



United Kingdom of Great Britain and Northern Ireland

Certificate of EC type-examination of a measuring instrument

Number: UK/0126/0020

issued by the Secretary of State for Trade and Industry
Notified Body Number 0126

In accordance with the requirements of the Measuring Instruments (Automatic Rail-weighbridges) Regulations 2006 (SI 2006/1256) and the Measuring Instruments (Non-Prescribed Instruments) Regulations 2006 which implement, in the United Kingdom, Council Directive 2004/22/EC, this certificate of EC type-examination has been issued to:

Meridian Engineers Pty Ltd
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West Perth
WA
6005
Australia

in respect of an automatic rail-weighbridge designated the ME-TrackWeigh-1BXD, and having the following characteristics:

Accuracy class: 2.0 (coupled wagon weighing)
 ≥0.5 (total train weighing)

The necessary data (principal characteristics, alterations, securing, functioning etc) for identification purposes and conditions (when applicable) are set out in the descriptive annex to this certificate.

Signatory: G Stones
for Chief Executive
National Weights & Measures Laboratory
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Descriptive Annex

1 INTRODUCTION

This pattern of an automatic rail-weighbridge is designated the ME-TrackWeigh-1BXD (Figure 1). The pattern is designed for the in-motion weighing of rail wagons, and comprises the following:

- ME-Boltweigh transducer modules
- ME-CANAMP modules
- Tiefenbach track switches (non contact type)
- Trackside junction box
- ME-TrackWeigh controller

The instrument is designed for the weighing of axles and bogies of:

- Coupled wagons in a train formation, pulled in both directions
- Entire trains, pulled in both directions

2 FUNCTIONAL DESCRIPTION

2.1 ME-Boltweigh transducers

The transducers (Model ME-Boltweigh-railtype) comprise two halves, one each side of the rail, that form one load cell. Two pairs (one on each rail) of “ME-Boltweigh” transducers are permanently bonded to each rail. The transducers are connected, via a trackside junction box, to the ME-TrackWeigh controller. A set (one pair) of ME-Boltweigh transducers mounted on one rail has a maximum capacity of 20,000 kg. LM35 temperature sensors are installed inside each transducer. The modules are enclosed by stainless steel covers and encapsulated with a silicone rubber.

2.2 ME-CANAMP

Each transducer pair is terminated in a “ME-CANAMP” which forms a Wheatstone bridge and amplifies the strain signal, digitises and encodes the signal into a data packet to be sent to the controller via a CAN bus network. The data packet on the CAN bus includes the digitised load cell module output, the LM35 temperature value and the device number from which the packet originated.

2.3 Tiefenbach track switches

These non-contact track switches (Model 2N59-1R-200-45) are installed on the rail for sensing wheel position and for determining the direction and speed of train. Their spacing and number along the rail depend on site requirements.

2.4 Trackside junction box

A Trackside junction box (Model ME-TJB-01) may be used to route the track switches cables to multi-core data cables for long runs to the location of the controller.

2.5 ME-TrackWeigh controller

The ME-TrackWeigh (Model ME-EC5) controller is an industrial PC which interfaces to the CAN bus network installed on the rails. The entire hardware is enclosed in a metallic housing. All digitised rail data is received via the CAN bus network. The track switch cables connect directly to the controller. The controller compiles the rail axial load, speed, wheel direction, wheel load and the temperature to give recorded axle weights. It also combines all axle weighing events into train weighing reports. The system may be set up to be fully automatic (no operator intervention), semi-automatic (minimal operator intervention) or manual (operator required to enter train details prior to start a weighing command).

2.4 Printer

A printer is connected (see section 4.2.) to the controller to automatically print the train reports once complete.

2.5 Devices

The ME-TrackWeigh is provided with the following devices:

- Automatic detection of over-speed
- Automatic detection of roll-back
- Automatic zero-setting device ($\leq 4\%$ of Max.)
- Direction of travel detection
- Measurement of vehicle speed

3 TECHNICAL DATA

3.1 The ME-TrackWeigh-1BXD has the following technical characteristics:

Accuracy class	2.0 (coupled wagon weighing)
	≥ 0.5 (total train weighing)
Maximum operating speed	≤ 10.0 km/h (depends on site conditions)
Minimum operating speed	≥ 0.1 km/h
Maximum wagon weight	$\leq 160,000$ kg (depends on rail size)
Minimum wagon weight	$\geq 10,000$ kg (depends on rail size)
Scale interval	≥ 100 kg
Maximum capacity	$\leq 40,000$ kg (per axle) (depends on rail size)
Minimum capacity	$\geq 2,500$ kg (per axle)
Max. no. of transducers	4 (2 pairs)
Max. number and type of wagons per train	Determined at verification
Direction of weighing	Bi-directional
Power supply	230 VAC, 50/60 Hz
Operating temperature range	- 10°C to + 40°C
Climatic environment	Closed, non-condensing (controller)
	Open, condensing (track side system)
Electromagnetic classification	E1

3.2 Documentation and drawings

3.2.1 Documentation

ME-TrackWeigh-1BXD System Manual

3003-SM-01 rev 2

3.2.2 Drawings

Drawing No.	Description	Rev. No.
3003-S-34	ME-TrackWeigh system layout	0
3003-E-34	System wiring diagram	0
3003-E-38	ME-TJB-01 box	0
3003-E-33	EC-5 controller wiring	0
3003-E-35	Controller front and rear layout	0
3003-E-37	PCB pin and connection details	0
3003-I-11	ME Boltweigh Transducer	0
3003-I-10	System Schematic	0
3003-E-39	CAN Interface card	0

3.3 Software

3.3.1 The application software is designated the RailMaster and its version number is 5.0. The version number is displayed in the SUPPORT page. When the system computer is started the user needs to login to Windows, and the RailMaster software will automatically start. The application executable can be found at “C:\meridian\bin\RailMasterServer5.0.exe” but cannot be accessed by the end user.

3.3.2 The system computer directory structure is as follows:

```
C:\windows
C:\program files
C:\meridian\config
    \data
    \logs
    \utilities
    \weighbridge reports
```

Config: contains weighbridge and interface configurations, and has an encrypted signature to ensure only authorised configuration files can be accepted by the controller. Changes to the configuration file are restricted to authorised personnel. The software will reject any altered file and go into an Error state until reset.

Data: contains files with the train weighing data and other information relative to the weighing process (start time, serial number...)

Log: contains the system log file and is capable of storing 500 lines of program events. It records among others any alarms and messages during the weighing process, and all hardware reboot and software reset.

Utilities: Location for any utility programs provided by Meridian Engineers to assist with system fault diagnosis.

Weighbridge reports: contains the stored weighing data and messages shown during the weighing process. This information can be printed and emailed at the end of the train weighing. A previous report can also be printed and emailed. The reports have an encrypted signature that must be valid to allow printing. Any altered file will be detected and a warning displayed.

3.3.3 The ME-EC5 Controller has a touch screen on the front panel for operator interface, and allows the following pages to be displayed:

MAIN page (Figure 2): presents relevant data from the weighbridge and track switches which includes site name, software state, track switches state, strain gauge output, rail temperature, current wagon information (type, sequence number, weight, ID and speed), as well as the operating conditions (train pulled/pushed, direction of move, weighbridge status). A table lists, in real time, all wagons' weight and speed.

SEMI-AUTO page: for use when the wagon type is not of the standard type allowed for by automatic classification using track switches. In this mode the user must enter the train and wagon details and has to manually control the weighbridge. This page is disabled in automatic mode.

LOG page: provides a view of the recent events recorded in the system log. All events are time stamped.

CONFIGURATION page (Figure 3): lists all the configuration parameters used by the system, including all the legally relevant parameters

REPORTS page (Figure 4): the same information as in MAIN page is displayed, plus messages and date. This is the information that will be printed (Figure 5) and emailed at the end of the train weighing.

SUPPORT page: displays the software version number and manufacturer's details

MERIDIAN page: used for diagnostic purposes by authorised personnel only.

4 PERIPHERAL DEVICES AND INTERFACES

4.1 Interfaces

The instrument may be fitted with the following protected interfaces:

- RS232
- USB
- Ethernet
- CAN bus
- Track switches

4.2 Peripheral devices

4.2.1 The instrument may be connected to any peripheral device that has been issued with a test certificate by a Notified Body responsible for Annex B (MI-006) under Directive 2004/22/EC in any Member State and bears the CE marking of conformity to the relevant directives; or

4.2.2 A peripheral device without a test certificate may be connected under the following conditions:

- it bears the CE marking for conformity to the EMC Directive 89/336/EEC;
- it is not capable of transmitting any data or instruction into the weighing instrument, other than to release a printout, checking for correct data transmission or validation;
- it prints weighing results and other data as received from the weighing instrument without any modification or further processing; and
- it complies with the applicable requirements of Directive 2004/22/EC Paragraph 8.1 of Annex I.

4.2.3 When the instrument detects that a vehicle weighing was over the maximum permitted weighing speed or a wheel weight of that vehicle exceeded the transducer capacity or the vehicle weight was outside the permitted weighing range, then the weight on the report file and the printout will be left blank, and ‘OverSpeed’, ‘OverCapacity’, ‘AboveMaximum’ or ‘BelowMinimum’ will be displayed and printed next to that vehicle, as appropriate.

5 APPROVAL CONDITIONS

The certificate is issued subject to the following conditions:

5.1 Legends and inscriptions

The following legends are durably and legibly marked on the ME-TrackWeigh controller (Figure 6):

- ‘CE’ marking
- Supplementary metrology marking
- Notified body identification number
- Certificate number
- Manufacturer’s mark or name
- Accuracy classes

6 LOCATION OF SEALS AND VERIFICATION MARKS

6.1 The ‘CE’ mark shall be impossible to remove without damaging it. The rating plate shall be impossible to remove without it being destroyed.

The markings and inscriptions shall fulfil the requirements of Paragraph 9 of Annex I of the Directive 2004/22/EC.

6.2 The controller and the track side system shall bear the same serial number.

6.3 Components that may not be dismantled or adjusted by the user (ME-CANAMPs seal location, Figure 7), shall be secured by either a wire and seal or tamper evident label and securing mark. The securing mark may be either:

- A mark of the manufacturer and/or manufacturer’s representative, or
- An official mark of a verification officer.

6.4 Whenever the metrological characteristics of the system are modified, a new configuration code is issued by authorised personnel in presence of the verifier. This code is an integer number and can be displayed by viewing the configuration page of the RailMaster program and looking for the 'calibrationcounter' parameter. This code must then be written on a tamper-evident label on or near the rating plate to ensure the configuration has not been altered since the last verification.

7 ALTERNATIVES

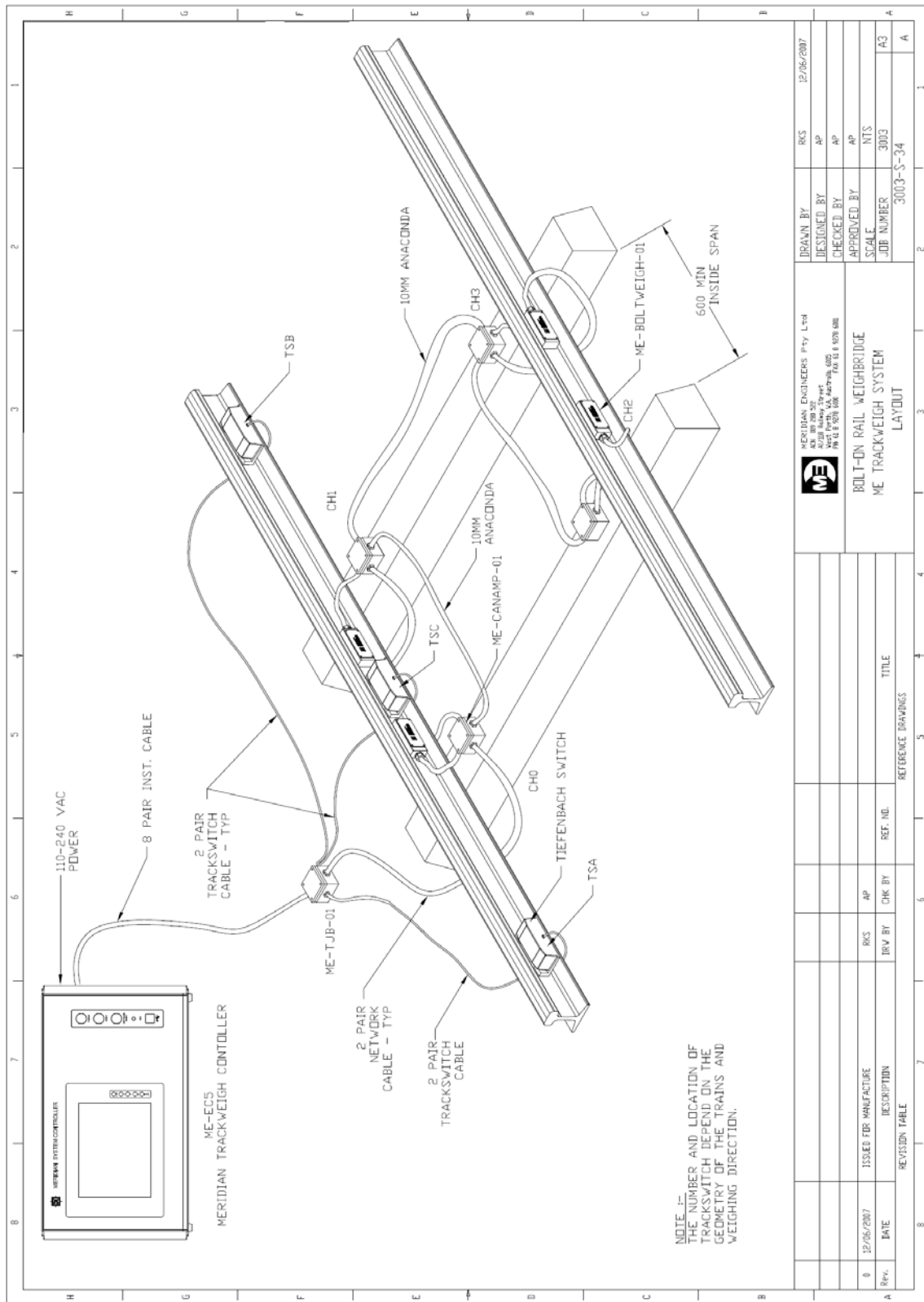
There are at present no alternatives.

8 ILLUSTRATIONS

- Figure 1 System overview
- Figure 2 MAIN page
- Figure 3 CONFIGURATION page
- Figure 4 REPORTS page
- Figure 5 LOGS page
- Figure 6 Typical report print-out
- Figure 7 Rating plate (Port of Tyne application)
- Figure 8 Location of seal on load cell connection

CERTIFICATE HISTORY

ISSUE NO.	DATE	DESCRIPTION
UK/0126/0020	21 February 2008	Type examination certificate first issued.
-	-	No revisions have been issued.



REVISION TABLE		REFERENCE DRAWINGS	
REV.	DATE	ISSUED FOR MANUFACTURE	DESCRIPTION
0	12/06/2007	RKS AP	
1		DRV BY	CHK BY
		REF. NO.	TITLE
		BOLT-ON RAIL WEIGHBRIDGE ME TRACKWEIGH SYSTEM LAYOUT	
		 MERIDIAN ENGINEERS Pty Ltd 401, 403, 405, 407, 409, 411, 413, 415, 417, 419, 421, 423, 425, 427, 429, 431, 433, 435, 437, 439, 441, 443, 445, 447, 449, 451, 453, 455, 457, 459, 461, 463, 465, 467, 469, 471, 473, 475, 477, 479, 481, 483, 485, 487, 489, 491, 493, 495, 497, 499, 501, 503, 505, 507, 509, 511, 513, 515, 517, 519, 521, 523, 525, 527, 529, 531, 533, 535, 537, 539, 541, 543, 545, 547, 549, 551, 553, 555, 557, 559, 561, 563, 565, 567, 569, 571, 573, 575, 577, 579, 581, 583, 585, 587, 589, 591, 593, 595, 597, 599, 601, 603, 605, 607, 609, 611, 613, 615, 617, 619, 621, 623, 625, 627, 629, 631, 633, 635, 637, 639, 641, 643, 645, 647, 649, 651, 653, 655, 657, 659, 661, 663, 665, 667, 669, 671, 673, 675, 677, 679, 681, 683, 685, 687, 689, 691, 693, 695, 697, 699, 701, 703, 705, 707, 709, 711, 713, 715, 717, 719, 721, 723, 725, 727, 729, 731, 733, 735, 737, 739, 741, 743, 745, 747, 749, 751, 753, 755, 757, 759, 761, 763, 765, 767, 769, 771, 773, 775, 777, 779, 781, 783, 785, 787, 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1489, 1491, 1493, 1495, 1497, 1499, 1501, 1503, 1505, 1507, 1509, 1511, 1513, 1515, 1517, 1519, 1521, 1523, 1525, 1527, 1529, 1531, 1533, 1535, 1537, 1539, 1541, 1543, 1545, 1547, 1549, 1551, 1553, 1555, 1557, 1559, 1561, 1563, 1565, 1567, 1569, 1571, 1573, 1575, 1577, 1579, 1581, 1583, 1585, 1587, 1589, 1591, 1593, 1595, 1597, 1599, 1601, 1603, 1605, 1607, 1609, 1611, 1613, 1615, 1617, 1619, 1621, 1623, 1625, 1627, 1629, 1631, 1633, 1635, 1637, 1639, 1641, 1643, 1645, 1647, 1649, 1651, 1653, 1655, 1657, 1659, 1661, 1663, 1665, 1667, 1669, 1671, 1673, 1675, 1677, 1679, 1681, 1683, 1685, 1687, 1689, 1691, 1693, 1695, 1697, 1699, 1701, 1703, 1705, 1707, 1709, 1711, 1713, 1715, 1717, 1719, 1721, 1723, 1725, 1727, 1729, 1731, 1733, 1735, 1737, 1739, 1741, 1743, 1745, 1747, 1749, 1751, 1753, 1755, 1757, 1759, 1761, 1763, 1765, 1767, 1769, 1771, 1773, 1775, 1777, 1779, 1781, 1783, 1785, 1787, 1789, 1791, 1793, 1795, 1797, 1799, 1801, 1803, 1805, 1807, 1809, 1811, 1813, 1815, 1817, 1819, 1821, 1823, 1825, 1827, 1829, 1831, 1833, 1835, 1837, 1839, 1841, 1843, 1845, 1847, 1849, 1851, 1853, 1855, 1857, 1859, 1861, 1863, 1865, 1867, 1869, 1871, 1873, 1875, 1877, 1879, 1881, 1883, 1885, 1887, 1889, 1891, 1893, 1895, 1897, 1899, 1901, 1903, 1905, 1907, 1909, 1911, 1913, 1915, 1917, 1919, 1921, 1923, 1925, 1927, 1929, 1931, 1933, 1935, 1937, 1939, 1941, 1943, 1945, 1947, 1949, 1951, 1953, 1955, 1957, 1959, 1961, 1963, 1965, 1967, 1969, 1971, 1973, 1975, 1977, 1979, 1981, 1983, 1985, 1987, 1989, 1991, 1993, 1995, 1997, 1999, 2001, 2003, 2005, 2007, 2009, 2011, 2013, 2015, 2017, 2019, 2021, 2023, 2025, 2027, 2029, 2031, 2033, 2035, 2037, 2039, 2041, 2043, 2045, 2047, 2049, 2051, 2053, 2055, 2057, 2059, 2061, 2063, 2065, 2067, 2069, 2071, 2073, 2075, 2077, 2079, 2081, 2083, 2085, 2087, 2089, 2091, 2093, 2095, 2097, 2099, 2101, 2103, 2105, 2107, 2109, 2111, 2113, 2115, 2117, 2119, 2121, 2123, 2125, 2127, 2129, 2131, 2133, 2135, 2137, 2139, 2141, 2143, 2145, 2147, 2149, 2151, 2153, 2155, 2157, 2159, 2161, 2163, 2165, 2167, 2169, 2171, 2173, 2175, 2177, 2179, 2181, 2183, 2185, 2187, 2189, 2191, 2193, 2195, 2197, 2199, 2201, 2203, 2205, 2207, 2209, 2211, 2213, 2215, 2217, 2219, 2221, 2223, 2225, 2227, 2229, 2231, 2233, 2235, 2237, 2239, 2241, 2243, 2245, 2247, 2249, 2251, 2253, 2255, 2257, 2259, 2261, 2263, 2265, 2267, 2269, 2271, 2273, 2275, 2277, 2279, 2281, 2283, 2285, 2287, 2289, 2291, 2293, 2295, 2297, 2299, 2301, 2303, 2305, 2307, 2309, 2311, 2313, 2315, 2317, 2319, 2321, 2323, 2325, 2327, 2329, 2331, 2333, 2335, 2337, 2339, 2341, 2343, 2345, 2347, 2349, 2351, 2353, 2355, 2357, 2359, 2361, 2363, 2365, 2367, 2369, 2371, 2373, 2375, 2377, 2379, 2381, 2383, 2385, 2387, 2389, 2391, 2393, 2395, 2397, 2399, 2401, 2403, 2405, 2407, 2409, 2411, 2413, 2415, 2417, 2419, 2421, 2423, 2425, 2427, 2429, 2431, 2433, 2435, 2437, 2439, 2441, 2443, 2445, 2447, 2449, 2451, 2453, 2455, 2457, 2459, 2461, 2463, 2465, 2467, 2469, 2471, 2473, 2475, 2477, 2479, 2481, 2483, 2485, 2487, 2489, 2491, 2493, 2495, 2497, 2499, 2501, 2503, 2505, 2507, 2509, 2511, 2513, 2515, 2517, 2519, 2521, 2523, 2525, 2527, 2529, 2531, 2533, 2535, 2537, 2539, 2541, 2543, 2545, 2547, 2549, 2551, 2553, 2555, 2557, 2559, 2561, 2563, 2565, 2567, 2569, 2571, 2573, 2575, 2577, 2579, 2581, 2583, 2585, 2587, 2589, 2591, 2593, 2595, 2597, 2599, 2601, 2603, 2605, 2607, 2609, 2611, 2613, 2615, 2617, 2619, 2621, 2623, 2625, 2627, 2629, 2631, 2633, 2635, 2637, 2639, 2641, 2643, 2645, 2647, 2649, 2651, 2653, 2655, 2657, 2659, 2661, 2663, 2665, 2667, 2669, 2671, 2673, 2675, 2677, 2679, 2681, 2683, 2685, 2687, 2689, 2691, 2693, 2695, 2697, 2699, 2701, 2703, 2705, 2707, 2709, 2711, 2713, 2715, 2717, 2719, 2721, 2723, 2725, 2727, 2729, 2731, 2733, 2735, 2737, 2739, 2741, 2743, 2745, 2747, 2749, 2751, 2753, 2755, 2757, 2759, 2761, 2763, 2765, 2767, 2769, 2771, 2773, 2775, 2777, 2779, 2781, 2783, 2785, 2787, 2789, 2791, 2793, 2795, 2797, 2799, 2801, 2803, 2805, 2807, 2809, 2811, 2813, 2815, 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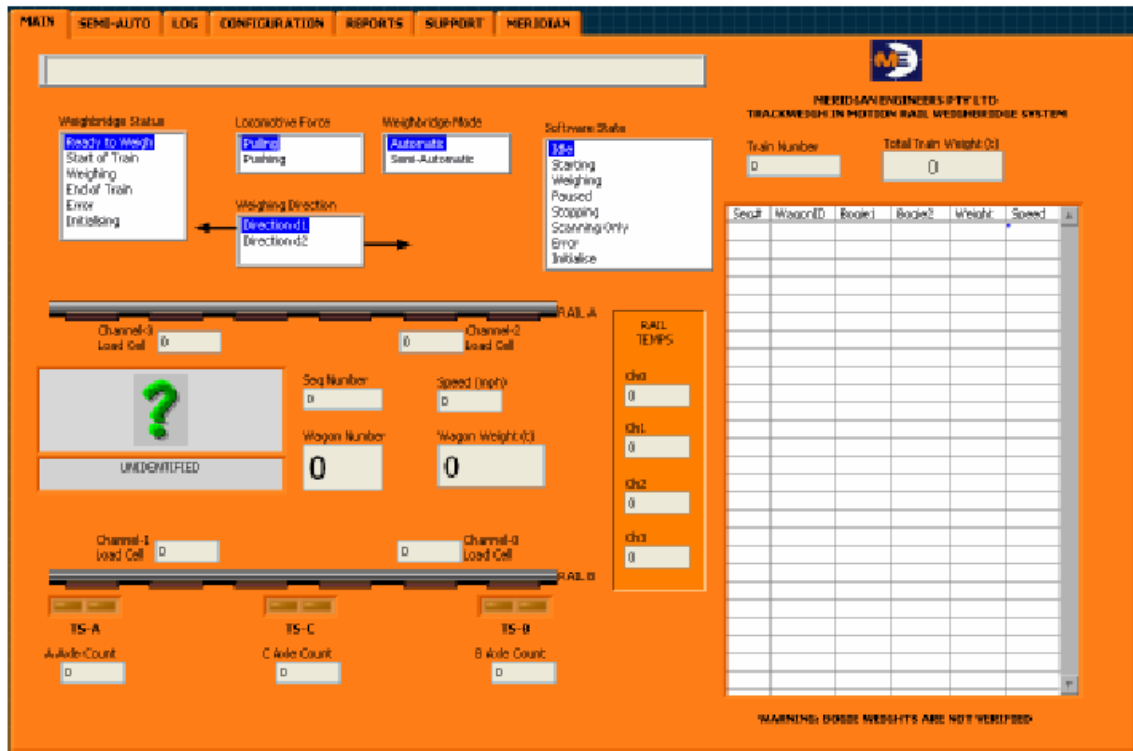


Figure 2 MAIN page

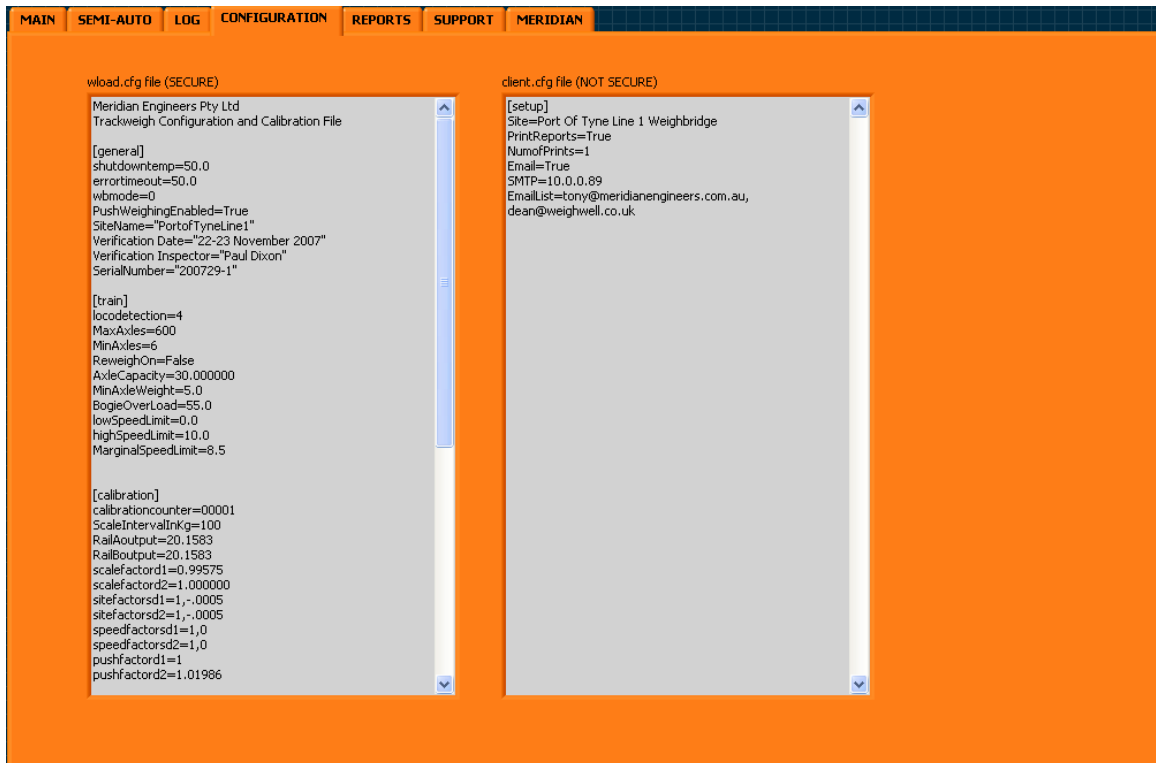


Figure 3 CONFIGURATION page

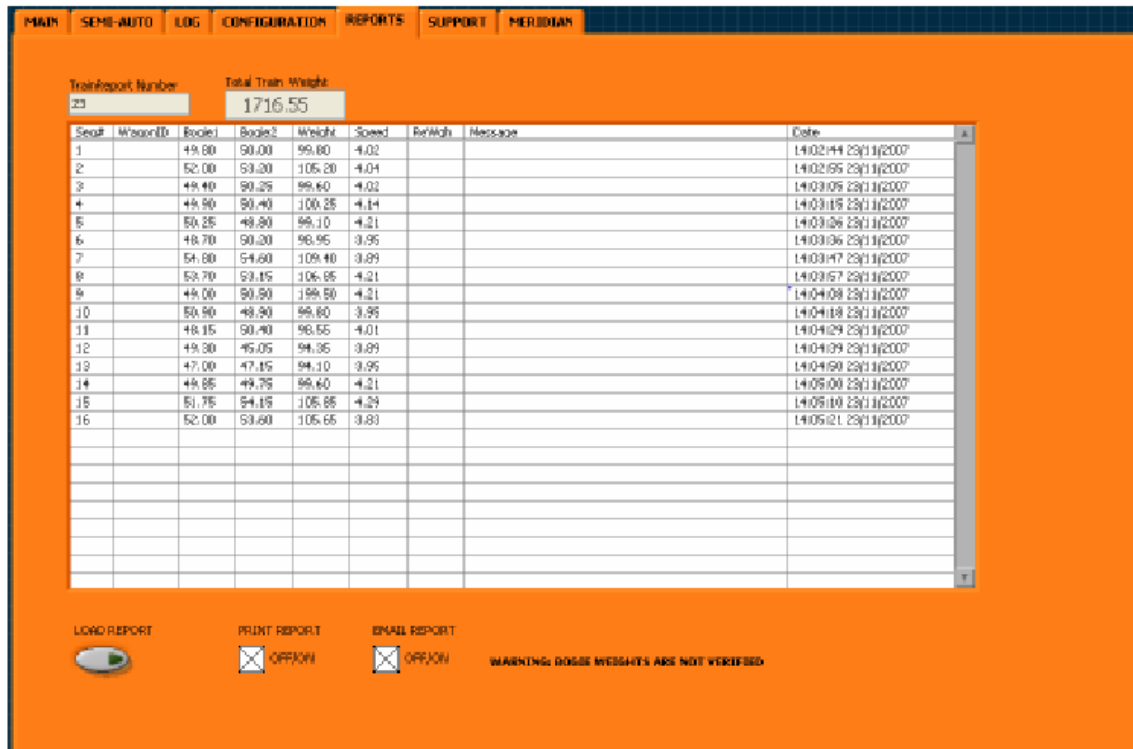


Figure 4 REPORTS page

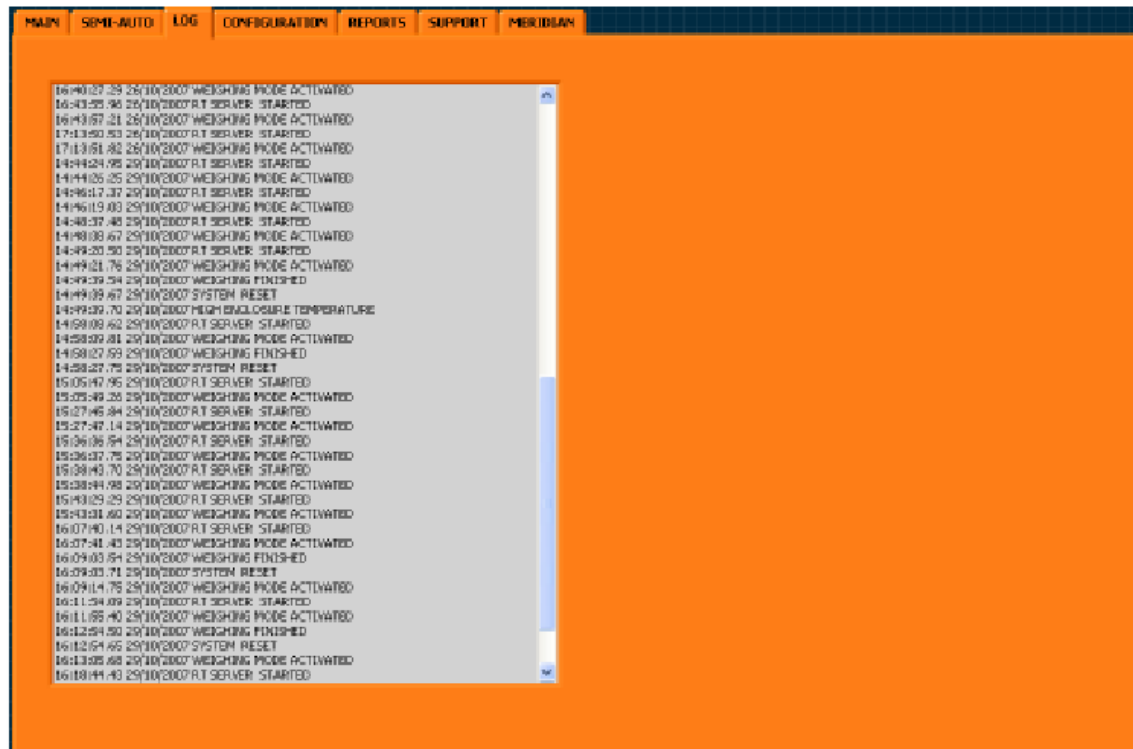


Figure 5 LOG page

Port Of Tyne Line 2 Weighbridge

Weighbridge Serial#: 200724-

2

Weighbridge File#: 35

Date: 23/11/2007

Start Time: 16:05

End Time: 16:10

WAG#	RUN#	B1(t)	B2(t)	Wgt(t)	Spd (mph)	MSG
	1	48.8	49.1	97.9	2.46	
	2	46.9	48.55	95.5	3.08	
	3	47	49.65	96.6	2.98	
	4	46.85	50.65	97.5	2.91	
	5	50.6	52.2	102.8	2.91	
	6	51.5	51.45	102.95	3.01	
	7	51.75	51	102.7	3.01	
	8	48.35	49.05	97.4	3.04	
	9	46.75	45.85	92.6	2.88	
	10	44.05	48.4	92.45	3.01	
	11	49.05	46.5	95.6	2.88	
	12	47.1	50.15	97.25	2.97	
	13	48.95	48.15	97.1	3.04	
	14	51.8	52.5	104.3	2.91	
	15	53	53.95	106.95	2.85	
	16	48.95	48	96.95	2.81	
	17	47.55	49.5	97	2.88	
	18	49.15	49.1	98.25	2.91	
	19	49.05	48.35	97.4	2.94	
	20	51.85	51.55	103.35	2.88	
	21	48.85	48.9	97.75	2.87	

Total Train Weight: 2070.30 Tonnes

Warning: Bogie Weights are not verified

Notes: Train Weight only includes the last weight recording of each wagon

Invalid weighings are not included in the train weight total

Weighbridge Manufacturer: Meridian Engineers Pty Ltd

Weighbridge Model: TrackWeigh-1BXD

NWML Approval Number:

UK/0126/0020

Train Weighing Accuracy Class: 0.5

Wagon Weighing Accuracy Class: 2.0

Certification Status: Certified for Trade, 23rd November 2007

File Security Key:

Figure 6 Typical report print-out



 MERIDIAN ENGINEERS PTY LTD	
Model designation	TRACK-WEIGH -1BxD
Serial number	200722-1
Power Supply	230VAC, 50/60 Hz
NWML Approval	UK/0126/0020
Accuracy classes:	
Train weighing	0.5
Wagon weighing	2.0
Maximum capacity (Axle)	30t
Minimum capacity (Axle)	5t
Scale interval	100kg
Maximum operating speed	6.0kph
Minimum operating speed	0.1kph
Direction of Pulling	Bidirectional
No. Partial Weighings/Wagon	4
Weighing Method	Inmotion, Coupled
Weighing Mode	Locomotive Pulled
Number of Wagons	
n _{min.}	10
n _{max.}	30
	

Figure 7 Rating plate (Port of Tyne application)

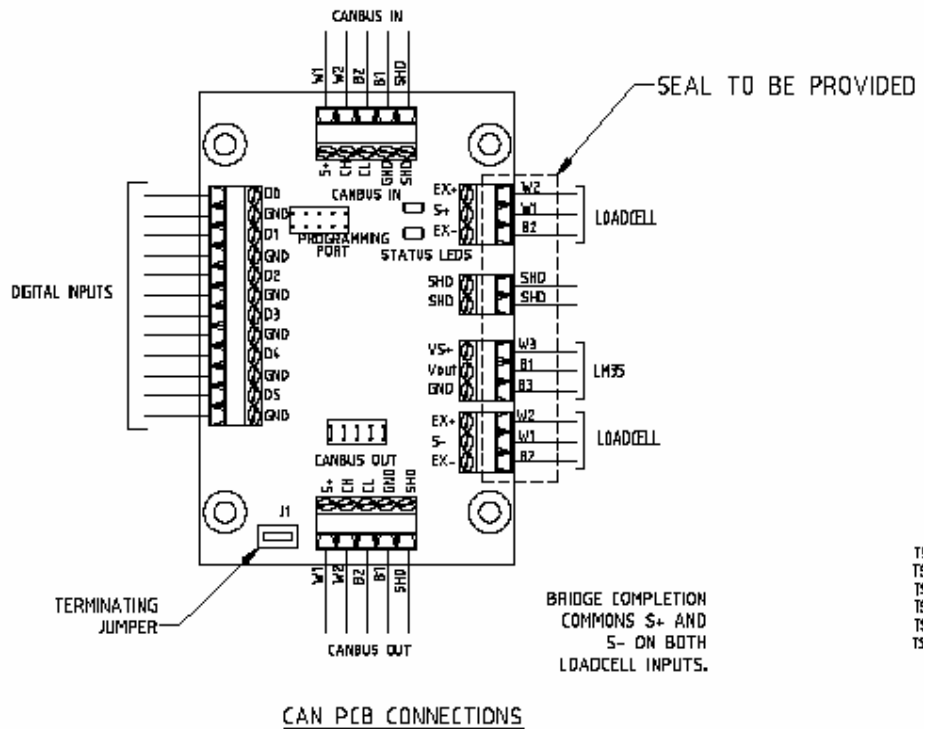


Figure 8 Location of seal on load cell connection