



Wireless Load Monitoring System

In partnership with
Senceive
Wireless condition monitoring



Important Notes

All excavation work must be thoroughly planned before work commences on site to identify hazards and assess risk.

These instructions form guidance for the Wireless Load Monitoring System. Non-standard applications should be approved by a suitably qualified engineer.

Ensure all personnel engaged in excavation operations are properly briefed and adequately supervised by a competent person.

THIS USER GUIDE IS NOT CONTROLLED WHEN PRINTED

You can also access this User Guide to [download as a pdf](#) from the Groundforce Technical Library.

**IF IN ANY DOUBT SEEK FURTHER ADVICE:
ON FREEPHONE - 0800 000 345**



Certification Number 14419
ISO 9001 • ISO 14001 • ISO 45001

Rev	Date	Comments	Initial
1.5	23/06/23	Updated node design	DSW

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SAFETY

Common Symbols and Meanings

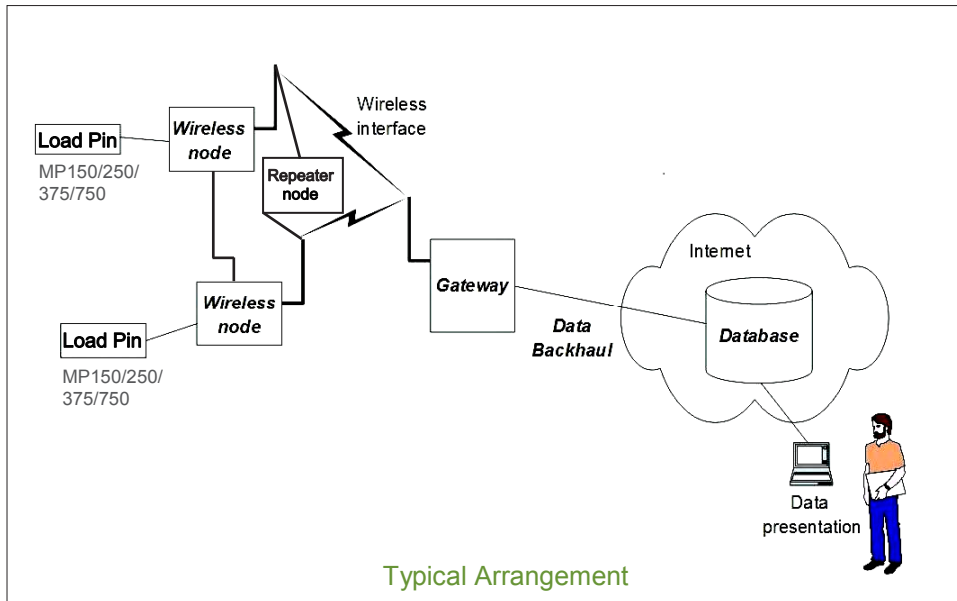
PERSONAL PROTECTIVE EQUIPMENT (PPE)	
	Use eye protection
	Use hearing protection
	Wear protective gloves
	Wear head protection
	Wear protective footwear

WARNING SYMBOLS	
	General warning
	Crushing of hands

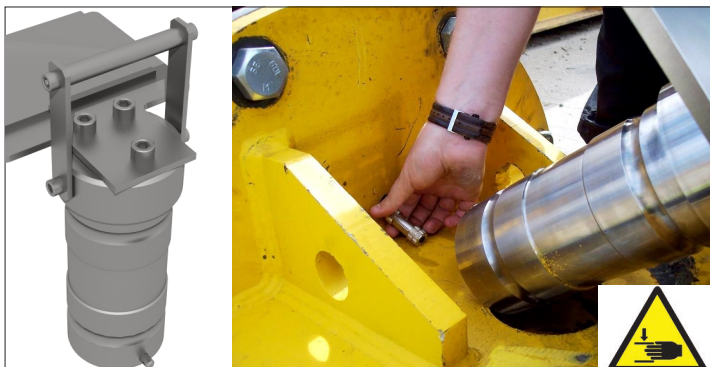
Introduction

Senceive's wireless condition monitoring systems enable real time monitoring of challenging and difficult to access environments for many construction and civil projects. Groundforce have worked closely with Senceive to develop a system to continuously monitor load pressure (tonnage) and ambient temperature (°C) of MP150, MP250, MP375 and MP750 hydraulic struts when installed on site. This monitoring is particularly useful when large shoring projects are in close proximity to adjoining buildings and other structures. It also provides essential data when operating in environments where there are significant fluctuations in temperature.

The diagram below shows a typical arrangement, demonstrating how the system works from a Load Pin fitted into the end cap of the strut which feeds information regarding load and ambient temperature via a Wireless Node to the Gateway; enabling real time monitoring of information. This information is made accessible through the web based FlatMesh™ WebMonitor™ Portal. As well as providing live information, the system can produce Data Logs and reports that may reveal patterns where pressure and/or temperature is typically high or low. Multiple site projects can easily be accessed through this user friendly interface.



Equipment Identification



Example of a Load Pin being fitted into the end cap of a hydraulic strut. (4 sizes of pin to suit MP150, MP250, MP375 & MP750 struts)



Wireless nodes can be fitted with or without a protective aerial cap. The node relays data regarding loading and temperature wirelessly to the 3G Gateway.



The 3G Gateway initiates the connection with the FlatMesh™ WebMonitor™ software so that the data can be viewed remotely via the internet using the FlatMesh™ WebMonitor™ Portal.

Installation

Load Pins

MP150, MP250, MP375 or MP750 struts will arrive on site fitted and configured by Groundforce engineers prior to delivery, no further customer adjustment to the Load Pin will be necessary. If required, Groundforce engineers will detect any problems and make the necessary adjustments.

Node Installation

There are a number of ways that nodes can be fitted and this largely depends on the type of surface to which the node is to be attached. There are three possible options shown below:

Method 1 - 360° Swivel Mount

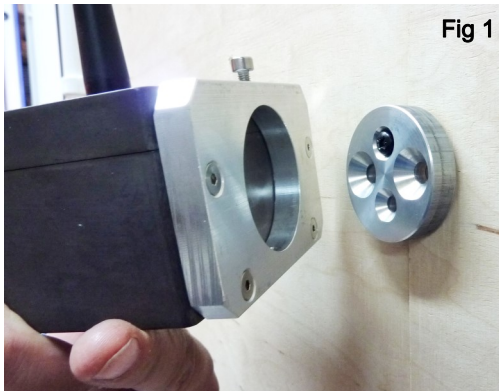


Fig 1



Fig 2

As shown in **Fig 1**, a circular aluminium adapter is firstly fitted to a surface using four countersunk screws - a compatible plate is fitted to the node itself.

The node then fits over the surface mounted adaptor which allows it to be rotated through 360 deg. The node is secured into the desired rotational position using the locking screw circled red in **Fig 2**.

Method 2 - Patented Magnetic Mounting



Fig 3

Fig.3 This method uses magnetic pads to fix the node to a ferrous metal surface. A compatible plate is attached to the node body and the magnetic pads are screwed into position using countersunk Allen screws.



Fig 4

In **Fig 4** the node is shown in-situ attached to a hydraulic strut using magnets.

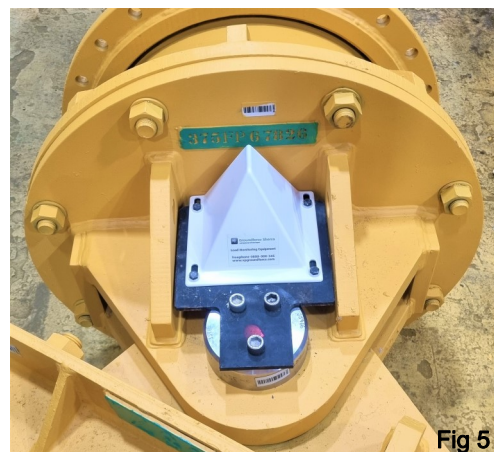


Fig 5

In **Fig 5** the node is shown in-situ attached to a hydraulic strut with a protective cover.

Method 3 - Adhesive with Mounting Plate



Safety Note: Always wear suitable gloves when handling adhesives



Fig 6



Fig 7

This method uses a strong proprietary adhesive to stick the node to surfaces. This is a particularly useful option where surfaces may be uneven.

Apply the adhesive as shown in Fig 6 and stick directly to the required surface. Push and rotate the plate slightly back and forth to uniformly distribute the adhesive. (see Fig 7)



Note: It is important to firstly attach the plate as the adhesive will be difficult remove after use.



The FlatMesh™ 3G Gateway

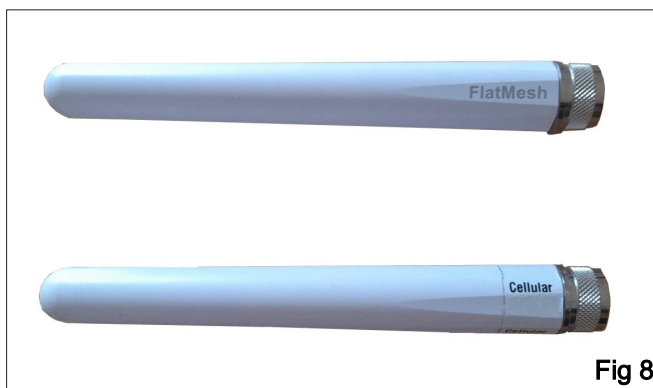


Fig 8



Fig 9

If not already fitted, attach two antennae to the ports in the main FlatMesh™ Gateway unit. (see Fig 9)



Important note:

Use the metal knurled connector to gently screw in the antennae until fully home. **Do not overtighten.**



Ensure that that the words 'Flatmesh' and 'Cellular' etched on the antenna correspond with the markings on the main body of the unit. (see left image)

Circled red on Fig 10 shows the correct position for each antenna.

A qualified engineer will then complete the set-up and configuration of the FlatMesh™ 3G Gateway and the Senceive Wireless Load Monitoring system. The FlatMesh™ WebMonitor™ Portal can then be accessed to provide live information and generate data reports etc.



Fig 10

The FlatMesh™ WebMonitor™ Portal

Log in to the WebMonitor™ Portal by using the email address and password used when registering.

Vp plc **Groundforce**
Specialist Construction Solutions

Welcome to
Groundforce Shorco Live Monitoring

Please enter your details to access the portal

Email:

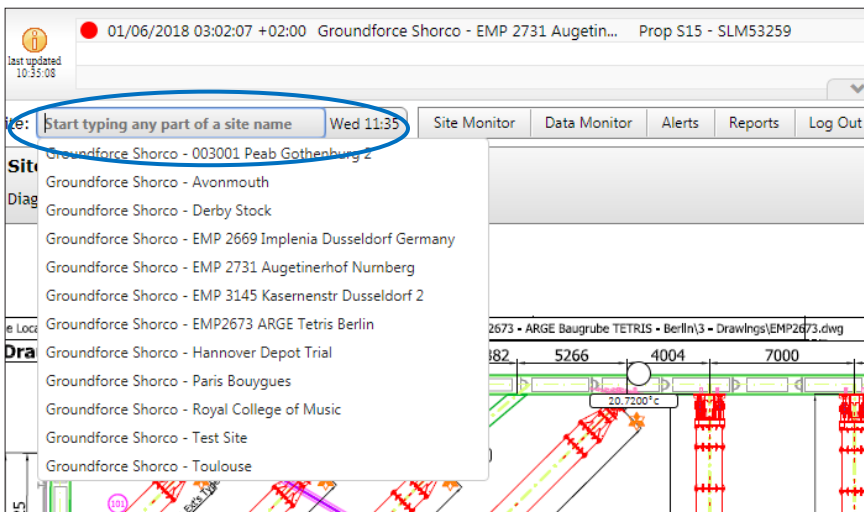
Password: [Forgotten Password?](#)

☒ Remember me

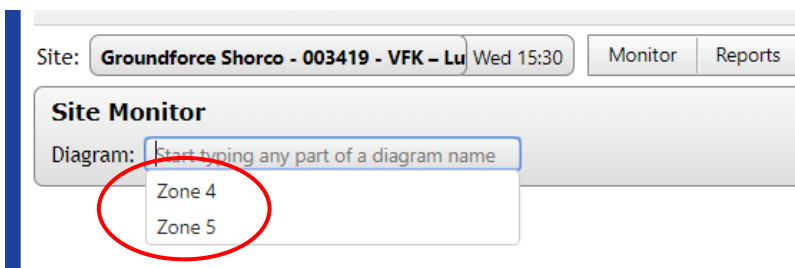
If you require assistance using the service, please contact us on:
+44 (0)20 7731 8269 or
support@senceive.com

Main WebMonitor™ Portal Features

Accessing a Live Site

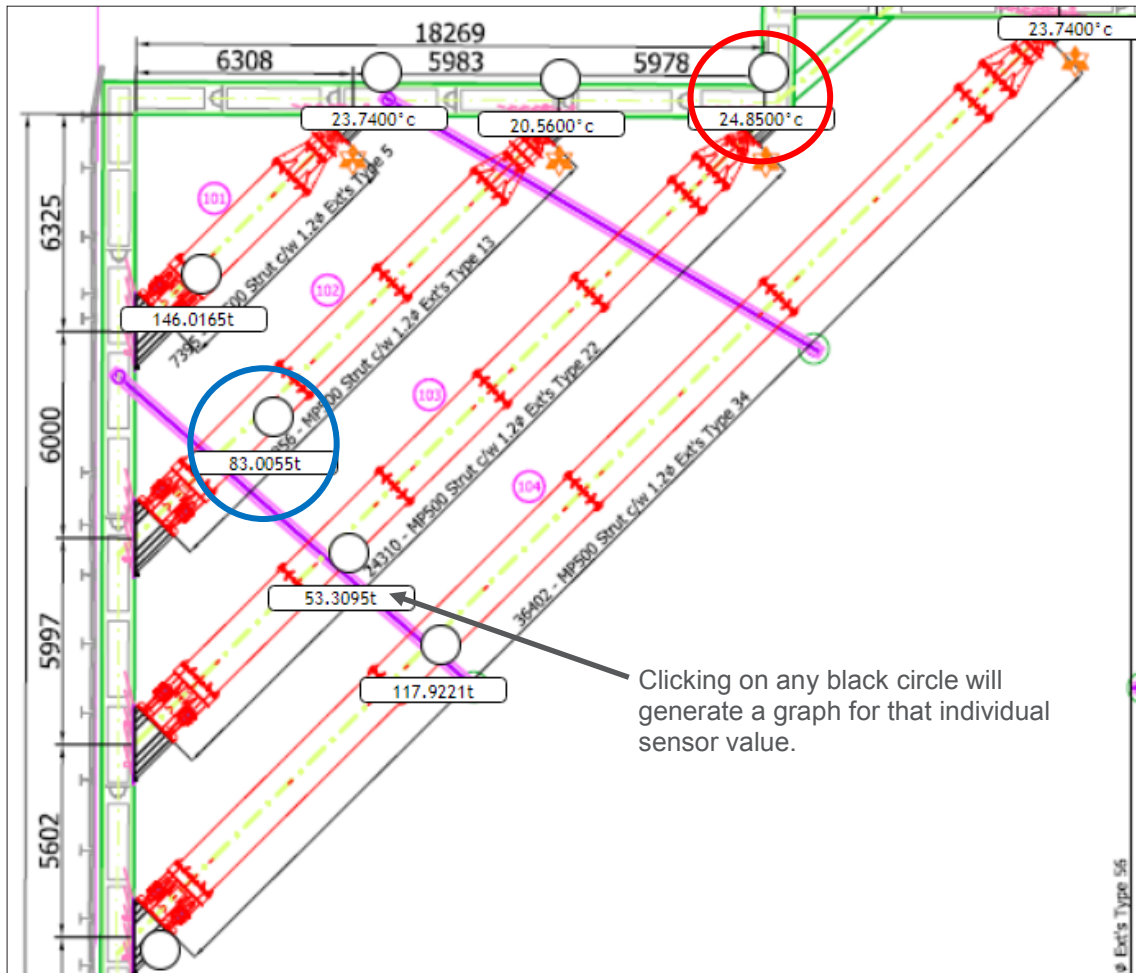


To view a live project, click on the tab circled in blue. A drop down list will appear showing all current site projects.



Choose and click on a live site project name from the drop down list. If a project has more than one monitored area/zone, click the required area/zone (see above circled red)

Live Site Example



The image above shows a section taken from a live project: the smaller black circles indicate which struts are fitted with wireless load monitoring sensors: these provide real time values for tonnage and temperature. For example, the sensor within the blue circle is showing a current strut load of 83.0055t. The sensor within the red circle is showing a current ambient temperature of 24.8500°C.

Site: **Groundforce Shorco - 003549 - Himmel** Wed 16:48

Monitor Reports Alerts Tools Configuration

Groundforce Shorco VP

Data Monitor

Location Group: All Locations

Sensor Types: ☐ Select All ☒ FM3 Onboard Battery Voltage ☐ FM3 Onboard Temperature ☒ Metric Tonne ☒ Millivolt per Volt ☐ Unknown Sensor Type [Apply Filters](#)

Location	Location Groups	Sensor Type	Time	Sensor Value	OB Temp		
Prop 3 - SLM60057	<-none->	FM3 Onboard Battery Voltage	04/11/2019 11:28:49	3.5940	11.50	Show Graph	Alerts
Prop 3 - SLM60057	<-none->	Metric Tonne	04/11/2019 11:28:49	53.2601	11.50	Show Graph	Alerts
Prop 3 - SLM60057	<-none->	Millivolt per Volt	04/11/2019 11:28:49	0.3867	11.50	Show Graph	Alerts
Prop 8 - SLM53234	<-none->	FM3 Onboard Battery Voltage	22/01/2020 16:30:01	3.5430	1.65	Show Graph	Alerts
Prop 8 - SLM53234	<-none->	Metric Tonne	22/01/2020 16:30:01	16.0300	1.65	Show Graph	Alerts
Prop 8 - SLM53234	<-none->	Millivolt per Volt	22/01/2020 16:30:01	0.1860	1.65	Show Graph	Alerts
Rep SLM58651	<-none->	FM3 Onboard Battery Voltage	22/01/2020 16:36:00	3.6330	-1.85	Show Graph	Alerts
Rep SLM60064	<-none->	FM3 Onboard Battery Voltage	22/01/2020 16:36:36	3.6180	2.60	Show Graph	Alerts
SLM60068	<-none->	FM3 Onboard Battery Voltage	22/01/2020 16:28:31	3.6290	11.02	Show Graph	Alerts
SLM60068	<-none->	Millivolt per Volt	05/09/2019 14:58:31	-0.0123	21.20	Show Graph	Alerts

Click the Data Monitor tab (circled blue) to access a range of possible data, for example, 'Onboard Battery Voltage'.

Pick from the list generated below to analyse the data in graph form or to view any alerts etc.

Alerts

Site: **Groundforce Shorco - EMP2673 ARGE Te** Wed 12:31

Site Monitor Data Monitor **Alerts** Reports Log Out

Alerts

☐ Show alerts from all sites Location:

From: To: (UTC+01:00) Amsterdam, Berlin, Bern, Rome, Stockholm, Vienna

Auto-Refresh Interval

	Date	Location	Trigger Description
●	20/03/2018 01:51:01	P112 - SLM53240 - Berlin	EMP 2673 Red 110% (of 500t)
●	20/03/2018 01:51:01	P112 - SLM53240 - Berlin	EMP 2673 Yellow 100% (of 500t)
●	20/03/2018 01:51:01	P112 - SLM53240 - Berlin	EMP 2673 Green 90% (of 500t)
●	19/03/2018 16:24:25	P105 - SLM53245 - Berlin	EMP 2673 Red 110% (of 500t)

Click the Alerts tab to view any current alerts. Alerts are colour coded to signify status. Current alerts can be viewed, as well as alerts from a specified date range.

Reports

Site: **Groundforce Shorco - 003605 - Serneke** Wed 17:00

Monitor Reports **Alerts** Tools Configuration

Data Reports

From: To: Report Format:

Report Options

Sensor Type: Location Group:

Chart Options

Chart Size: Grouping Algorithm: Time Grouping:

☐ Include Outliers ☐ Automatic Scaling

☐ Location ☐ Prop 9 - SLM58857 ☐ SLM53262 ☐ SLM53274 ☐ SLM56633 ☐ SLM60049

Click the Reports tab to generate different types of report. From the Reports tab, click Data Reports Legacy to generate a report. (see example below)

Site: **Groundforce Shorco - G003067- JL - AR** Wed 17:11

Monitor Reports **Alerts** Tools Configuration

Data Reports

From: To: Report Format:

Report Options

Sensor Type: Location Group:

Chart Options

Chart Size: Grouping Algorithm: Time Grouping:

☐ Include Outliers ☐ Automatic Scaling

☐ Location ☒ Prop 01 - SLM60056 ☒ Prop 02 - SLM60042 ☐ REP - SLM53271 ☐ REP - SLM53272 ☐ SLM56633 ☐ SLM58631

Select locations as circled red. Select 'Sensor Type' as circled blue. Click 'Generate Report' button as circled black

Data Reports

This Data Report shows information for two individual struts in a given project within a specified time range.

The image below shows the report in the form of a graph.

The graph generated displays the load (tonnage) on the two struts shown in the screenshot below.

