

Live Wire Grabwire System

Designed specifically for long distance protection, where a tensioned wire installation (GW series) becomes expensive or impractical.

The Live Wire system incorporates the following safety features:-

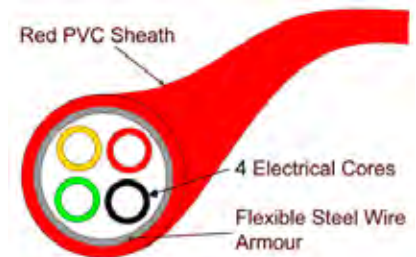
- The trip switch interior to each grabwire assembly contains positive push-off contacts
- The system will trip in the event of -
 - (a) a Grab-Line being pulled in any direction.
 - (b) a Grab-Line being broken or the Grab-Line circuit interrupted.
 - (c) a short circuit condition occurring in the Grab-Line circuit.
 - (d) a loss of power to the Control Station.
- Once tripped, the system requires manual resetting.
- Only a safe low voltage is applied to the Grab-Line circuit and Grab-Line switch assemblies.

The system is ideal for heavy duty and exposed situations. The Control Station and Grab-Line switch assemblies are housed in substantial enclosures which are sealed to IP65. Stainless steel components are used where necessary to ensure reliability is maintained.

Principle of the Design

The design of the overall system has been kept as flexible as possible to allow for additional features that may be required to fulfil specific applications. However, the basic operating system will be at the heart of every system and can be described simply as follows:-

A single Control Station is required for each installation, and from there a low voltage rectified output is fed to the Grab-Line circuit. Unlike the tensioned wire systems (GW), which use a form of catenary wire with a stranded steel core, the Grab-Line used here is very different. The cable is constructed with a flexible steel armour, however down the centre of the Grab-Line run four electrical cores.



The low voltage supply is taken from the control station to the first Grab-Line switch in normal cable. The safety circuit is then fed through the rotary switch within the Grab-Line switch and leaves using the special Grab-Line cable. This is fed through the cable tensioner and on to the next Grab-Line switch. This continues along the protection run until at the last Grab-Line switch, where a wire link completes the return path of the safety circuit.

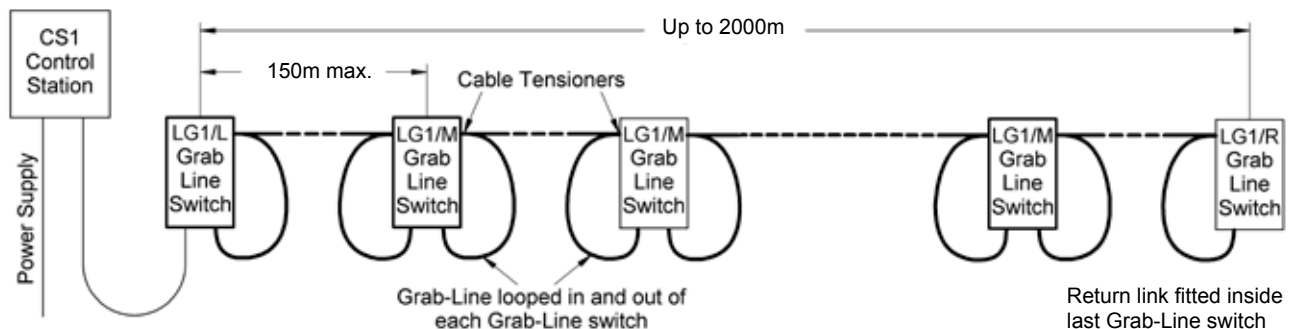
When the system is setup, and the control station is indicating ‘Set To Run’, a relay in the control station is held energised. For any of the fault conditions as listed above, the relay de-energises. The correct connection of the relay contacts ensures a ‘Fail Safe’ condition.

The relay has 3 sets of contacts:-

- The protected machinery Start/Stop control circuit. (Safety circuit - N/C)
- An alarm or indication circuit. (N/O)
- An interlock whereby the emergency stopping of a single conveyor, in a multi-conveyor installation, will also stop ‘upstream’ conveyors as required. (N/C)
- and many other possibilities

Two of the three inner cores of the Grab-Line cable comprise the ‘go & return’ safety circuit, the third core is used for signalling.

With very long conveyors, typically found in quarries or gravel pits, the protection may go ‘out of sight’ of the control centre. Here, someone might be despatched to rectify a fault which could be up to 2km from the source. After correcting the fault he can then signal to the control by pressing the ‘Signal to Reset’ pushbutton which is fitted on every Grab-Line switch. The ‘Reset System’ indicator will illuminate on the CS1 control station, and the conveyor ‘Start-Up’ sequence can begin.



Installation Components

- CS1 - Control Station Assembly (1 required for each safety circuit run)
 LG1/L - Grab-Line switch - Left Hand (1 required for each safety circuit run)
 LG1/R - Grab-Line switch - Right Hand (1 required for each safety circuit run)
 LG1/M - Grab-Line switch - Mid Unit (1 required every 150m along the safety circuit run)



Installation Parameters

The installed system must fall within the following parameters:-

- 1 The total length of Grab-Line safety circuit will consist of -
 - The feed from the CS1 Control Station to the first Grab-Line switch
 - The Grab-Line run
 - If connected, the two wire connection for conveyor interlock control

The total of the above must not exceed 2km or a total circuit resistance of 50 ohms.
- 2 The distance between Grab-Line switches must not exceed 150m.
- 3 The interconnections between Grab-Line switches is by the Grab-Line cable which must be secured to each of the Grab-Line switches by the attachments provided.
- 4 The Grab-Line should be supported at 2m intervals, and 'pigtailed' are available for this purpose. The first support should be as close to the Grab-Line switches as practical. This ensures that the pull on the switches is always linear.
- 5 The CS1 Control Station must be fed by either a 110V or 240V clean a.c. supply.
- 6 A minimum of 1.0 sq mm cable must be used for the following connections.
 - The 3 wire connection between the CS1 Control Station and the first Grab-Line switch
 - The loop 'return' connection in the most distant Grab-Line switch
 - If required, the 2 wire connection to a 'down stream' control station.

Components

CS1 Control Station

Required for each installation, the sheet steel housed control station contains the following equipment:-

Internal

- Half wave rectified low voltage source from either a 110V or 240V a.c. supply.
- Control circuit relay
- Fuse protection
- Terminal blocks for external connections

Lid Mounted

- On/Off switch
- 'Supply On' Indicator Lamp (Blue)
- 'Reset' Pushbutton
- 'Reset System' Indicator Lamp (White)
- 'System Tripped' indicator Lamp (Red)

LG1 Grab-Line Switches

Supplied in three versions **LH**, **RH** & **Mid**, the assemblies are housed in heavy duty die-cast aluminium enclosures and contain the following components:-

Internal

- Chassis plate mounted safety rotary switch
- Terminal blocks for external connections
- A diode (LH & RH units only) which is only connected into the safety circuit if the Grab-Line switch is at the end of the run
- Bellows protected stainless steel 'pull shafts' to which the Grab line is attached
- M20 glands to terminate the Grab-Line cable
- Thimbles, shackles & clamps are supplied loose. Required to attach the Grab-Line to each switch assembly

Lid Mounted

- Manual 'Reset/Condition Indicator' knob
- 'Signal to Reset' pushbutton

Grab-Line Cable

Specialist cable with the following characteristics:-

Internal

- Supplied in four different cut lengths. (75m, 100m, 125m & 150m). A 2m allowance for 'making off' the cable is added to the nominal lengths.
- Thick outer sheath of red PVC
- Flexible steel wire armour
- Four 1 sq mm flexible cores with Red, Yellow, Green & Black sheaths
- Approx. Ø10 O/D



CS1 Control Station



CS1 Control Station Interior



LG1/M Grab-Line switch



LG1/M Grab-Line switch with cover removed

System Technical Data

Input Voltage	110V (15W max.), 240V (15W max)
System Voltage	24V a.c. - 1/2 wave rectified.
Control circuit relay	
Contact operation	Positively operated
Rated load	3A at 240V a.c. 3A (Resistive) at 24V d.c.
Max. switching current	6A
Max. switching Voltage	250V a.c. & 24V d.c.
Minimum permissible load	5V d.c. - 10mA
Mechanical/Electrical life	10 x 10 ⁶ /10 x 10 ³
Contact resistance	100 mΩ
Power Protection Fuse	2A
Safety circuit fuse	200mA
Max. Grab-Line circuit resistance	50 Ohms
Pull force to operate	Approx 5kg.

Full documentation and installation instructions are supplied with each control station

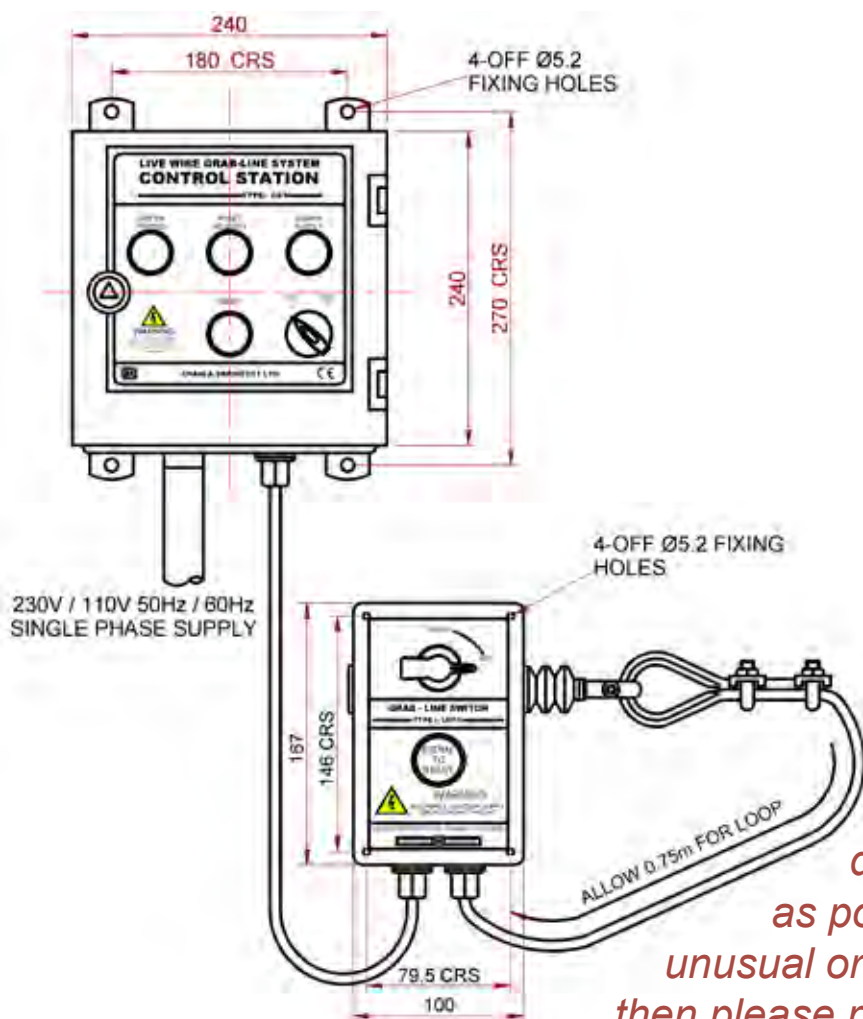
Ordering Codes

Control Station Assembly	CS1
LH Grab-Line switch	LG1/L
RH Grab-Line switch	LG1/R
Mid Grab-Line switch	LG1/M
Grab-Line cable (75M)	GWC 0038A
Grab-Line cable (100M)	GWC 0038B
Grab-Line cable (125M)	GWC 0038C
Grab-Line cable (150M)	GWC 0038D
St St Eyebolt with fixing nuts	GWA 0070

Accessories

Grab-Line Thimble	GWC 0031
Grab-Line Clamp	GWC 0032
Grab-Line 'D' shackle	GWC 0033
Cable gland	GWC 0039

Dimensions



Application in Rolling Stock Repair pits

"The Live-Wire system is designed to be as flexible as possible, so if you have an unusual or complicated application, then please phone our technical sales team who will be at hand to give advice"

