

TRAINWEIGH

RAIL WEIGHING SOLUTIONS

Part of the Weighbridge Services Group



High speed, weigh-in-motion Train Weighing System

FW-HS SERIES

Trainweigh – Rail Weighing Specialists

Weighbridge Services Ltd is a family run business based in Sheffield, UK. With over 40 years experience of designing, building and installing both road and rail weighing equipment, our team of engineers cover almost every aspect of the weighing industry.

Our Trainweigh brand of products, offered solely by Weighbridge Services Ltd, offer a vast range of rail weighing solutions. Over the past 10 years our product range has benefited profoundly from increased R & D budgets, a stronger supply chain and the increased expertise of our workforce by bringing in experienced engineers from other parts of the rail weighing industry.

The Trainweigh range is designed for application into any rail infrastructure from factory installed weighers and testing systems to out-in-the-field weighing and data collection services.

We are now positioned as one of the leading train weighing specialists and can supply a vast range of products worldwide, both off-the-shelf and bespoke manufactured.

We look forward to working with you.

Regards,

The Trainweigh Department







UNIQUE SELLING POINTS

- No traffic interruptions during installation.
- No infrastructural changes required.
- Fast Installation (approximately 10-12 hours).
- Best cost and performance overall.
- MTTR less than 1 hour.



- Turnkey solution
- Fits all known rail standards
- No weight or speed limitation at weighing site
- High measuring accuracy (better than 0.5% OIML R106)
- Extremely durable sensor (MTBF >90,000 hours)
- Easy maintenance (MTTR less than one hour)
- Integrated wagon classification system
- Remotely operated (upgrades, diagnostics, maintenance)
- Easy integratable data (MySQL data structure)

EXAMPLES OF OPERATIONAL USE

Weighing single wagons

A mining company needs to know their wagons are not unevenly, under or overloaded.

Weighing complete train sets

A railway operator needs to know the number of engines and wagons to charge a traffic fee.

Monitoring all train sets

The infrastructure owner needs to know how the track system is used.

Detecting derailment risks

The track owner and the train operator want information on if and when there is an increased risk of derailment.



WEIGHING IN MOTION SYSTEM REGISTER

- | | | |
|-----------------|----------------------------------|------------------------------|
| • Weighing site | • Number of axles | • Type of locomotive / wagon |
| • Date and time | • Weight of single wheel / bogie | • Broken bogie suspension |
| • Speed | • Weight of wagon / train set | • Wheel defect |
| • Direction | • Uneven load, under or overload | • Derailing risk condition |



FORCE WIM TECHNICAL DESCRIPTION



Picture 1 WIM fully installed (with sensor protection shields).



Picture 2 Same site during installation (sensors visible).

Weighing in Motion (WIM) is a stationary dynamic scale with which locomotives and cars are weighed when passing over the weighing station, in the speed range 1 - +140 km/h.

A fully installed system is equipped with eight (8) weighing points – four (4) on each rail. One weighing point consists of a sensor pair mounted by bolting on the rail's web, on both sides of the rail, in the gap between two sleepers. Through the bolting, the rail becomes an integral part of the railway scale.

The sensors detect the passage of each single wheel by the changes in the most sensitive part of the rail. Thereby the system obtains the most accurate information that can be registered. This together with extremely refined algorithms the system derives weight and other valuable information from the passing train set.

The system has, in principle, no moving parts. Active part of the sensor is a strain gauge sensor which, through a patented manner, detects the rail's changes and converts this information into analogue electrical signals.

Each weighing point is connected via cable to an analogue/digital signal converter (PSLA). The eight signal converters send the digital signal to a main processor (SIPR) in real time, where the signals are analysed and converted through advanced algorithms to, inter alia, weight.

WIM has been certified by the Research Institutes of Sweden (RISE) and Netherlands Measurement Institute (NMI) which both prove that the system accuracy is better than 0.25%.

FORCE WIM TECHNICAL DESCRIPTION



The system has a built-in locomotive and cart database that compares the distances between the passing wheels and can determine which wheels belong together, thus defining a loco-motive and/or a car.

Information about:

- the weighing station's identity, date and time;
- the train sets' direction and speed;
- number of passing axles;
- the weight of the single wheel, axle and single bogie;
- the weight of individual locomotive/wagon;
- the entire train set weight;
- type of locomotive and/or wagon;
- increased derailing risk;
- uneven load and overload;
- damaged wheels;

is sent, in MySQL format, to a central database. Communication to/from the WIM is via Ethernet cable and/or via a 3G/4G modem.

Data captured by the WIM (password protected) may be accessed from any computer with Internet access. The WIM can also detect wheel damage and when a train set has an increased risk of derailment.

Train Data										
<input type="checkbox"/>	Timestamp	Site	Direction	Cars	Axes	Gross (T)	Speed (m/s)	OL	UL	
<input checked="" type="checkbox"/>	2020-01-05 19:59:16		North	21	124	1,715.05	23.30	0	10	
<input type="checkbox"/>	2020-01-05 18:52:36		North	3	40	692.55	23.50	0	1	
<input type="checkbox"/>	2020-01-05 14:51:39		North	3	48	686.49	26.90	0	0	
<input type="checkbox"/>	2020-01-05 13:43:38		North	2	36	492.01	30.10	0	0	
<input type="checkbox"/>	2020-01-05 11:40:56		North	2	36	496.20	27.60	0	0	
<input type="checkbox"/>	2020-01-05 10:53:40		North	31	47	654.00	34.70	0	1	
<input type="checkbox"/>	2020-01-05 06:03:50		North	1	4	91.75	26.30	0	0	
<input type="checkbox"/>	2020-01-05 00:15:58		North	2	36	493.31	20.90	0	0	
<input type="checkbox"/>	2020-01-04 21:13:33		North	2	36	497.36	30.40	0	1	
<input type="checkbox"/>	2020-01-04 19:01:49		North	2	32	475.27	25.70	0	1	
<input type="checkbox"/>	2020-01-04 17:51:06		North	24	96	601.60	16.10	0	8	
<input type="checkbox"/>	2020-01-04 11:42:49		North	2	36	492.38	29.70	0	0	
<input type="checkbox"/>	2020-01-04 09:52:54		North	2	32	459.37	26.80	0	1	

Car Data												
<input type="checkbox"/>	#	Type	Tire (T)	Gross (T)	Net (T)	Speed (m/s)	Front (T)	Rear (T)	OL	L/Ri UL	F/Re UL	
<input checked="" type="checkbox"/>	1	BB 26000	68.83	68.47	0.00	22.65	42.46	46.01	0	0		
<input type="checkbox"/>	2	Car 6A 1	999.00	72.64	0.00	22.76	41.31	31.53	0	0		
<input type="checkbox"/>	3	Car 6A 1	999.00	82.79	0.00	22.76	41.16	41.63	0	1		
<input type="checkbox"/>	4	Car 6A 1	999.00	82.47	0.00	22.82	41.02	41.48	0	0		
<input type="checkbox"/>	5	Car 6A 1	999.00	95.31	0.00	22.91	43.30	42.01	0	0		
<input type="checkbox"/>	6	Car 6A 1	999.00	74.06	0.00	22.95	39.50	34.56	0	1		
<input type="checkbox"/>	7	Car 6A 1	999.00	69.49	0.00	23.04	45.59	43.90	0	0		
<input type="checkbox"/>	8	Car 6A 1	999.00	84.69	0.00	23.14	42.58	42.12	0	1		
<input type="checkbox"/>	9	Car 6A 1	999.00	70.24	0.00	23.21	36.44	31.60	0	0		
<input type="checkbox"/>	10	Car 6A 1	999.00	86.98	0.00	23.19	44.53	42.33	0	0		
<input type="checkbox"/>	11	Car 6A 1	999.00	69.26	0.00	23.29	29.52	39.75	0	0		
<input type="checkbox"/>	12	Car 6A 1	999.00	84.33	0.00	23.32	42.93	41.40	0	0		
<input type="checkbox"/>	13	Car 6A 1	999.00	85.93	0.00	23.35	40.41	45.42	0	2		

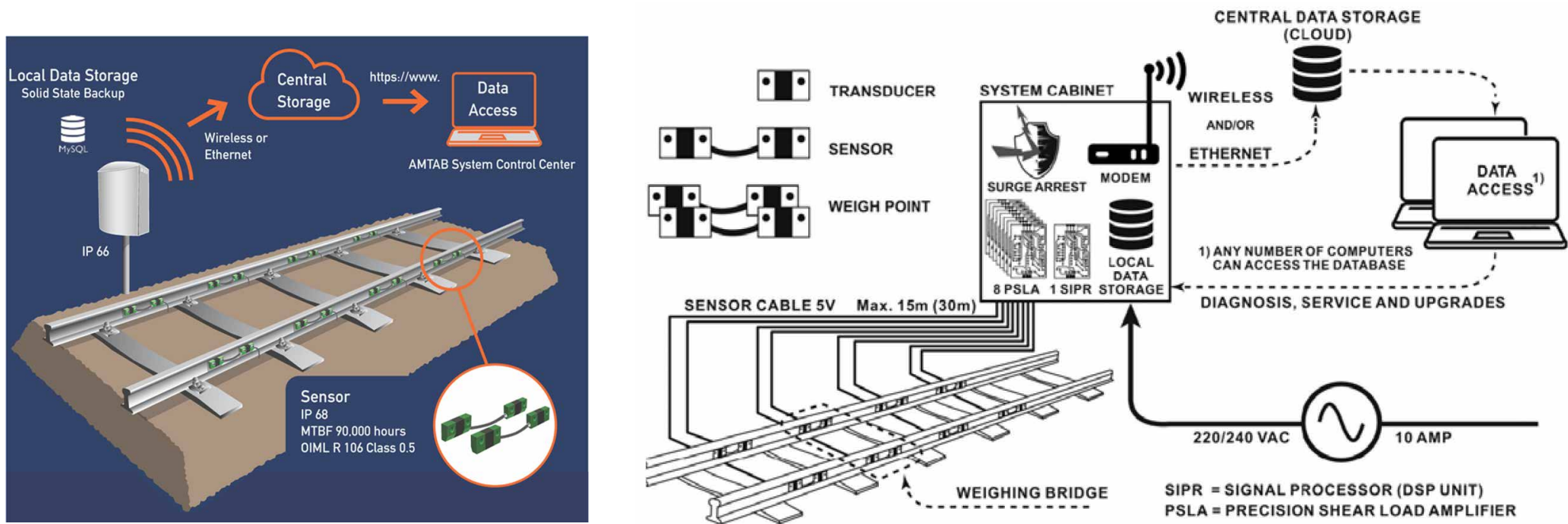
Data layout of the standardised WIM System Control Centre. The data may be customised and presented any way and anywhere the operator requires.

FORCE WIM TECHNICAL DESCRIPTION

The system is delivered and installed as a key turn solution with all functionalities, i.e. Local Data Storage, Communication Modem, Uninterrupted Power Supply (external and optional), Lightning protection and Surge Arrest included (see Picture 4).

WIM's software architecture is designed so other sensor functionalities (e.g. Hot Box detection, RFID, OCR of registration plates and surveillance camera) may be integrated.

The WIM puts no restrictions on maximum weight and/or speed at the weighing site. Nor does the system require any change in the rails, sleepers or embankment for installation and operation.



Picture 4 Schematic drawing of system cabinet, power supply, communication and sensor array.

FORCE WIM TECHNICAL DESCRIPTION



WIM SYSTEM CABINET

DIMENSIONS (H x W x D)	850 x 690 x 360 mm
INNER ENCLOSURE (H x W x D)	590 x 560 x 280 mm
SHIPPING WEIGHT (W. SENSORS)	100 kg
ENVIRONMENT PROTECTION	IP66
OPERATING TEMPERATURES	-30°C to 80°C
POWER	100 - 240 VAC, 50 - 60 Hz, 6A
CONSUMPTION (W. HEATER)	90 W (190 W)
CLASSIFICATION	OIML R 106
ACCURACY	±1.0 - 0.2% depending on configuration
MEASUREMENT RANGE	3.0 - 32.5 ton per axle
GRAPHICAL USER INTERFACE	Built-in web-based interface
COMMUNICATION INTERFACES	USB, RS-232, RS-485, TCP/IP 10/100Base-T Ethernet
STORAGE	CompactFlash® card / External MySQL™ Database (optional)

MULTI-FUNCTIONAL SENSOR BAR (MFSB)

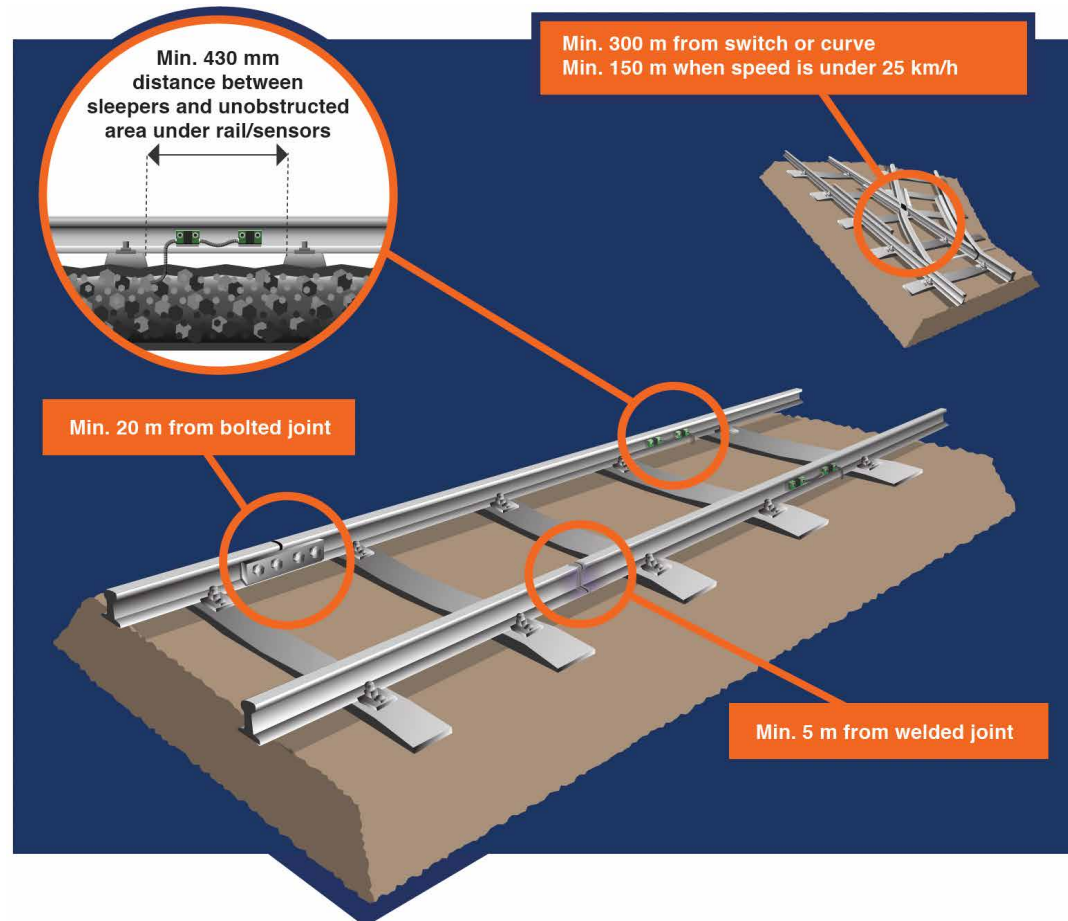
DIMENSIONS (H x W x D)	47 x 90 x 22 mm
SHIPPING WEIGHT	1.7 kg
ENVIRONMENT PROTECTION	IP68
OPERATING TEMPERATURES	-30°C to 80°C
MTBF	90,000 hours

OPTIMAL ENVIRONMENT AND CONDITIONS FOR INSTALLATION

There is a minimum allowed distance between the sleepers (430 mm) where the Load Transducers (= sensors) are to be mounted and free space below the Load Transducers is also required.

A Load Transducer shall not be installed closer than 5 meter from the nearest welded joint nor closer than 20 meters from the nearest bolted joint.

No curve or switch should be closer than 300 meters from the weighing/measurement site or 150 meters when speed is under 25 km/h.



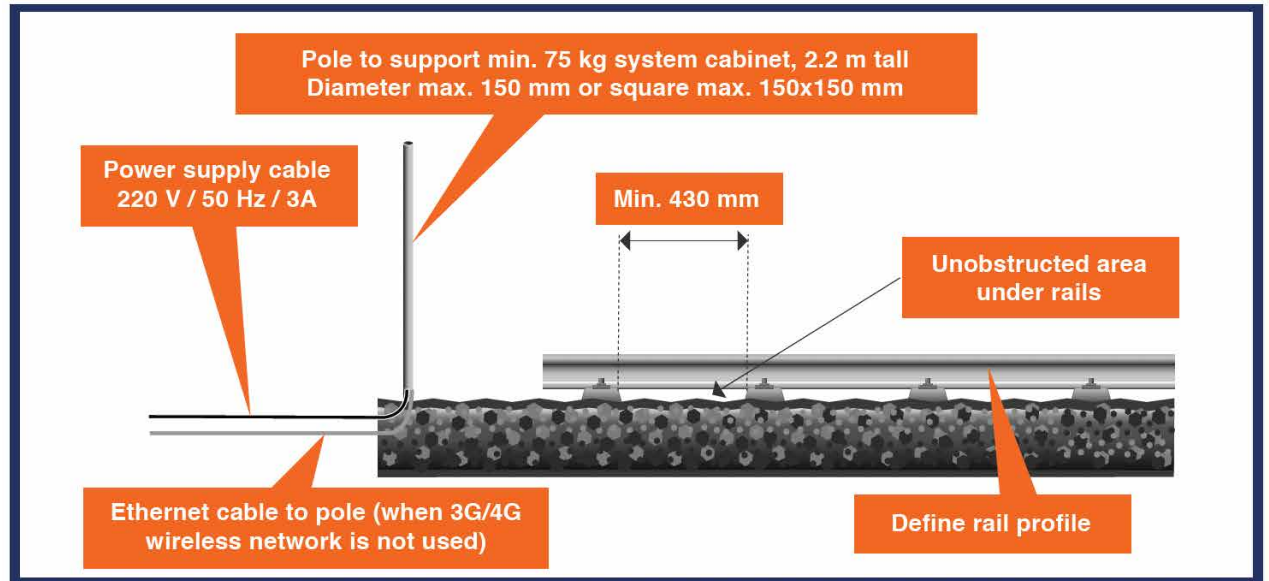
SITE PREPARATION RESPONSIBILITIES

Prior to the WIM installation, the site must be prepared. The client is responsible for a pole capable of supporting the system cabinet (approx. 75 kg). Its position shall be decided together with us.

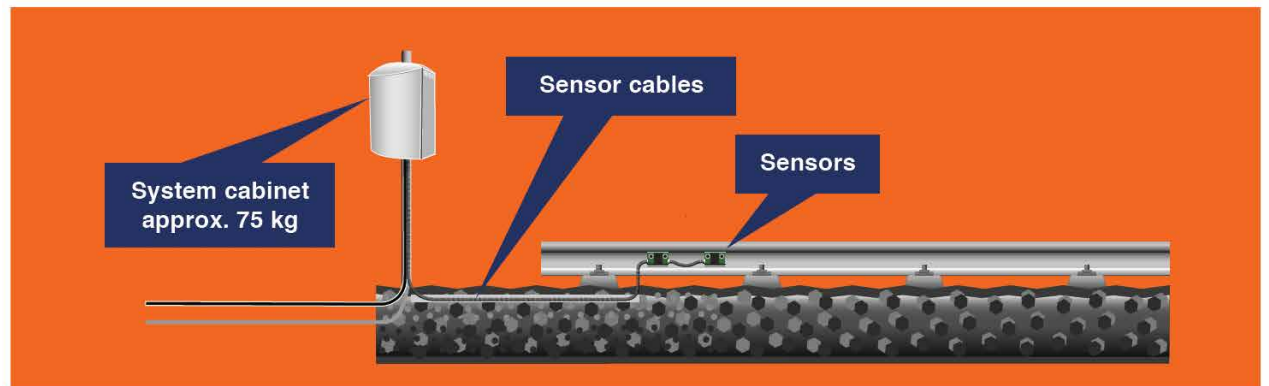
kg). Its position shall be decided together with us.

The client is also responsible for attaching the WIM to the power grid and providing Ethernet cable for system communication (option: 3G/4G wireless network).

CUSTOMER RESPONSIBILITIES ON FORCE WIM SITE



OUR RESPONSIBILITIES ON FORCE WIM SITE



PREVIOUS INSTALLATIONS



STOCKHOLM, SWEDEN



STOCKHOLM, SWEDEN



LULEÅ, SWEDEN



LULEÅ, SWEDEN



WEIGHBRIDGE SERVICES LTD

The Chapel, Carrwell Lane, Sheffield, S6 1NR, United Kingdom

Tel: +44 (0)114 321 63 64

Email: trainweigh@weighbridgeservices.com