DV2

Electronic Speed Switch

USER MANUAL – TECHNICAL DOCUMENTATION

Part Number: A27YO 9 0020 C EN
Last Update: October 2023

Technical documentation history

Date	Version	Comment
June, 2019	A	Initial edition
October, 2019	B	Chapter Calibration 3.1
October, 2023	C	Wiring of mpu select in 12VDC

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You can download the most up-to-date version of this documentation and different other documentations relating to DV2 on our web site http://www.cretechnology.com.

Content

1. PRESENTATION

The DV2 is an electronic speed switch for industrial engine and generator applications. The DV2 has 2 separated speed switches terminal outputs.

Check the connection diagrams in this manual for the most suitable connection.

DV2 capabilities include:

- Robust and strong mechanical housing
- Easy configuration by potentiometers
- European Standard manufacturing experience
- 2 separated speed switches output independently set between 10% and 140%
- Factory value at 40% for crank cut and 114% for overspeed
- Alternator voltage or MPU input selection
- 12 or 24Vdc power supply
- Latch or un-latch capabilities
- 16 “volt-free” contact output
- Harsh environments

1.1 WARNING

DANGER	
	**HAZARDOUS VOLTAGES. Do not operate when not familiar with generators.** ▪ The system should not be installed, operated, serviced or modified except by qualified people who understand the danger of electric shock hazards and have read and understood the user instructions. ▪ Never work on a LIVE generator. Unless there is another person present who can switch off the power supply or stop the engine. ▪ Dangerous voltages are present at the board. Accidental contact with live conductors could result in serious electrical shock or electrocution. ▪ Disconnect the power source before making repairs, connecting test instruments, or removing or making connections to the generator. **Failure to follow these instructions will result in death or serious injury**

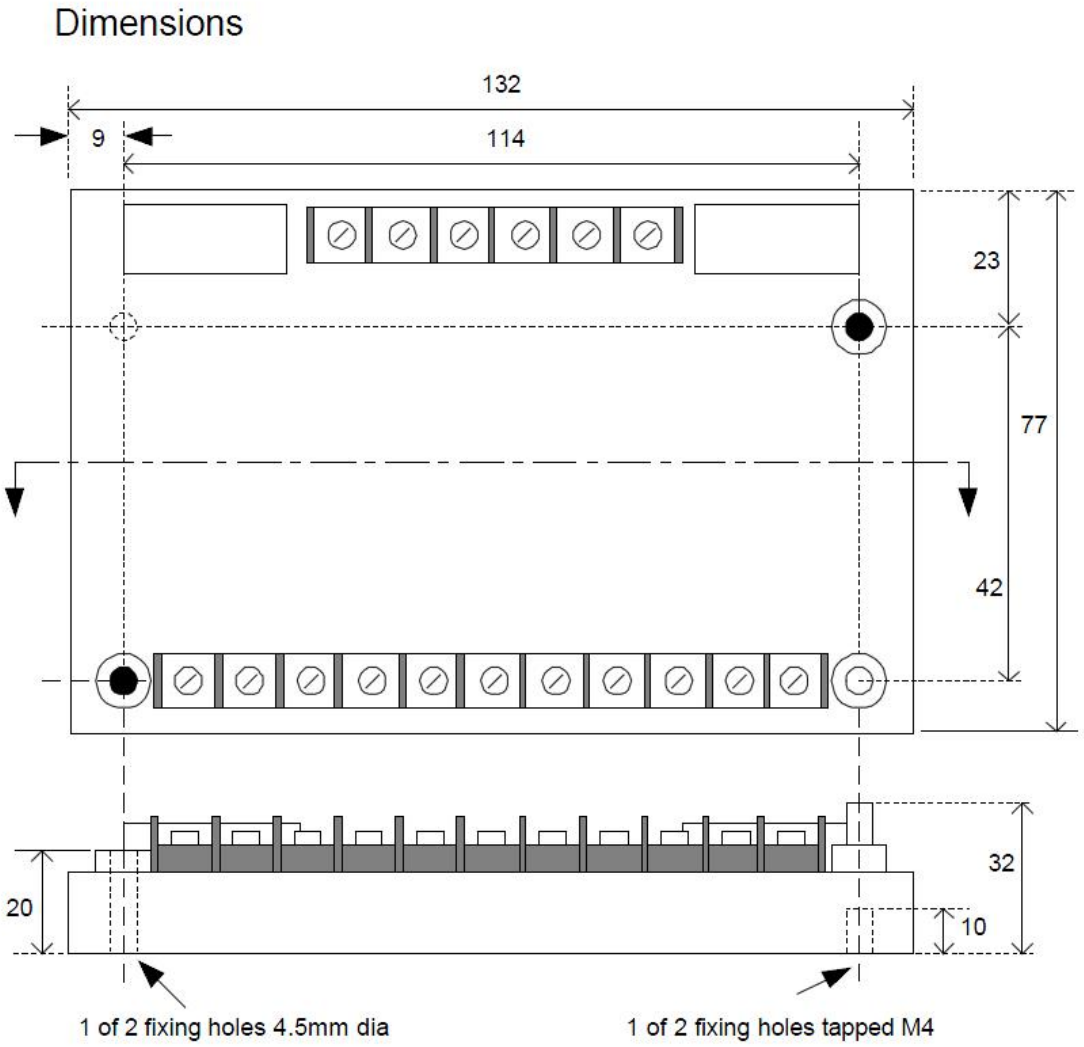
WARNING
Never change the potentiometers settings during operation

WARNING
The manual does not cover ALL technical details of the product. Specifications may be modified by the manufacturer without notice. For further information, the manufacturer should be contacted.

1.2 Dimensions

The DV2 is protected against environmental conditions by a PUR coating.

DV2 dimensions:



1.3 Electrical characteristics

You will require a DC Voltmeter to aid calibration
'CAL' Setting = 2.00 Volts Meter Output at nominal Speed (i.e. 1500 RPM or 50Hz)

(Optional) RPM Indicator : 0-1mA 75 Meter, scaled 0-2000RPM or as required.
'CAL' potentiometer adjusted for correct RPM indication at nominal Speed
Note: S1 and S2 trip levels can be set using this meter

Speed Sensing input **ALT** = 50 to 280Vrms
'CAL' Range = 40Hz to 230Hz for 2.00V at Meter Output

Typical Trip Settings (ALT)	**Application**	**Frequency**	**Hysteresis**	**Meter Output**
Nominal	---	50Hz (60Hz)	---	2.00 Volts
S1 = 10% - 125% set at 40%	Crank Cut	20Hz (24Hz)	7.5%	0.80 Volts
S2 = 10% - 125% set at 114%	Overspeed	57Hz (68Hz)	2.0%	2.28 Volts

Speed Sensing input **MPU** = 1 – 85Vpk-pk (transient protection included)
'CAL' Range = 1200Hz to 7000Hz for 2.00V at Meter Output (48 to 280 teeth @ 1500 RPM)

Typical Trip Settings (MPU)	**Application**	**Frequency**	**Hysteresis**	**Meter Output**
Nominal 1500 RPM & 126 teeth	---	3150 Hz	---	2.00 Volts
S1 = 10% - 125% set at 40%	Crank Cut	1260 Hz	7.5%	0.80 Volts
S2 = 10% - 125% set at 114%	Overspeed	3591 Hz	2.0%	2.28 Volts

S1 and S2 Response Time for both ALT and MPU operation
'CAL' for Normal Speed = 2.00V (i.e 50Hz, 1500RPM) : Power-up = Application of DC Supply
Overspeed = 2.28V : Overspeed + 1% = 2.30V : Overspeed + 10% = 2.51V

Power-up > Overspeed + 1%	2 sec	time until relay changes state
Power-up > Overspeed +10%	1 sec	time until relay changes state
Normal Speed > Overspeed + 1%	1 sec	time until relay changes state

DC Supply Performance @ 20 deg.C

				Comment
Nominal DC Supply	12V			8V to 16V
		24V		16V to 32V
Maximum DC Supply			32V	Transient protection at 39V
Relay Pull-In	8.0V	15.0V	---	
Relay Drop-Out	< 7.0V	< 10.0V	---	
Minimum Supply Current	12mA	19mA	23mA	
Maximum Supply Current	87mA	95mA	125mA	

Contact Type for S1, S2	Independant, SPCO volt-free contacts sets
Contact Rating for S1, S2	16A at 32Vdc resistive load or 115 / 230V AC1 For Inductive Load de-rate to 2.2A continuous to allow for 7x Inrush
Temperature Range	Operating = -20 to +50 deg.C : Storage = -40 to +70 deg.C
Humidity	90% RH (non-condensing)
Approvals	Electromagnetic Compatibility Directive 89/336/EEC amendments 91/263/EEC, 92/31/EEC, 93/68/EEC, 93/97/EEC
	Low Voltage Directive 73/23/EEC amendments 93/68/EEC

Notes
1. Unless requested otherwise, all units are factory calibrated for ALTernator mode --
Nominal Frequency of 50Hz = 2.00V at Meter Output
S1 = 40% of Nominal = 20Hz = 0.80V at Meter Output
S2 = 114% of Nominal = 57Hz = 2.28V at Meter Output

2. INSTALLATION

2.1 The connection terminals

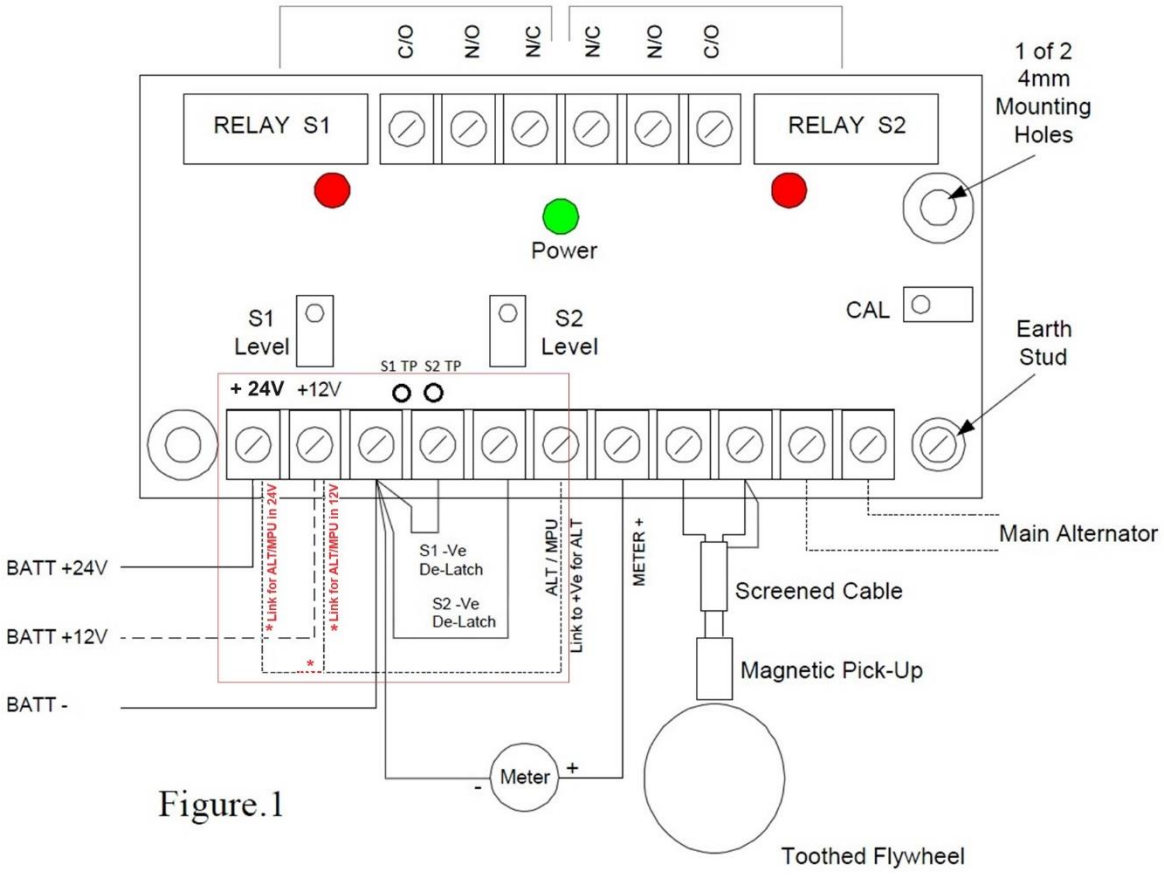


Figure.1

Notes:

- Contacts identified as N/O and N/C refer to the relay being de-energised
- N/O = normally open; N/C = normally closed; C/O = changeover
- Red LED's are lit to indicate when their respective relay is energised. Green LED lit when unit powered.
- The 'Meter' can be a temporary voltmeter to aid calibration or a permanent RPM indicator – see text
- Always connect MPU or ALT inputs but never at the same time
- Be aware of the metal case when connecting the ALTernator inputs
- Fit Link "S1 –Ve delatch" to reset or operate S1 as unlatched
- Fit Link "S2 –Ve delatch" to reset or operate S2 as unlatched
- Ensure (MPU) screened cable connected as shown. The screen must only be connected at one end !
- Fit Link "ALT/MPU" to supply +Ve (12v or 24v) when sensing ALT input, and omit when using MPU input

3. CALIBRATION AND FAULT FINDING

1. **Unit Not Working**
   If the Green LED is not Lit use a DC Voltmeter to check that a valid 12V or 24VDC supply is correctly connected to the terminals as shown in figure.1. If the supply voltage is correct and Green LED is not Lit – **replace the unit**

2 . Relay S1 and / or S2 are not changing state at the desired speed

Check S1 and S2 are used correctly (i.e. Crank-Cut, Underspeed, Overspeed, etc)
If in **ALT** mode the ALT/MPU terminal should be linked to Supply +Ve and if in **MPU** mode this link should be ommitted. If in **MPU** mode, ensure that the Magnetic Pick-Up is correctly fitted into the bell-housing and connected as in figure.1
Check for meter output and Trip Calibration – see below
If either S1 and/or S2 are still not functioning – please contact your local distributer or our factory, for assistance

3.1 Full Calibration

a) Prior to running the engine –
Calculate Meter Output for your required S1 Trip Level (i.e. Crank Cut = 40% x 2.0V = 800mV) Calculate Meter Output for your required S2 Trip Level (i.e. Overspeed = 114% x 2.0V = 2.28V)

b) Setting S1 and S2 Trip Levels
Connect a valid 12V or 24V DC Supply as shown in figure.1
Connect a DC Voltmeter between -BATT and the test point S1 TP as shown in figure.1
Slowly turn S1 Level Potentiometer clockwise or anti-clockwise until read the value calculate on the voltmeter.
Connect a DC Voltmeter between -BATT and the test point S2 TP as shown in figure.1
Slowly turn S2 Level Potentiometer clockwise or anti-clockwise until S2 read the value calculate on the voltmeter.

c) Recalibrate for Normal Running Speed
Start the engine and run at approx. 'Normal' speed
Measure the Actual Speed using a handheld or mechanical Tachometer or note the the main Alternator frequency . Calculate the reguired Voltmeter reading (Vm = 2.00 x Actual Speed / Normal Speed)
RPM example: Vm = 2.00 x (1580 rpm actual speed / 1500 rpm nominal speed) = 2.11V
ALT example: Vm = 2.00 x (51.5Hz actual frequency / 50Hz nominal frequency) = 2.06V Adjust 'CAL' potentiometer until Voltmeter reads the calculated Vm setting.
The unit is now calibrated and the Meter output should read 2.00V at Normal Speed (i.e. 50Hz, 1500RPM)

3.2 Full Calibration on bench test

a) **ALT**: Aternator Frequency speed sensing -- Proceed as 3. above but use 110 or 230V AC mains for the 'ALT' input b) **MPU**: Magnetic Pick-Up speed sensing
Repeat as 3.(a) above but ignore S1 and S2 trip level calculations
Calculate Input frequency for the required engine.
Input frequency = (Number of Flywheel teeth x RPM at Normal Speed) / 60
Example: 146 teeth at 1500RPM = 3550Hz

Set S1 Trip Level
Calculate Input frequency for Trip Level S1 (example: Crank-cut = 40% of 3550Hz = 1420Hz) Adjust Oscilator to the calculated Input Frequency
Slowly adjust S1 Level Potentiometer (anti-clockwise) until S1 Relay just energises (S1 Red LED on)

Set S2 Trip Level
Calculate Input frequency for Trip Level S1 (example: Overspeed = 114% of 3550Hz = 4047Hz)
Adjust Oscilator to the calculated Input Frequency
Slowly adjust S1 Level Potentiometer (anti-clockwise) until S1 Relay just energises (S2 Red LED on)

Recalibrate for Normal Running Speed
Adjust Oscilator to the calculated Input Frequency at normal speed
Adjust 'CAL' potentiometer until Meter Output = 2.00V.
The unit is now calibrated and the Meter output should read 2.00V at Normal Speed (i.e. 1500RPM)

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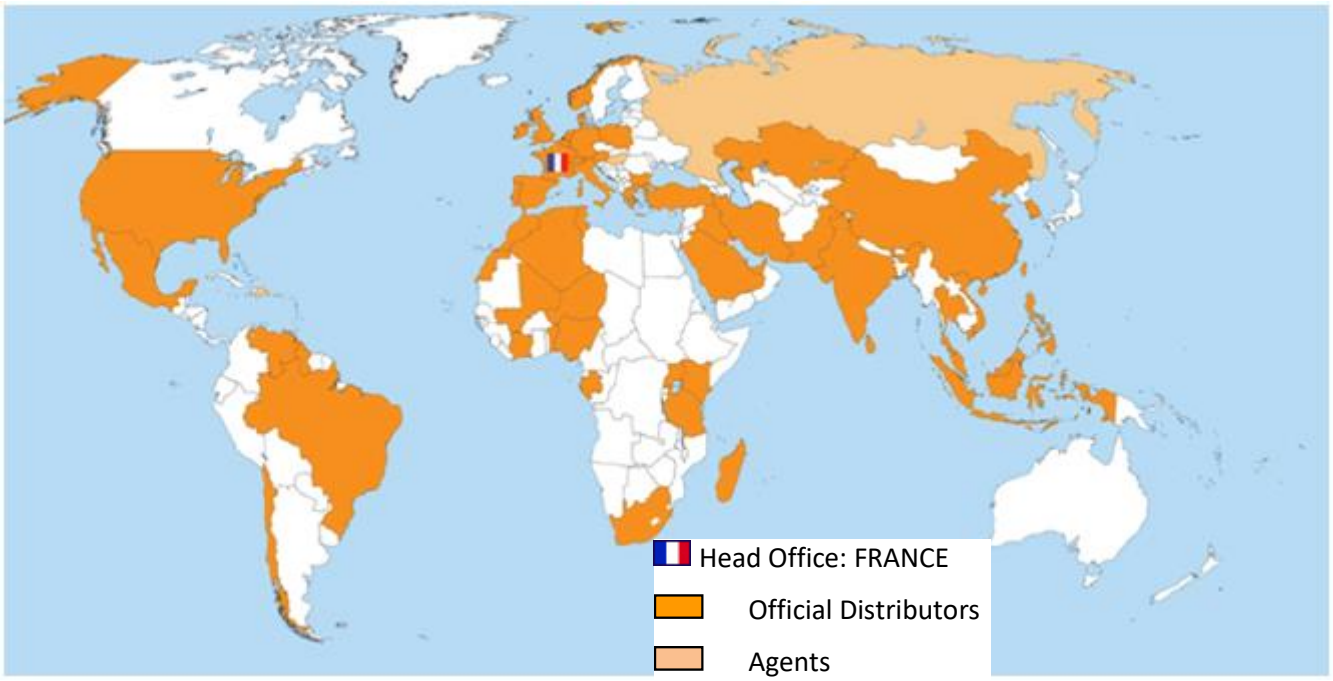

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