Pulse Board Manual

Revision Date: Dec 19, 2016

ECD System Manual

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Section 1.1 Safety Regulations

- Installation of this equipment shall be done in accordance with all applicable local codes

- Elevator controllers and other electrical components can cause serious harm or death if installation guides are not met. It is the responsibility of the installer of our equipment to ensure that once installed, the equipment does not pose any threat, danger or hazard.

Section 1.2 Obligations & Liability

1.2.1 Following operating instructions.

- In order to ensure safe handling and problem free operation of this equipment, it is absolutely essential for the relevant personal to be fully acquainted with the relevant safety regulations.
- These operating instructions contain the most important information for operating the machine correctly and safely.
- These operating instructions, in particular the safety regulations, must be observed by all those persons who work on the equipment.
- Furthermore, all locally applicable rules and regulations relating to accident prevention and installation must be observed.

1.2.2 Obligations of operator.

The operator undertakes to allow only those persons to work on the equipment who

- Are fully acquainted with the basic regulations relating to safety in the workplace and accident prevention and to have been trained in handling the equipment.
- Have read the safety regulations and the warning notices contained in these the operating instructions and have confirmed by way of their signature that they have fully understood these.
- Regular checks are conducted to ensure that personnel perform their duties with safety considerations foremost in their minds.

1.2.3 Obligations of personnel.

All personnel charged with working on the machine undertake prior to starting work to

- Observe the basic regulations relating to safety in the workplace and accident prevention.
- Read the operating instructions, in particular the safety regulations, and confirm by way of their signature that they have understood them.

1.2.4 Hazards associated with the equipment.

The equipment is built with state-of-the-art technology and recognized safety regulations. Nevertheless, use of the equipment can result in dangers to life and limb for the installer, user or a third party and in impairments to the equipment or to other material property. The equipment must only be used

- For its intended purpose.

- In perfect condition in terms of safety requirements.

Operate the equipment in technically perfect condition and for its intended use only while bearing in mind all safety and hazard considerations and following the operating instructions. In particular, faults which restrict safety must be rectified immediately after they have been identified and at the latest before the equipment is started up.

1.2.5 Warranty and liability.

Our "Sales terms and conditions" apply. These terms and conditions will have been available to the purchaser at time of sale. Warranty and liability shall be limited to repairs and replacement to the equipment purchased from us. Warranty and liability claims shall not be entertained if they can be traced back to one or more of the following causes.

- Equipment not used for its intended purpose.
- Improper installation, startup, operation and maintenance of the equipment.
- Operation of the equipment with faulty safety devices or improperly installed or non-operational safety and protective equipment.
- Failure to observe the information, instructions and notices contained in the operating instructions relating to transportation, storage, installation, startup, operation, maintenance and setting up of the equipment.
- Inadequate monitoring of the equipment parts which are subject to wear.
- Improperly conducted repairs.
- Catastrophes caused by the influence of foreign bodies and force majeure.

1.2.6 Organisational measures.

- The installer and or maintainer shall provide the necessary protective equipment for the personnel
- All existing safety equipment must be checked at regular intervals.

1.2.7 Protective equipment.

- At all times, prior to putting the machine into operation, all protective equipment must be correctly installed and in proper working condition.
- Protective equipment may only be removed
  - after the machine has come to a complete stop and the machine has been disabled to ensure it cannot be started up again.
  - if subcomponents are delivered, the operator must install the protective equipment in accordance with regulations

1.2.8 Informal safety measures.

- Keep the operating instructions and circuit diagrams permanently at the site where the equipment is installed.
- In addition to the operating instructions, the generally valid and local regulations relating to accident prevention and environmental protection must be provided and observed.
- Maintain all safety and danger notices on/next to the machine in legible condition and comply with them.

- If the equipment is sold or transferred, the operating instructions must be included with the equipment.

1.2.9 Training of personnel.

- Only personnel who have been trained and instructed are allowed to work on the machine.
- The responsibilities of the personnel must be clearly defined for the machine/controller installation, startup, operation, setting-up, maintenance and repairs.
- Personnel still in the process of being trained are only permitted to work at the machine under the supervision of an experienced person.

1.2.10 Machine controls.

- Under no circumstances carry out any program modifications to the software!
- Only properly instructed personnel are permitted to operate the controls.
- The machine must not be operated if potential electromagnetic interference sources are acting on the machine. Interference sources are e.g. welding equipment, portable phones.

1.2.11 Safety during normal operation.

- Only operate the machine when all protective equipment is fully operational.
- Prior to switching on the machine, ensure that the startup can cause no harm to personnel.
- Regularly maintain and check machine for externally identifiable damage and check that all the safety devices are operational.

1.2.12 Hazards caused by electric power.

- Work on the electric power supply may only be carried out by a qualified electrician.
- Check the electrical equipment of the machine at regular intervals.
  Repair loose connections and scorched cables immediately.
- Keep the control cabinet locked at all times. Access is only permitted to authorized personnel with a key or tool.
- If work has to be carried out on live parts, do this only in the presence of a second person who can switch off the master switch in an emergency.
- The machine causes electromagnetic interference sources. For this reason, do not use any sensitive equipment in its vicinity.

2.1 Product Overview

The Pulse Board is specifically designed to produce a reduced rate 0V pulse for the elevator controller from the machine encoder.
This pulse input is then used by the elevator controller in determining position, selecting running speeds and to calculate slowdown points.
See Counting Method "01" in the ECD Controller Manuals.

The Pulse Boards microprocessor control system allows fast and accurate control and adjustment of the pulse output.

The basic operation is to input 1 channel of an incremental encoder mounted on the machine into the Pulse Board. Several adjustable parameters are entered to enable the microprocessor to calculate the required reduction ratio so that it will output the equivalent of 1 pulse per customer adjustable distance of travel.
The board's software is flexible enough to allow for a range of different encoder pulse rates and lift machine configurations.
Also various input voltages can be allowed for from the encoder

2.2 Contents of Pulse Board Kit.

1 off Pulse Board
1 off 15mm Ferrite Core
1 off System Manual

2.3 Connection of ECD Pulse Board

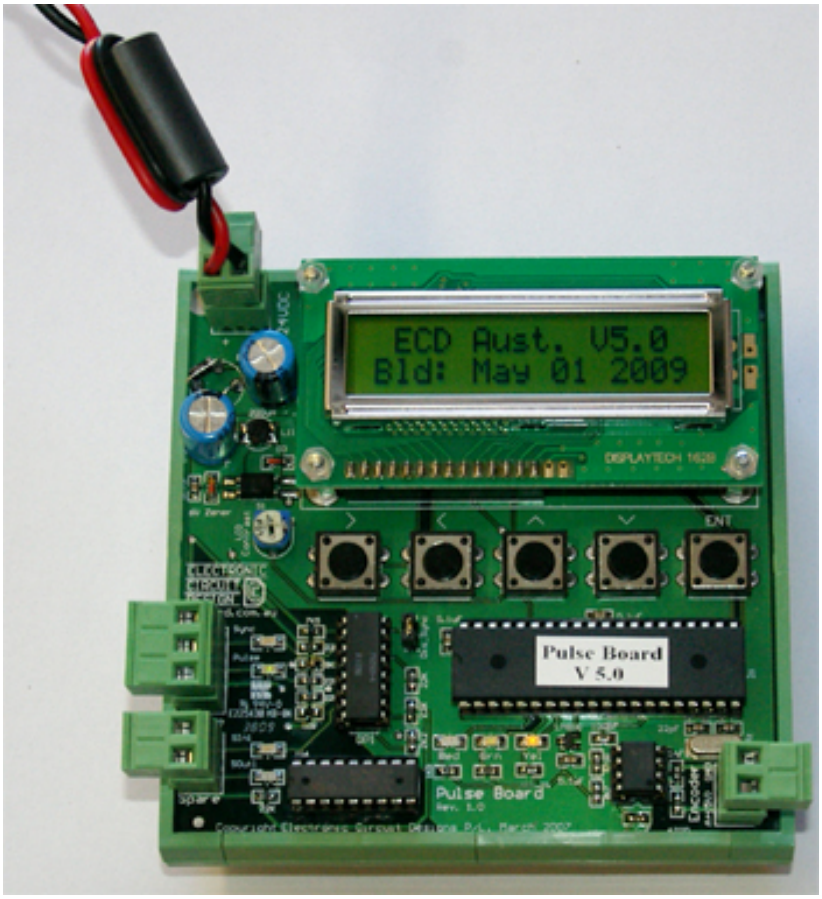
Below is a list of all connection terminals on the Brake Board.

24VDC	Pulse board power supply
Encoder	A+ (5VDC) and 0V (COM) input from machine encoder
Pulse	Pulse output to the elevator controller
Sync	Currently not used
SOut1	ETS: Emergency Terminal Slowing output
SIn1	Spare input not used

2.3.1 24VDC terminal:

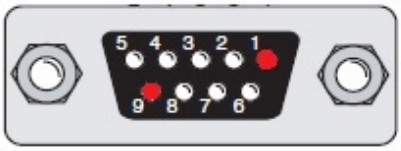
The 24VDC input is the power supply to the microprocessor and as such should be as stable as possible.
Nb: Ensure correct polarity of the 24VDC supply to the board.

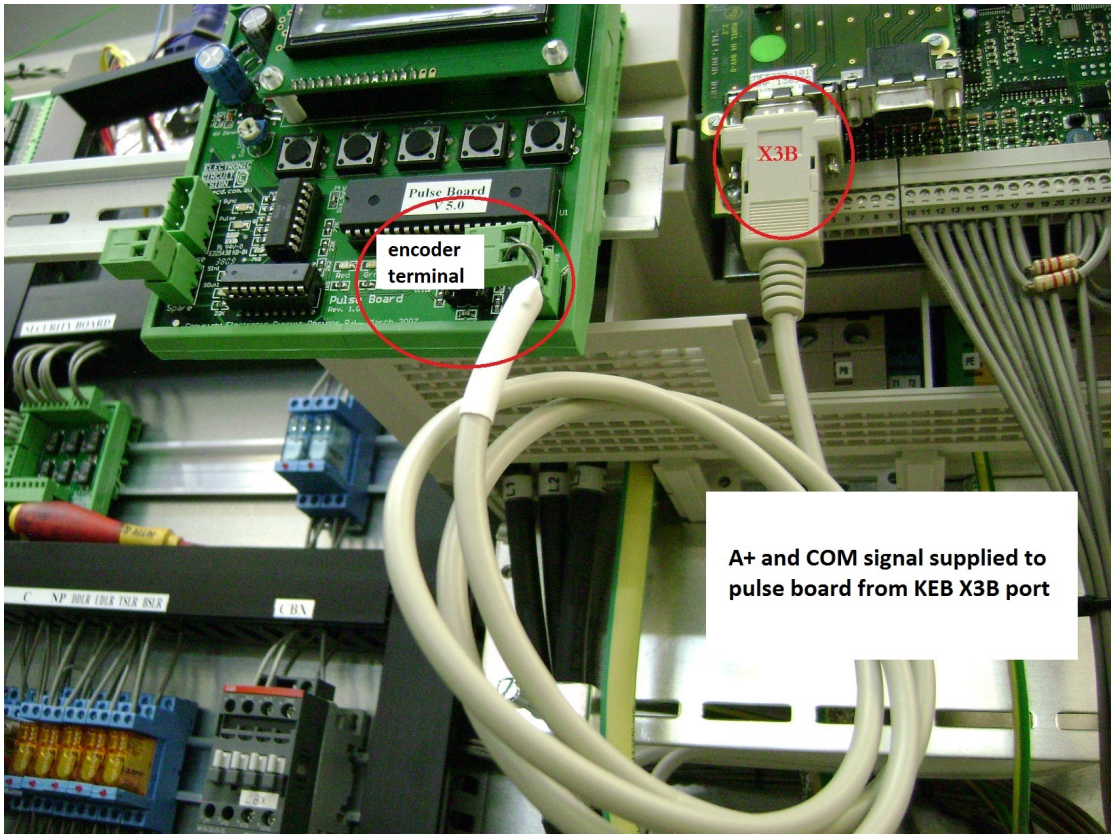
Supplied in the kit is a ferrite core that is to be installed on the 24vdc supply. Supply cable shall be twisted pair looped through a ferrite core. Note this is particularly important if the board is being supplied from a switch mode power supply.



2.3.2 Encoder A+ / COM terminal:

This is the input terminal for a channel of the encoder and its reference. Connect the A+ (5V) and COM from the encoder to these terminals.
Or, if a KEB drive is being used, connect the A+ (5V) and COM from the KEB output X3B with a shielded cable. See below.
KEB X3B - PIN 1: A+
KEB X3B - PIN 9: COM

X3B	
	Pin 1 - A+ Output Track A Pin 9 - Output Track A reference



For a 5V encoder, connect the A+ channel of the encoder directly to the Pulse board terminal A+ (5V).
If a 9V to 15V encoder connect a 1.8kΩ resistor in series with the A+ channel of the encoder then connect to the Pulse board terminal A+ (5V).
If a 16V to 30V encoder connect a 2.2kΩ resistor in series with the A+ channel of the encoder then connect to the Pulse board terminal A+ (5V).

Note: Use shielded cable. Connect the shield to Earth. Ensure this cable is isolated in separate conduit and not run next to any high AC voltage.

2.3.3 Pulse terminal:

The Pulse terminal outputs a pulse rate of 1 pulse per POD setting to the elevator controller board.
The pulse output is connected to the terminal marked “Pulse” on the ECD elevator controller board.

2.3.4 Sync terminal:

Currently not used.

2.3.5 SOut1 – ETS terminal:

Adjusts the speed at which the SOut1 (ETS) output switches to 0V.
This output switches when the lift speed is equal to or greater than the ETS set speed and is used to drive a relay in the Emergency Terminal Slowing circuit.

2.3.6 SIn1 terminal:

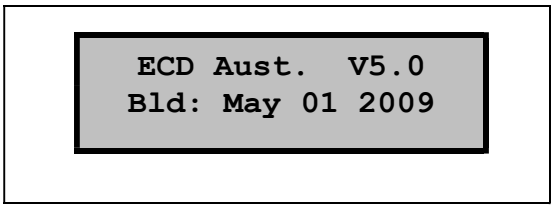
Currently not used.

2.4 LCD

2.4.1 Understanding the LCD

2.4.2 LCD Control Buttons

The Control buttons are used for accessing and programming the second line of the LCD display



Buttons -

- > =FORWARDS
- < = BACKWARDS
- ^ = UP
- v = DOWN
- ENT = ENTER

2.4.2 LCD Display Options

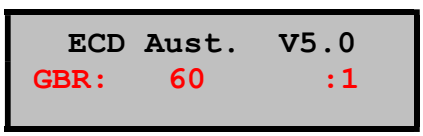
Use the forwards button to cycle through the available options

Bld. Software BuiLD date

> Forwards

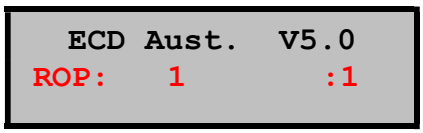
SHD. SHeave Diameter
See 2.5.1

> Forwards



GBR. Gear Box Ratio
See 2.5.2

> Forwards



ROP. ROPing method
See 2.5.3

> Forwards

PPR. Pulse Per Revolution
See 2.5.4

> Forwards

POD. Pulse Output Distance
See 2.5.5

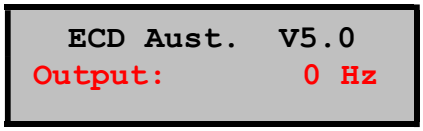
> Forwards

ETS. Emergency Terminal Slowing
See 2.5.6

> Forwards

Speed. Displays the current lift speed in m/sec.

> Forwards



Output. Displays the current frequency of the pulse output in Hertz. The faster the lift travels or smaller POD setting, the faster the pulse output.

2.5 Setup of Pulse Board

The Pulse Board has 6 user adjustable settings which must be entered to enable the Pulse board to calculate the output pulse at a rate of 1 pulse per required distance of travel.

- SHD
- GBR
- ROP
- PPR
- POD
- ETS

2.5.1 SHD Adjustment (Sheave Diameter)

SHD is the diameter of the sheave on the elevator machine. This setting is in millimeters and should be measured as accurately as possible.

2.5.2 GBR Adjustment (Gearbox Ratio)

GBR is the elevator machine Gear Box Ratio and can usually be found on the gearbox data plate i.e. 30:1. All the user is required to enter is the first part of the ratio.
On a gearless machine this setting will be 1.

2.5.3 ROP Adjustment (Roping Method)

ROP is the elevator roping method. For a 1 to 1 roping you would enter 1, for 2 to 1 roping you would enter 2

2.5.4 PPR Adjustment

PPR is the pulse rate per revolution of the encoder. This information can be usually found on the encoder.

2.5.5 POD Adjustment

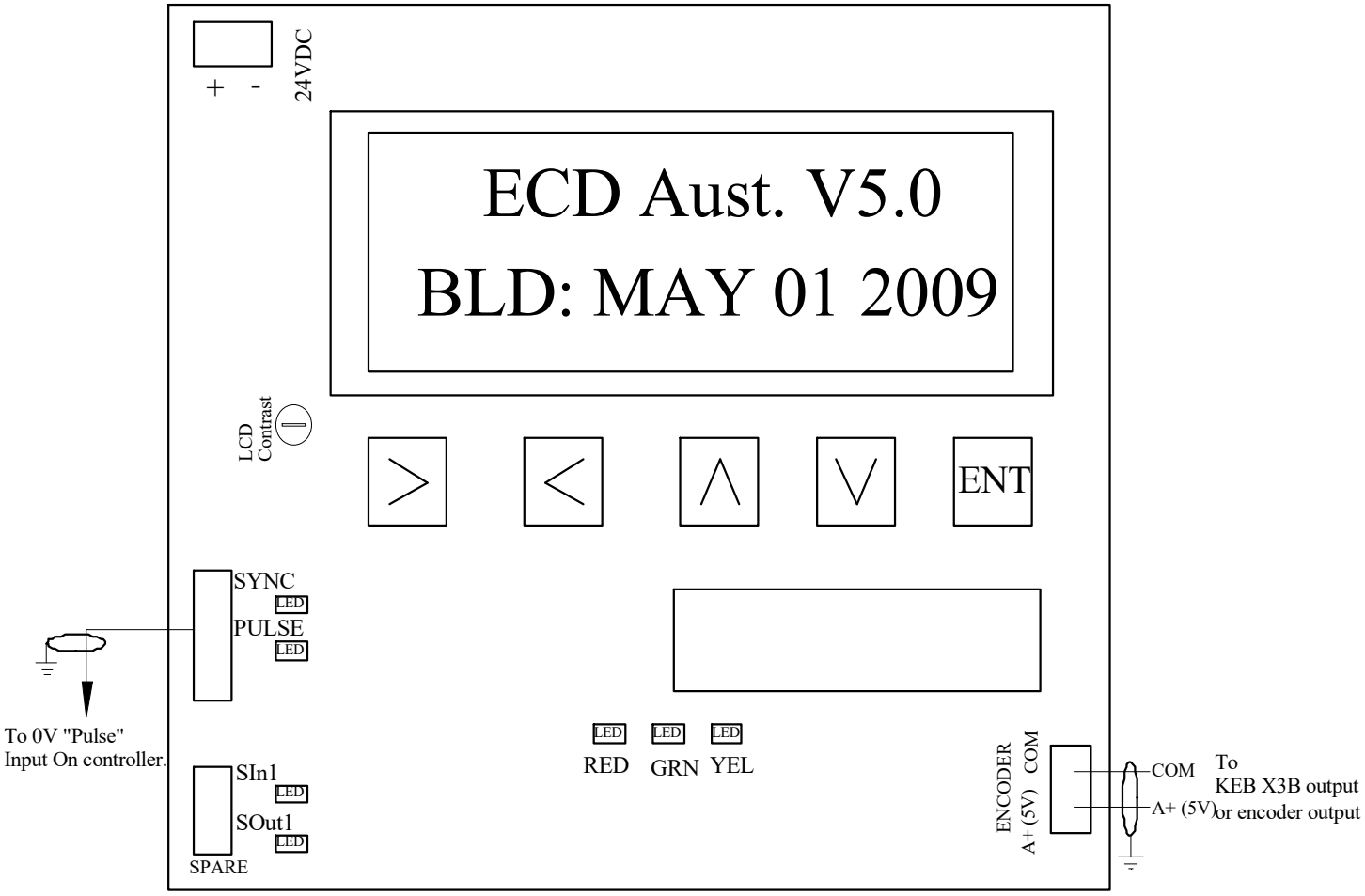
POD is the Pulse Output Distance i.e. for an ECD controller set this to 40 which is 40mm of car travel.
This setting has can be adjusted in steps of 5 from 5 to 100.
For none ECD controllers the installer's discretion must be used on this setting.

2.5.6 ETS Adjustment

Adjusts the speed at which the SOut1 output switches.
This output switches off when the lift speed is equal to or greater than the ETS set speed and is used to switch ETS relay for the Emergency Terminal Slowing circuit.

Once all the above settings have been correctly set the board needs no further adjustment.

2.6 LED Sequence of Operation



The green Pulse LED flashes to indicate the pulse output from the board. The faster the flash, the faster the output rate, or frequency. See “Output”, 2.4.2.

The green LED will only flash when the input from the encoder at terminal A+ is active.

At idle and below ETS speed, the red SOut1 LED is ON.
When ETS speed is reached, SOut1 LED is OFF

3 Specifications

3.1 Pulse Board Power Supply

24Vdc +/- 10%

3.2 Encoder Pulse Rate and Voltage

Max 5000 ppr
Default +5Vdc
Max +30Vdc with the addition of an external resistor

3.3 Pulse Output

0Vdc in reference to the Power Supply +24Vdc

3.4 Setting Values

Default:

- SHD 600
- GBR 60
- ROP 1
- PPR 2500
- POD 40

Minimum

- SHD 200
- GBR 1
- ROP 1
- PPR 100
- POD 5

Maximum

- SHD 1000
- GBR 100
- ROP 10
- PPR 5000
- POD 100

NOTES

ELECTRONIC CIRCUIT DESIGNS PTY. LTD.

Operation Guide

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