Technical manual for the shaft encoder programming tool

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Contents

1 Introduction

The ILE Shaftencoder Programming Tool has been developed to allow the user on site to programme, interrogate, and alter parameters on the ILE Shaft encoder. The unit also incorporates extra features when used in conjunction with the ILE MRL System. The individual interfaces for each of the external devices are detailed below:

Shaft Encoder:

The Shaftencoder Programming Tool communicates with the Shaft encoder via the RS232 Serial link connection utilising a DB9 type Serial CABLE. This allows the user to amend, set, and view shaft encoder parameters. The options available are as follows:

Display General Information
Set Pulse Per Millimetre
Set Floor Levels
Set Slowing Distance
Set Px Lengths
Learn Pulses Per Millimetre
Perform Learning Run

These functions are described in detail in section 3 of this manual.

Hand winding Mode:

The Shaftencoder Programming Tool includes a hand winding positional display, with an audible floor level output. To operate in this mode a connection with an encoder is required and floor level signals from the shaftencoder. The hand winding display gives a description of the lifts position via the interface LCD, for example "*LIFT JUST ABOVE* " "*LIFT AT FLR LEVEL*" etc.

The Shaftencoder Programming Tool has been developed to operate in conjunction with the ILE Emerald System, when used with the Emerald system extra features are available. In addition to giving a position display and audible floor level output, the unit also limits the speed of the lift during hand winding via the brake contact. This feature monitors the lift speed via the encoder to ensure the lift speed does not exceed 0.25m/s during handwind operation. This feature requires the correct setting of the "*PPM*" Pulse per Millimetre parameter.

2 Shaftencoder Programming Tool board layout / connections

The Shaftencoder Programming Tool inputs /outputs are as follows:

PROGRAMMING INTERFACE 160106 ISSUE 1   RS232   B- B+ FS1   AC2 AC1   1   2   BRAKE RELAY

LOOP
POWER
CHARGE
H/W
READY
ALARM
FAULT

SW1 SW2 SW3 SW4 SW5 SW6

P   S ◄ RESET ► I   ↵   ↑   ↓

A 0V B TA TB 0VT +VT HWU HWD HRS HWR HW1 HW2

PIEZO
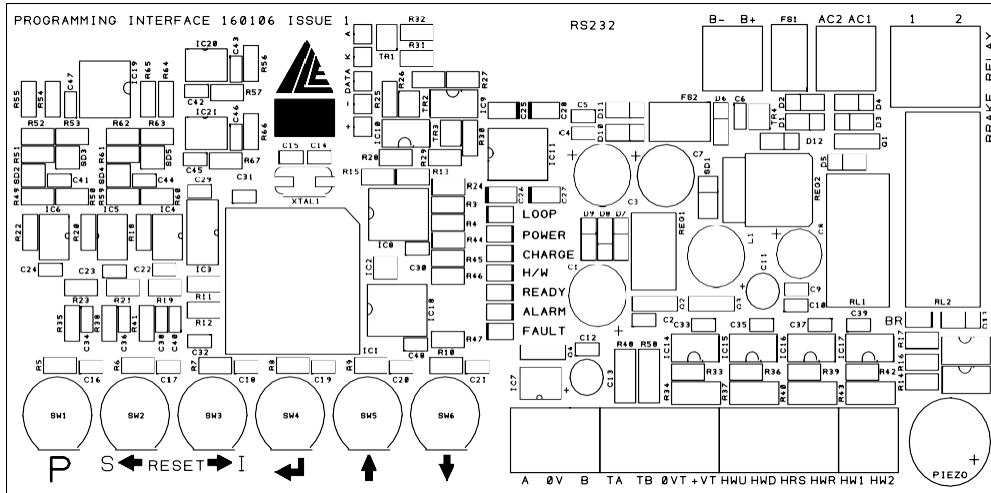
TA	ENCODER CHANNEL A	(CONNECTED TO SHAFTENCODER)
TB	ENCODER CHANNEL B	(" ")
OVT	ENCODER SUPPLY	(" ")
+VT	ENCODER SUPPLY	(" ")
HWU	HANDWINDING UP INPUT	(CONNECTED TO SHAFTENCODER)
HWD	HANDWINDING DOWN INPUT	(" ")
HRS	HANDWINDING RESET INPUT	(" ")
HWR	HANDWIND RETURN	(" ")
HW1	HANDWINDING INPUT	(HANDWIND CONTACT IN PANEL)
HW2	HANDWINDING INPUT	(" ")
B-	BATTERY CONNECTION TERMINAL (-)	
B+	BATTERY CONNECTION TERMINAL (+)	
AC1	9-30V AC/DC SUPPLY TERMINALS	
AC2	(" ")	
1	BRAKE CONTACT TERMINALS	
2	(" ")	
RS232	D TYPE 232 CONNECTOR	

3   Shaftencoder Programming

Upon initialisation the screen will display the following

```
┌─────────────────────────────────┐
│           SHAFTENCODER           │
│        PROGRAMMING TOOL          │
│                                  │
│        PRESS 'P' FOR MENU        │
└─────────────────────────────────┘
```

The menu is accessed by pressing the parameter button (labeled P), and is as follows:

```
┌─────────────────────────────────┐
│        DISPLAY GEN INFO          │
│        SET PULSE/PER/MM          │
│        SET FLOOR LEVELS          │
│        SET SLOW DISTANCE         │
│ ...............................  │
│        SET PX LENGTHS            │
│        LEARN PULSE/PER/MM        │
│        START LEARNING RUN        │
└─────────────────────────────────┘
```

The first four items are seen when the menu is accessed and the other three elements are accessed by scrolling the display. Each item in the menu is selected by placing the flashing cursor over the relevant line and pressing the return key.

The directions in which you can scroll will be signified by arrows displayed in the top left and bottom left of the screen.

The buttons that are active when in this function are:

↑ = move cursor up a line
↓ = move cursor down a line
↵ = select the option

3.1   Display General Information

This option on the menu retrieves the general information from the shaft encoder via the RS232 port. It is the equivalent of doing an 'ecb' command via a terminal window. Note the values for the floor vane length / px length / px gap, and slowing distances are displayed in **millimetres**.

```
┌─────────────────────────────────┐
│        Meas PPM =                │
│        Init stp dst=             │
│        Flrs seen=                │
│        Flr vane len=             │
│ ...............................  │
│        Sp Pxlg PxGp Slw          │
│        0                         │
│        1                         │
│        4                         │
└─────────────────────────────────┘
```

The first four items appear when the option is accessed from the menu. Scrolling the display accesses the rest of the information.

The directions in which you can scroll will be signified by arrows displayed in the top left and bottom left of the screen.

The buttons that are active when in this function are:

P = Go back to menu
↑ = Move up
↓ = Move down

3.2 Set Pulse Per MM

This is to set the pulses per millimetre parameter for the shaftencoder, if the pulse per millimetre of the attached encoder is known the value can be entered and saved directly to the shaftencoder, therefore a learn pulse per millimetre, will not be required by the operator. The pulse per millimetre value is also stored by the programming tool, so that the lift can be run in handwind mode. The screen will display the following.

```
SET PULSE/PER/MM
0.000 p/mm
←  →  UP & DN  ACTIVE
P = EXIT RETURN = SAVE
```

The buttons that are active in this function are:

P = Go back to the menu without saving the value
← = Go to previous digit
→ = Go to next digit
↵ = Store the pulses per millimetre
↑ = Increase digit
↓ = Decrease digit

3.3 PPM Learn

Two button magnets should be positioned in between a floor **EXACTLY** 150mm apart on the guide in order to operate the proximity sensor. Operate the lift on test control through both magnets. Once both magnets have been seen the value for the Pulses per millimeter is returned by the shaft encoder via the RS232 port and will be displayed on the LCD display, this value will also be stored for future use as the handwind pulses per millimeter.

Note: If a " learn" has been selected by pressing "return" it must then be performed as described above, before the user has the option to exit to the menu.

3.4 Set Floor Levels

This is done by changing the stopping distance, (distance from second vane to the floor level) for all or each individual floor; both are done from this option in the menu.

It is the equivalent of using the ecm(floor)(sign)(mm)(direction) command using a terminal window. The *floor* parameter signifies the floor that the command will change, the *sign* signifies whether it is a positive or negative change, the *'mm'* is the number of millimeters by which the parameter will change and the *direction* is either up or down.

If −1 is used as a floor value then all floors are affected by the changes made, and the up/down parameter cannot be set.

The sign parameter is along side the millimeters parameter. When traversing across the parameters and digits the order is as follows (left to right):

Floor (digit2)
Floor (digit1)
Sign
Millimetres (digit5)
Millimetres (digit4)
Millimetres (digit3)
Millimetres (digit2)
Millimetres (digit1)
Direction

```
┌─────────────────────────────────┐
│         SET FLOOR LEVELS        │
│        FLOOR  'mm'  U/D         │
│                                 │
│      P = EXIT RETURN = SAVE     │
└─────────────────────────────────┘
```

The buttons that are active in this function are:

P = Go back to menu
← = Go to previous parameter/digit
→ = Go to next parameter/digit
↵ = Send the command to the shaft encoder
↑ = Increase parameter/digit
↓ = Decrease parameter/digit

With the floor and the millimetres parameter you can set each digit up to a maximum of the number of floors allowed, and the highest change allowed in the number of millimetres. The floor is a 2 digit number and the millimetres are a 5 digit number.

When changing the floor levels for the up direction if the lift car is higher than a floor level you need to use the + sign, and if the lift car is lower than the floor level you need to use the − sign. Conversely when travelling in the down direction if the lift car is higher than a

floor level you need to use the – sign, and if the lift car is lower than the floor level then you need to use the + sign.

Once the return button is pressed to send the command to the shaft encoder, the screen will display 'PARAM CHNGED & SAVED'. You can then set another floor level, or return to the menu.

3.5 Set Slowing Distances

This is done by changing the slowing distance for all or each individual floor, both are done from this option in the menu.

It is the equivalent of using the ecx(floor)(speed)(sign)(mm)(direction) command using a terminal window. The *floor* parameter signifies the floor that the command will change, the *speed* is the speed that it will affect, the *sign* is whether it is a positive or negative change, the '*mm*' is the number of millimetres by which the parameter will change and the *direction* is either up or down.

If –1 is used as a floor value then all floors are affected by the changes made, and the up/down parameter cannot be set.

The sign parameter is along side the millimetres parameter. When traversing across the parameters and digits the order is as follows (left to right):

Floor (digit2)
Floor (digit1)
Speed
Sign
Millimetres (digit5)
Millimetres (digit4)
Millimetres (digit3)
Millimetres (digit2)
Millimetres (digit1)
Direction

```
SET SLOWING DISTANCE
FLOOR SP 'mm' U/D

P = EXIT RETURN = SAVE
```

The buttons that are active in this function are:

P = Go back to menu
← = Go to previous parameter/digit
→ = Go to next parameter/digit
↵ = Send the command to the shaft encoder
↑ = Increase parameter/digit
↓ = Decrease parameter/digit

With the floor speed and the millimetres parameter you can set each digit up to a maximum of the number of floors allowed, speeds allowed, and the highest change allowed in the number of pulses. The floor is a 2 digit number, the speed a 1 digit number, and the millimetres is a 5 digit number.

SPEED DIGIT: "0" = LEVELLING SPEED, "1" = MEDIUM SPEED, "4" = HIGH SPEED

Once the return button is pressed to send the command to the shaft encoder, the screen will display 'PARAM CHNGED & SAVED'. You can then set another slowing distance, or return to the menu.

3.6 Set PX Lengths

This is done by changing the slowing vane lengths for individual speeds.

It is the equivalent of using the ecv(speed)(mm) command using a terminal window. The *speed* parameter signifies the *speed* that the command will change, the *sign* is whether it is a positive or negative change, the '*mm'* is the number of millimetres by which the parameter will change.

The sign parameter is along side the millimetres parameter. When traversing across the parameters and digits the order is as follows (left to right):

Speed (digit1)
Sign
Millimetres (digit5)
Millimetres (digit4)
Millimetres (digit3)
Millimetres (digit2)
Millimetres (digit1)

```
┌─────────────────────────────────┐
│          SET PX LENGTHS         │
│         SPEED       'mm'        │
│                                 │
│       P = EXIT RETURN = SAVE    │
└─────────────────────────────────┘
```

The buttons that are active in this function are:

P = Go back to menu
← = Go to previous parameter/digit
→ = Go to next parameter/digit
↵ = Send the command to the shaft encoder
↑ = Increase parameter/digit
↓ = Decrease parameter/digit

With the speed and the millimetres parameter you can set each digit up to a maximum of the number of speeds allowed, and the highest change allowed in the number of millimetres. The speed is a 1 digit number, and the millimetres are a 5 digit number.

Once the return button is pressed to send the command to the shaft encoder, the screen will display 'PARAM CHNGED & SAVED'. You can then set another slowing vane length, or return to the menu.

3.7 Learning Run

Position the correction floor magnets on the guide so that the correction proximity is operated as near as possible to floor level.

All movement during a learning run is to be at reduced speed.

Prior to commencing the learning run the lift should be able to run between terminal floors at reduced speed, stopping on the terminal limits.

The lift should be positioned at the bottom floor on the down overtravel limit below the bottom floor correction point magnet and with the RSD limit switch activated. It will be necessary to short out the bottom terminal limit to place the lift on the overtravel limit.

Upon selecting the learning run option from the shaft encoder menu, the display will tell you when it is ready to run to the top of the shaft, by displaying 'RUN TO TOP' on the display. Run the lift in panel test mode, operate the override button to get the lift off the overtravel limit and continue to run the lift up onto the top overtravel limit, again it will be necessary to short out the top terminal limit.
The display will tell you when it is ready to run to the bottom of the shaft by displaying 'RUN TO BOTTOM' on the display. Run the lift onto the bottom overtravel limit, again shorting out the bottom terminal limit.

The display will inform you of the number of floors seen on the way up and the way down, these should be the same, if not the learning run needs to be repeated.

Note: If "learn" has been selected by pressing "return" a learning run must be performed as described above, before the user has the option to exit to the menu*.
****Failure to perform an actual learning run once selected will result in loss of shaftencoder data****.*

3.8 Handwinding Mode

This gives feedback to the operator as to the position of the lift in the shaft.

The screen will display the following:

```
! HANDWIND CONTROL !



     0 PPS          .00M/S
```

On the second and third lines the status of the lift will be displayed, on the second line any of the following will be displayed:

LIFT BELOW
LIFT ABOVE
LIFT BETWEEN
LIFT AT FLR LEVEL
POSITION LOST

On the third line the actual level will be displayed, and the brake status if tripped will be displayed
on the fourth line.

So if the lift is travelling between floors 3 and 4, the screen would display the following:

```
! HANDWIND CONTROL !
     LIFT BETWEEN
    FLOORS 3 AND 4
  500 PPS       0.22M/S
```

4 Technical Data

Power supply:

9-30V AC/DC

12V Battery Input

@9V current = 200mA
@24V current = 80mA
@30V current = 70mA

Power supply peak current:

90mA @24V D.C

Power supply standby current:

80mA @24V D.C

Interface Inputs:

HW1/2 Opto isolated inputs 9 to 30V D.C

HWU/HWD/HRS Opto isolated inputs 9 to 30V D.C

Interface Outputs:

Solid state NPN 4A power transistors for position outputs

Brake relays 10A @250V D.C