Electronic Code Switch

User & Installation Manual

SYNAPIUS B.V.
DIGITAL CONTROL SOLUTIONS

Contents

General Description

The Electronic Code Switch is designed for safe machine control and to help prevent unauthorized use of the machine
If the machine is taken out of service, it is possible to block all functions except for the master code to reactivate the device.

The ECS can be used as a simple switch without using PIN codes. This function is useful during machine maintenance and trouble-shooting. See ON/OFF Switching without PIN codes.

Features

- Up to 99 individual programmable user (PIN) codes
- Master Code (programmable)
- Personal unlock code (PUC)
- Automatic turnoff
- Service and maintenance mode
- Out of operation mode
- Reading the last two users
- Reset to factory settings
- Clear all user PIN codes with a single command procedure

Electrical

The ECS is available in three voltage ranges:
12VDC for IC engine, 12 to 36 VDC and 48 to 90VDC
Power supply is less then 60mA.

Getting Started

Install the ECS as described in the installation guide. The ECS is factory pre-programmed to run in service mode with a Master Code of 0000. In this mode the ECS functions as a simple ON/OFF switch which does not require any further code entry. The ON/OFF switch toggles the installation ON or OFF with each press of the ON/OFF button.

Depending on the application, some parameters may require changing:

- Master Code
- Automatic turn off
- User PIN codes can be added or modified at anytime after device activation.

Using the key pad

To enter a user pin code number or another instruction you have to press a sequential number of digits followed by pressing the ON/OFF button to accept. If you entered a wrong code or instruction you can abort keypad entry by pressing the CE button at any time. To be sure there are no existing or accidentally left digits you may start a new entry with the CE button to clear the register. You do not have to clear this register always for all entries are automatically cleared after about 6 seconds.

Operating Instructions

Indication Lamp (LED's)

In normal operation mode the RED LED will flash each time a correct key-stroke occurs.
To indicate that the switch is ON, the GREEN LED will illuminate.
When the ECS is in programming mode, the RED LED is on and the GREEN LED indicates a correct keystroke.

User PIN Codes

Users are registered on a user list and are indexed from 01 to 99 (user ID). A normal user does not have to remember their user ID. Just their PIN code.
The user PIN code must have a minimum of 4 digits and a maximum of 8 digits.
The PIN code 00000000 (8 zero's) is reserved for clearing existing PIN codes. This PIN code is not available for normal use.

The user ID is used in the following cases:

Entering a new user PIN code
Removing a user PIN code from the list
Reading the last users
Please note, the user ID 00 is not for general use as it is the location of the Master Code.

The Master Code

The master code is for programming and configuration the ECS. The switch cannot be turned ON with the master code.
The master PIN code must have a minimum of 4 digits and a maximum of 8 digits.
Please record the master code and store it in a safe place.

It is the Supervisors responsibility to record and store the Master Code and all User Codes. The supplier and manufacturer have no responsibility for storing the above codes.

Supervisors Operations

Changing the Master Code

The Master Code is factory preset to 0000. For safety and security reasons the Master Code should be changed first.
Please store the Master Code details in a safe place.

0000	Enter the factory set Master Code
	The red led will turn ON to indicate that the device is in programming mode
00	Enter the location (00) of the master code
	The red led will remain ON
xxxxxxxx	Enter the new master code (4-8 digits) Write this down and store in a safe place
	
xxxxxxxx	Enter the new master code again
	The red led will remain ON

Now the GREEN LED turns on without switching the relay on. This indicates that the new Master Code has been accepted and press now the On/Off button until the GREEN LED turns off.

If this does not happen, start again from the beginning.

WARNING:

DO NOT USE A DUPLICATE PIN CODE !

Only the first or lowest user ID of a duplicate pin code will be accepted, the other will be ignored.

Programming User PIN Codes

All user PIN codes are stored in a user PIN Code list having a specific location number between 01 and 99. The user identity is represented as the location where the PIN Code is registered. The location ID and associated PIN Codes should be noted and stored in a safe place, see section Code List.

How to enter a new user PIN Code

xxxxxxxx	Enter the Master Code
	The red led will turn ON to indicate that the device is in programming mode
xx	Enter the user ID location (always 2 digits, use 01 to 97)
	
xxxxxxxx	Enter the new user PIN Code (4-8 digits) Make note of this location ID and associated PIN Code, keep in a safe place.
	The red led will remain ON
xxxxxxxx	Re-enter the new code The GREEN LED turns on without switching the relay on. If this does not happen, retry and start from the beginning.
	Click until the green LED is off.

Clearing all User PIN Codes

xxxxxxxx	Enter the Master Code
	The red led will turn ON to indicate that the device is in programming mode
00000000	Enter eight zero's
	Clearing all the user codes can take some time. Please wait until the GREEN LED turns off before proceeding.

Removing a single User PIN Code

Change the user PIN Code to 00000000 (eight zero's)
This will replace the ID number with blank. This is the reason that 00000000 (eight zero's) con not be used as a code number.

User History

The ECS tracks the last two different users. The last user can be read by using code 99 and the previous user with code 98.

99 or 98

Last user or last but one
The RED and GREEN LED's will flash
to identify the user

RED flashes = 10's and GREEN flashes = one's
e.g. Two RED flashes and three GREEN flashes indicate user 23.

Automatic Turn Off

The ECS is equipped with a function that will turn the output off when power is removed from the grey wire (safety switch) and a time period has expired. The grey wire would typically be connected to the seat switch. The polarity of this function is active low. This means that if the grey cable is disconnected from negative (open circuit) the timed period starts and the ECS turns off when the timer period expires. Reconnecting the grey wire to negative during the timed period resets the time period.

Programming the automatic turn off delay

xxxxxxxx	Enter the master code
	The red led will turn ON to indicate that the device is in programming mode
01xx	Enter four digits starting with 01 followed by two digits to indicate the delay in minutes This can be programmed from 00 to 99).
	

Disabling the Automatic Turn Off

Setting the delay to zero disables the automatic turn off.

xxxxxxxx Enter the master code

The red led will turn ON to indicate that the device is in programming mode

0100 Disables automatic turn off

Beep during automatic turn off

When the engine is not being used and the automatic turn off is counting off the turn-off delay time, an audible pulsatile beep signals that the engine is still switched on. This beepsignal can be enabled or disabled as follows:

xxxxxxxx Enter the Master Code

The red led will turn ON to indicate that the device is in programming mode

5 Enter the single digit 5

Confirm to change the beep mode

Polarity of the safety switch

The polarity of the sense line (grey wire) is preset to be active when switched to battery minus (blue wire). Thus active low voltage. To change to active high level voltage :

xxxxxxxx Enter the Master Code

The red led will turn ON to indicate that the device is in programming mode

0501 Enter the four digit code 0501 for positive polarity or 0500 for negative polarity.

Confirm the chosen polarity

Setting the operation mode

The operation mode of the ECS determines how Emergency stops are processed and how to restart after an emergency event occurred. There are 3 modes to handle emergency stops:

- E-stop code 0: No action. The signal will be ignored
- E-stop code 1: Immediate switch off. Restart after a preset delay with the normal user pin code.
- E-stop code 2: Immediate switch off. Restart only after resetting with the master code

xxxxxxxx	Enter the Master Code
	The red led will turn ON to indicate that the device is in programming mode
x	Enter the single digit of the required E-stop code (0,1 or 2)
	To save this E-stop code

Setting the dead-time after E-stop in mode 1

In E-stop mode 1 the power will be switched of for a period so that it is not possible to power on within that period. This period can be adjusted by programming the desired dead-time as follows:

xxxxxxxx	Enter the Master Code
	The red led will turn ON to indicate that the device is in programming mode
03xx	where xx are the minutes for dead-time after an E-stop. E.g. if a dead-time of 6 minutes is required enter 0306
	To accept and store this value

Reading the number of E-Stops of an individual user

xx	Enter the user ID number (always two digits)
	Now the Red and green LED's flashes to indicate the number of E-Stops.

The red flashes the ten's and the green flashes the one's. Also, multiplying

the red flashes by ten and then adding the number of green flashes gives the total of E-stops by this particular user.

For example : If a user caused 23 E-stops, reading out results in two red flashes and three green flashes. To clear the E-stop counter, for a user xx, just reprogram the user pin code at the same user xx place.

This might be the same or a new pin code.

Maintenance mode

Maintenance engineers may need to switch the ECS On and Off without a user code or temporarily all user PIN Codes.

Disable all user PIN Codes (OUT OF OPERATION)

xxxxxxxx	Enter the Master Code
	The red led will turn ON to indicate that the device is in programming mode
3	Enter code 3 to program out of operation mode
	The RED LED will flash slowly to indicate that the ECS is in the 'out of operation' mode. Only the Master Code will now be active.

ON/Off switching without PIN Codes

xxxxxxxx	Enter the Master Code
	The red led will turn ON to indicate that the device is in programming mode
4	Enter code 4 to ON/OFF in toggle mode
	To confirm

To return to normal operation mode the operation mode must be reset to the initial value. See Setting the operation mode.

Resetting the Master Code using the PUC

(Personal Unlock Code)

If the Master Code is lost or forgotten the PUC (Personal Unlock Code) can be used to return the ECS to factory settings.
To obtain the PUC make a note of the ECS serial number involved. This is located on the back of the device, and call your supplier in case the PUC was not included with the ECS or lost.

When you have the PUC proceed as follows:

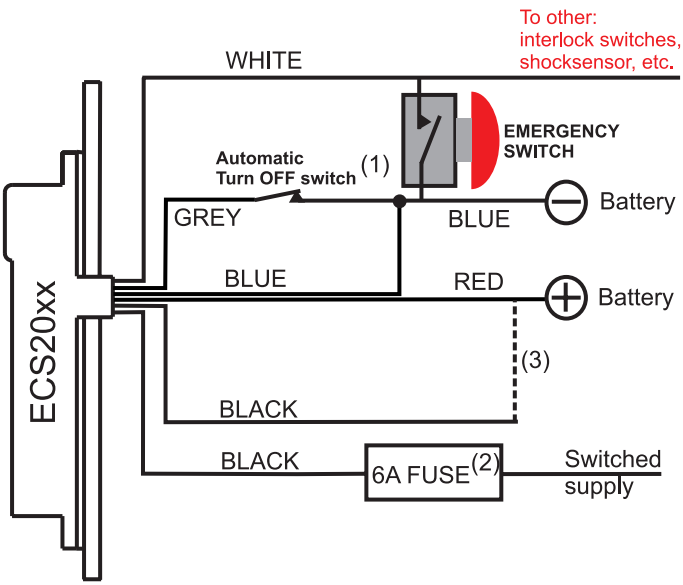
xxxxxxxx Enter the PUC and press 

Then repeat again:

xxxxxxxx Enter the PUC and press 

The GREEN LED will flash twice. The Master Code is now reset to 0000.
Please reprogram the ECS as previously described.

Installation circuits



Notes:

(1) The automatic turn OFF switch is negative active factory set. To change polarity consult the factory data sheet.

(2) The ECS internal relay can switch 6A. If larger loads is requiered an external relay must be used.

(3) The swithing wires (black) are isolated from circuit and supply and may switch any load upto 250VAC.
The **12VDC IC** version one black switched wire is connected internally to the 12V battery supply.

For other applications and wiring diagrams contact your supplier.

PIN Code User Name List

Machine ID: ECS Serial Number:

ID	PIN code	User Name	ID	PIN Code	User Name
00		master code	25		
01			26		
02			27		
03			28		
04			29		
05			30		
06			31		
07			32		
08			33		
09			34		
10			35		
11			36		
12			37		
13			38		
14			39		
15			40		
16			41		
17			42		
18			43		
19			44		
20			45		
21			46		
22			47		
23			48		
24			49		

ID	PIN code	User Name	ID	PIN Code	User Name
50			75		
51			76		
52			77		
53			78		
54			79		
55			80		
56			81		
57			82		
58			83		
59			84		
60			85		
61			86		
62			87		
63			88		
64			89		
65			90		
66			91		
67			92		
68			93		
69			94		
70			95		
71			96		
72			97		
73			98		
74			99		

Your Supplier: