to the setting closest, but below the rated frequency.

$f_{Pick-Up} = 3750$ Hz

➔ **Switch 1 setting on position 2 = 3200Hz**

Switches X.1 and X.01

Switches X.1 and X.01 are used to adjust the factor, the frequency of set point of S1 is to be multiplied with, in order to match the pick-up frequency.

This factor is calculated as follows:

$$factor_{S2,S3} = \frac{\text{Pick} - \text{Up Frequency}}{\text{Frequency setpoint Switch1}}$$

$$factor_{S2,S3} = \frac{3750 \text{ Hz}}{3200 \text{ Hz}}$$

$$factor_{S2,S3} = 1{,}17$$

➔ **Setting switch X.1 is 1**

➔ **Setting switch X.01 is 7**

Double check:

The rated pick up frequency has been calculated to 3750 Hz

Switch No.	Position	Setpoint
Range switch	7	3200Hz
Switch X.1	1	0,1
Switch X.01	7	0,07

$f_{Pick-Up} = 3200\ \text{Hz} \times 1{,}17$

$f_{Pick-Up} = 3744\ \text{Hz}$

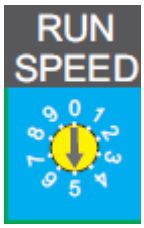
The small deviation of 6 Hz is due to the switch setting resolution.

8.4 Adjustment of engine running speed

The running speed is the limit for the M2600 to consider the engine running. If the speed detected on the pick-up input is lower than that, the M2600 will not consider the engine as running and shutdowns configured for conditional monitoring will not be monitored. (For the stop procedure however the M2600 must detect a speed < 1,5% of rated speed to consider the engine as stopped).

The running speed is adjusted as a percentage of rated speed. The Adjustment is done by a rotary switch with 10 positions:

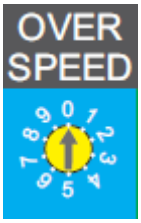
Position	% of rated speed
0	5
1	10
2	20
3	30
4	40
5	50
6	60
7	70
8	80
9	90



8.5 Adjustment of over speed shut down level

The over speed shut down level is adjusted as a percentage of rated speed. The Adjustment is done by a rotary switch with 10 positions:

Position	% of rated speed
0	108
1	118
2	128
3	138
4	148
5	158
6	168
7	178
8	188
9	198



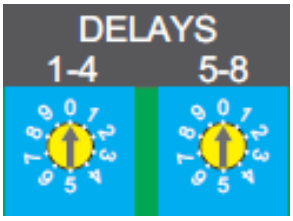
8.6 Shut Down Delays

Shut down delays can be configured for the digital inputs in two groups:

Inputs 1 to 4 (terminals 12 - 15) on the left delay rotary switch, inputs 5 to 8 (terminals 16 - 19) on the right delay rotary switch.

The Overspeed and Emergency Stop inputs (terminals 10 and 11) work instantaneously and cannot be changed.

Position	Delay
0	instantaneous
1	0,5s
2	1s
3	2s
4	4s
5	8s
6	16s
7	32s
8	32s
9	32s



8.6.1 Overspeed and emergency stop terminals 10 and 11

Not programmable. Instantaneous reaction

8.6.2 Terminals 12 to 15

Common adjustment switch as shown above.

8.6.3 Terminals 16 to 19

Common adjustment switch as shown above.

8.7 Stop Time

The stop time is the time the stop solenoid output is activated during shut down.

It can be adjusted by a rotary switch with 10 positions.

Position	Stop Time
0	5s
1	10s
2	20s
3	40s
4	80s
5	160s
6	320s
7	320s
8	320s
9	320s

8.7.1 Monitoring Delay

This is the delay between receipt of ignition speed signal and start of monitoring for those shut downs that are configured to conditional monitoring (e.g. low oil pressure).

Range between 5s and 30s.

Adjustment can be done by a 9 position rotary switch:

Position	Delay
0	0,5s
1	1s
2	2s
3	4s
4	8s
5	16s
6	32s
7	32s
8	32s
9	32s

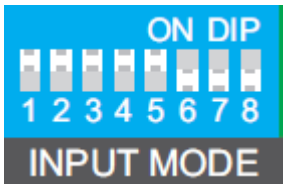
8.8 Conditional/ unconditional monitoring (Input Mode)

Conditional monitoring means that an input is only monitored with engine running (receipt of crank disconnect signal/ detection of engine running speed + expiration of **monitoring delay**). A typical example of this is oil pressure monitoring.

Unconditional monitoring means, that an input is always monitored, regardless if the engine is running or not. Typical examples for these are overspeed and emergency stop.

Each input can be set to conditional or unconditional monitoring (except overspeed and emergency stop terminals 10 and 11).

DIP switch no.	Input no.	ON	OFF
1	1 (terminal 12)	Unconditional monitoring (always active)	Conditional monitoring (only active with engine running)
2	2 (terminal 13)		
3	3 (terminal 14)		
4	4 (terminal 15)		
5	5 (terminal 16)		
6	6 (terminal 17)		
7	7 (terminal 18)		
8	8 (terminal 12)		



8.9 Power supply monitoring (CONFIG dip switch)

Both power supplies (primary and back-up) are monitored.

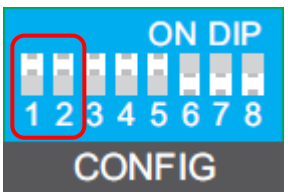
It is possible to configure the power supply monitoring for conditional or unconditional monitoring.

Conditional monitoring means that the power supply is only monitored with engine running.

Unconditional monitoring means the power supply is always monitored, regardless if the engine is running or not.

CONFIG dip switches 1 and 2 are used for this:

	ON	OFF
DIP switch 1	Conditional monitoring of primary supply	Unconditional monitoring of primary supply
DIP switch 2	Conditional monitoring of secondary supply	Unconditional monitoring of secondary supply



8.10 Cable monitoring of Stop Solenoid and Fuel Valve outputs

The outputs for the stop solenoid and fuel valve can be monitored for cable failure.

These cable monitoring functions can be activated or deactivated on the CONFIG dip switches 7 and 8:

	ON	OFF
DIP switch 3	Cable monitoring on fuel valve output disabled	Cable monitoring on fuel valve output enabled
DIP switch 4	Cable monitoring on stop solenoid output disabled	Cable monitoring on stop solenoid output enabled

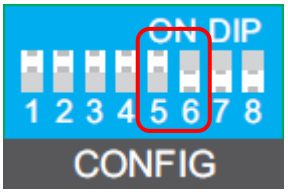
8.11 Running Detection (CONFIG dip switch)

The engine running condition can be detected either via a pick-up on terminals 7 to 9 or via a digital input on terminal 1.

In the configuration it is possible to disable these running detection inputs.

In default configuration both inputs are enabled.

	ON	OFF
DIP switch 5	Engine running input (terminal 1) disabled	Engine running input (terminal 1) enabled
DIP switch 6	Pick-up input (terminals 7-9) disabled	Pick-up input (terminals 7-9) enabled

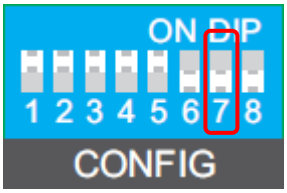


8.12 Cable monitoring on pick-up input (CONFIG dip switch)

The M2600 offers a cable monitoring function for the pick-up input. This cable monitoring function is also operational with the engine not running.

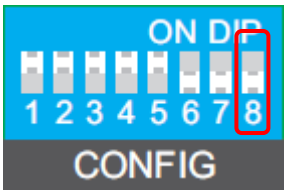
The cable monitoring function can be enabled or disabled with dip switch no. 3.

	ON	OFF
DIP switch 7	Cable monitoring on pick-up disabled	Cable monitoring on pick-up enabled



8.13CONFIG dip switch 8

Config dip switch 8 is not used



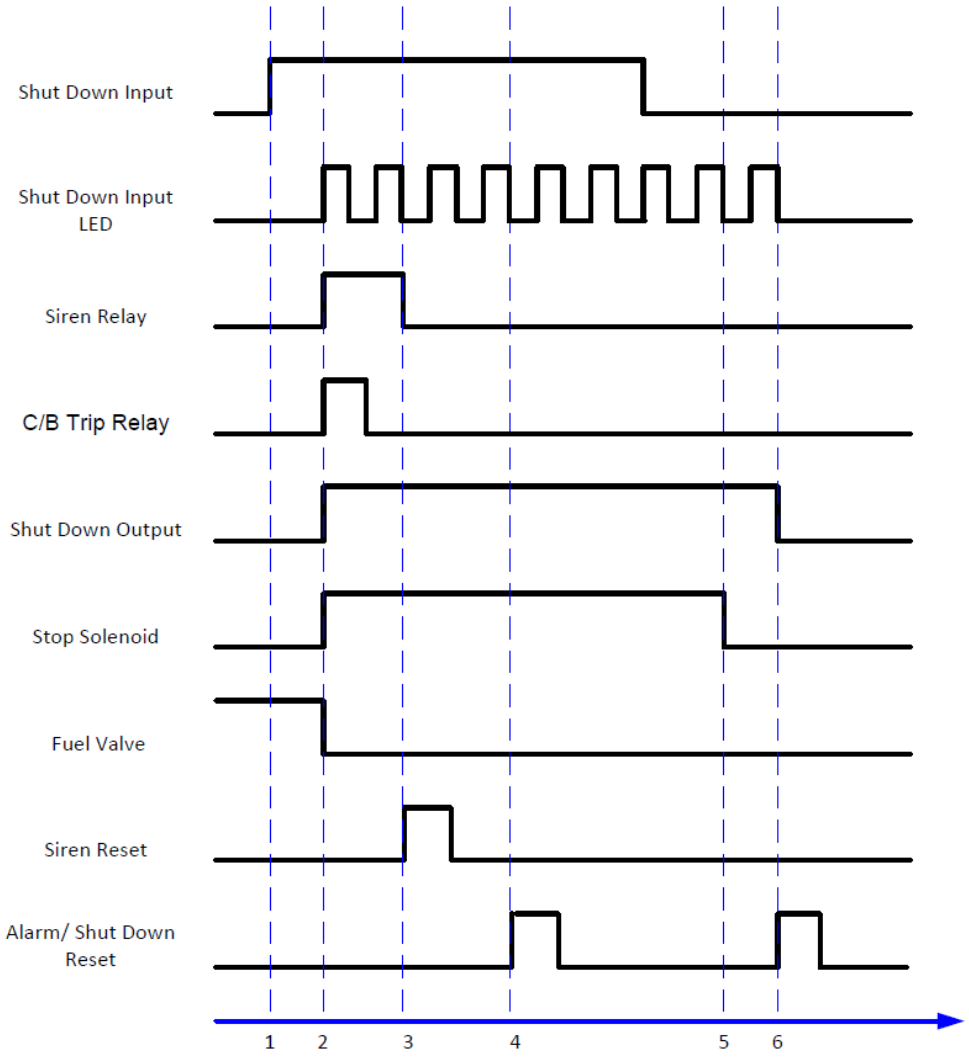
8.14 Config dip Switch overview:

	ON	OFF
DIP switch 1	Conditional monitoring of primary supply	Unconditional monitoring of primary supply
DIP switch 2	Conditional monitoring of secondary supply	Unconditional monitoring of secondary supply
DIP switch 3	Cable monitoring on fuel valve output disabled	Cable monitoring on fuel valve output enabled
DIP switch 4	Cable monitoring on stop solenoid output disabled	Cable monitoring on stop solenoid output enabled
DIP switch 5	Engine running input (terminal 1) disabled	Engine running input (terminal 1) enabled
DIP switch 6	Pick-up input (terminals 7-9) disabled	Pick-up input (terminals 7-9) enabled
DIP switch 7	Cable monitoring on pick-up disabled	Cable monitoring on pick-up enabled
DIP switch 8	Not Used	Not Used

9 LED Indications

Each in- and output is provided with an LED for status indication.

9.1 Timing diagram for inputs, outputs and LEDs



1 Shut Down input activated

2 Shut Down Delay expired -> activation of Shut Down

3 Siren Reset pressed

4 Alarm/ Shut Down Reset pressed 1st time

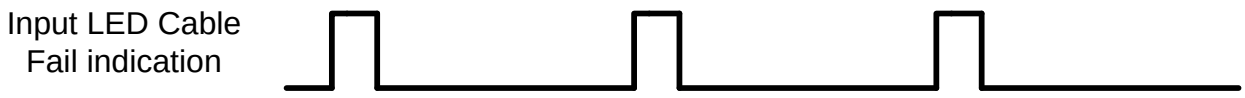
5 Stop time expired

6 Alarm/ Shut Down Reset pressed 2nd time

9.1.1 Cable fault indication

The input LED is either off, constantly on or flashing.

In case of a cable fault the LED is slow flashing (On 0,5s, Off 2s).



9.1.2 Output LED

There is an LED for each output. The LEDs are lit when the output relay is activated; they are off when the output relay is de-activated.

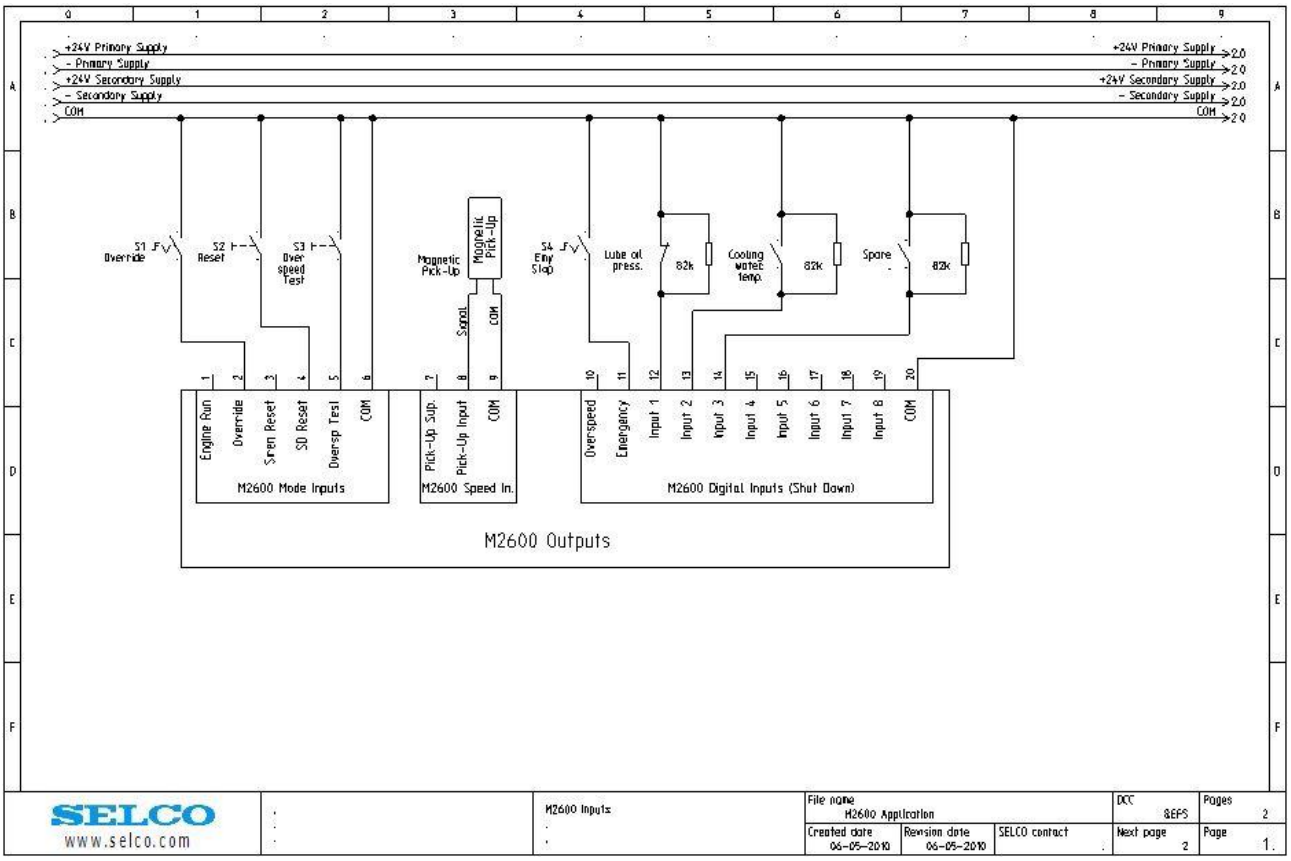
10 Application example

Below example shows an emergency/ harbor generator application.

Terminals 1 (Engine Running) and 10 (Overspeed) are not connected as the speed is taken from the magnetic pick-up.

The Override switch S1 is used for change between emergency generator mode and harbor generator mode. When activated (emergency mode) Lube oil pressure cooling water temperature and the spare shut down inputs will only give alarm, no shut down. Overspeed and emergency stop will still give shut down.

Inputs:



Outputs:

<u>Running Output</u>

Purpose of this interconnection between M2600 and M2500 is detection of a pick-up fault when the engine is not running, but the pick-up is still connected. A cable fault to the pick-up can be detected independently from this connection by the circuit check of the pick-up input. If the pick-up however is connected, but not generating a signal (eg. Adjusted too far from flywheel) this can only be detected by this interconnection.

For this function the Running Output is connected to a digital alarm input of the M2500 Engine Controller. Make sure that the reference used on REF 1 is the same as the COM reference for the

M2500. The digital input on M2500 used for this must be configured to NORMALLY COLSED and CONDITIONAL MONITORING.

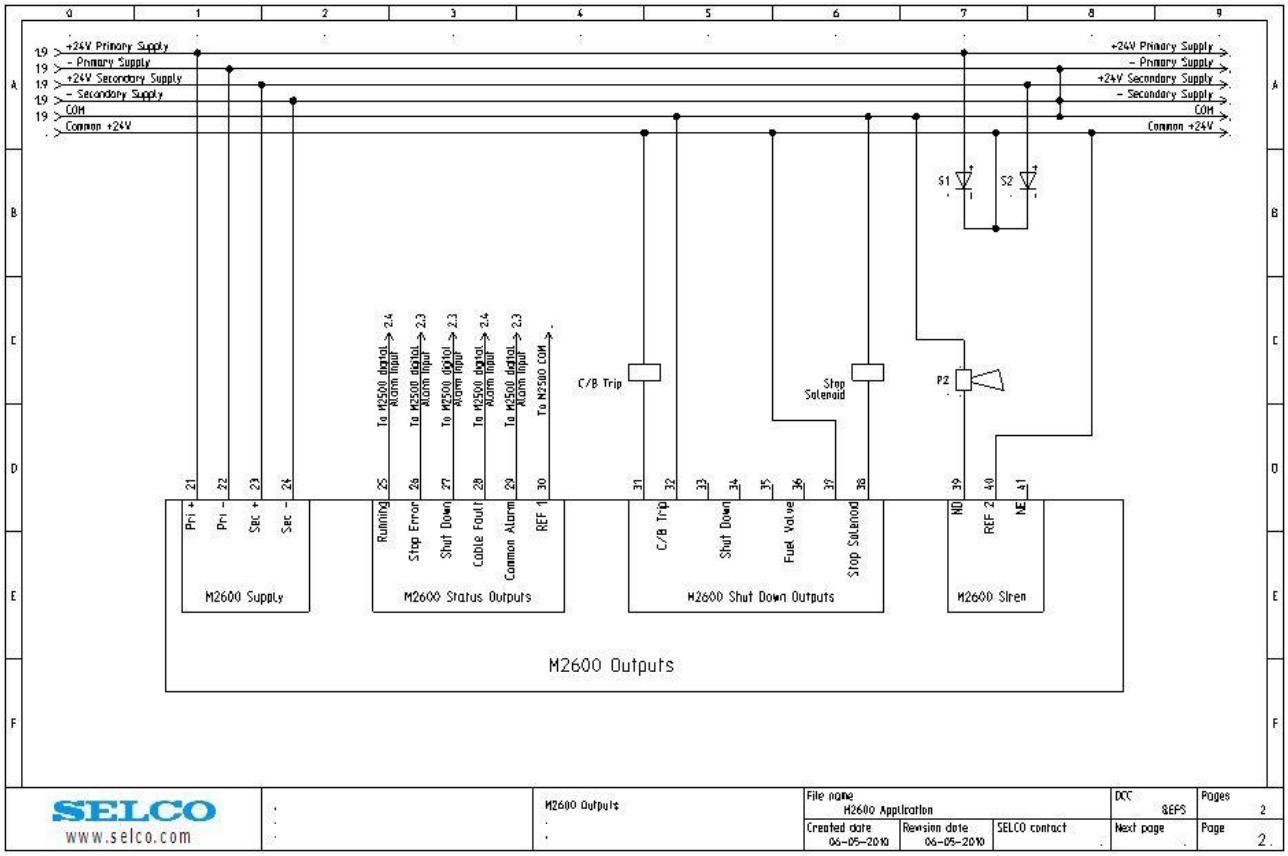
All other Status Outputs

The other status outputs give information to the M2500 about the state of the M2600. They can be wired independently or as common alarms. Make sure that the reference used on REF 1 is the same as the COM reference for the M2500. The digital input on M2500 used for this must be configured to NORMALLY OPEN and UNCONDITIONAL MONITORING.

Diodes

Purpose of the two diodes and the bridge between the minus of primary supply, secondary supply and com is to create a common redundant +24V and protect it so that a short circuit on either primary or secondary supply will not pull down the other supply.

The common redundant +24V is required for the stop solenoid and other auxiliary equipment.



11 Trouble Shooting

11.1 No Pick-Up signal

Magnetic pick-up is connected, no cable fault is detected, but it does not give a signal

1. Check position of Pick-Up Dip switch
2. Check position of CONFIG dip switch 6 (pick-up enabled/ disabled).
3. Make sure that the RANGE, x.1 and x.01 dip switches are adjusted correctly.
4. Make sure that the gap between pick-up and flywheel is adjusted correctly (see datasheet of pick-up for details.
5. If 1 – 3 do not give result it is possible that your magnetic pick-up is not suitable for cable monitoring (The circuit check current pushes the pick-up into saturation). You can get the system running anyway by disabling the cable monitoring on the pick-up (CONFIG dip switch 7) and setting PICK-UP dip switch 4 to OFF (this will disconnect the circuit check current).

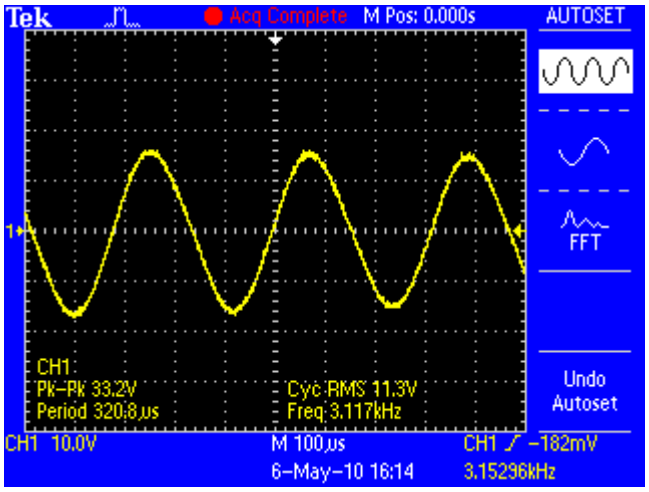
11.2 Unintended Overspeed Shut Downs

Check your pick-up signal with an Oscilloscope.

11.2.1 Magnetic Pick-Up

The magnetic pick-up signal is a sinus signal. For calculation the speed the module counts the 2,5V level crossings (the 2,5V level is necessary for the cable monitoring).

If the rising or falling flank of the pick-up signal is not clean you can choose the trigger on the other flank by the PICK-UP dipswitch (see PNP description 11.2.2 and NPN description 11.2.3).

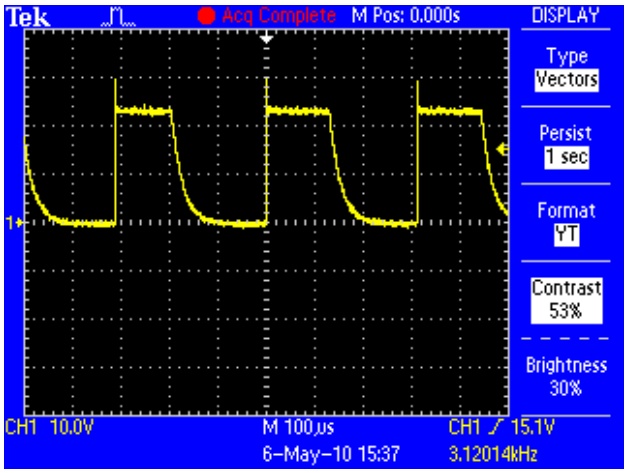


The minimum Voltage from the pick-up is Umin, pk-pk = 6V

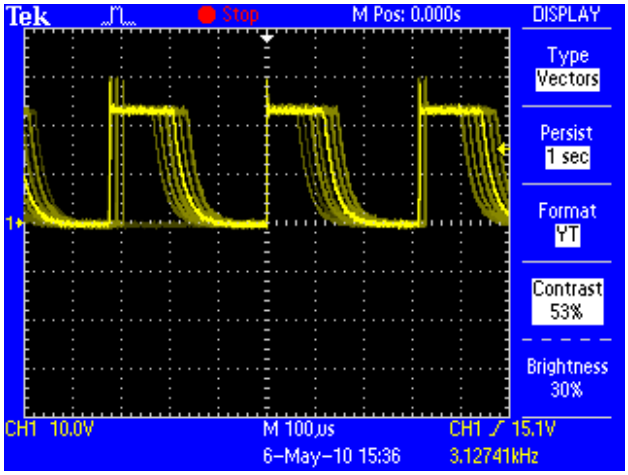
Umax, pk-pk, all pick-ups = 200V

11.2.2 PNP pick-up

Clean PNP signal:



Disturbed PNP Signal:



As can be seen on the right hand picture, it is important to trigger the pick-up input from the correct flank. For the PNP pick-up this is the raising flank.

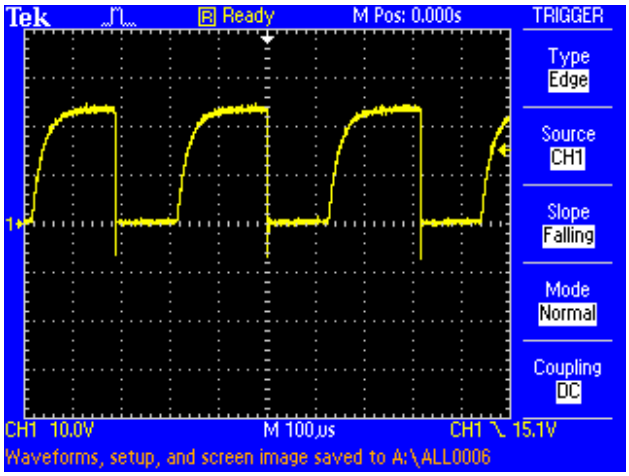
This is adjusted on the PICK-UP dip switch.

Dipswitch 1 ON, dip switch 2 OFF for PNP type pick-ups (trigger on rising flank).

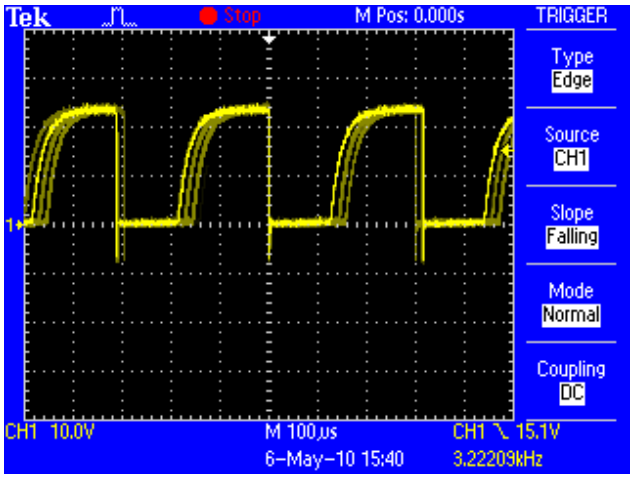
Both signals above give good speed detection provided M2600 is adjusted correctly.

11.2.3 NPN pick-up

Clean NPN signal:



Disturbed NPN Signal:



As can be seen on the right hand picture, it is important to trigger the pick-up input from the correct flank. For the NPN pick-up this is the falling flank.

This is adjusted on the PICK-UP dip switch. D

Dip switch 1 OFF, dip switch 2 ON for NPN type pick-ups (trigger on falling flank).

Both signals above give good speed detection provided M2600 is adjusted correctly.