Product Type Approval Certificate

Full

This certificate is issued to:

Supplier name and address:	Frauscher Sensor Technology Unit 3 / 435 Williamstown Road, Port Melbourne, VIC 3207 Australia

In respect of:

Manufacturer:	Frauscher Sensor Technology
Place of manufacture:	Austria
Product description:	Frauscher Axle Counter System FAdC R2 System components forming this approval are listed in Annexure 1
Use approved for:	Rail Vehicle Detection
Conditions of approval:	Annexure 2 details conditions on this approval
Limitations:	Approved for use to detect wheels complying with Vehicle type 20 as defined in Frauscher document D5686 Revision 6.

Evaluating rail transport operator

Name:	Andrew Gardner
Position:	Director Signals & Control Systems, Engineering
Signature:	Andrew Gardner
Date:	Digitally signed by Andrew Gardner Date: 2025.06.18 15:46:51 +10'00'

Product approval pack reference number: fA18247633

Annexure 1 – List of Type Approved Items-

This revision (Revision 3) of the Axle Counter System Type Approval Certificate has been issued to reflect a number of component updates within the approved Frauscher FAdC axle counter system. These updates involve the replacement of several hardware components with newer versions that maintain backward compatibility and do not require changes to the existing infrastructure.

Superseded components may continue to be used as maintenance spares in systems originally configured with those versions, under the conditions of the previous approval. For new system designs, the updated components listed in this revision shall be used.

Where a system is configured for a later revision, the use of earlier versions is not permitted, as they are not compatible with the system configuration.

The items listed in the table below have been assessed as part of this type approval. The key updates included in this revision are as follows:

Wheel Sensor

1. The RSR180-001 GS05 wheel sensor replaces the previous approved RSR180/S-250 GS03. The GS05 is available with tail cable length of 5 m, 10 m, 15 m, and 25 m. The 30 m cable version has been discontinued.

2. The GS05 variant is designed for mounting on either the SK140 or SK150 rail claw:
    a. When mounted with the SK140, the sensor head shall be fastened with a maximum torque of 15 Nm.
    b. When mounted with SK150, a standard torque of 40 Nm applies, consistent with all adjustment-related torque specifications for SK150.

3. The RSR180-001 GS05 is fully backward compatible with the RSR180/S-250 GS03 and can be used as a like-for-like replacement with no infrastructure change required.

Note: The GS05 has a centre cable entry, whereas the RSR180/S-250 GS03 variant has a side-entry cable.

Evaluator Board

- The current type approved Evaluator Board AEB101 GS04 has been superseded by the AEB101 GS07 and AEB101 GS09. The AEB101 GS07 and AEB101 GS09 are physically identical, with the only difference being the firmware version, which was

developed to address bugs. No changes in functionality or new features were introduced.

- The GS09 is backward compatible and suitable for use in place of earlier evaluator board versions.

Communication Board

- The current type-approved communication board version, COM-AdC101 GS01, has been superseded by COM-AdC101 GS02. The GS02 has been designed as a like-for-like replacement, offering the same functionality and full interchangeable with the GS01.

Input/Output Board

- The currently approved Input/Output Extension Boards, IO-EXB101 GS01, has been superseded by version GS02. In GS02, the programmable logic device (PLD) was replaced to address component availability issues and ensure long-term supply.

- The updated GS02 version is fully backward compatible.

Item Number	Hardware	Part Number / Software Version
1	Wheel Sensor RSR180-001 GS05 (5 m cable)	23320
2	Wheel Sensor RSR180-001 GS05 (10 m cable)	23529
3	Wheel Sensor RSR180-001 GS05 15m Cable	23531
4	Wheel Sensor RSR180-001 GS05 25m Cable	26786
5	Protection tube flame-resistant 4.8m	12205
6	Protection tube flame-resistant 9.8m	14475
7	Protection tube flame-resistant 14.8m	17443
8	Protection tube flame-resistant 24.8m	16906
9	Rail Claw SK140	10021
10	Low profile rail claw SK-140-010	21345
11	Rail Claw SK150	22288
12	Cable Entry KER20	10115
13	Clamping Bolt BBK 22 (Pairs)	10025
14	QUANTE Cable box SKV20 GAK (Complete)	10034
15	QUANTE Cable box SKV20 GAK (Without Foot)	12970
16	Overvoltage protection BSI004 GS01 (Conformal Coating)	18571

Item Number	Hardware	Part Number / Software Version
17	Rail Sensor Deflector	640001
18	Backplane BP-PWR101-0 8TE GS01	19952
19	Backplane BP-PWR101-4 24TE GS01	19953
20	Backplane BP-PWR101-8 40TE GS01	19954
21	Backplane BP-EXB101-1 10TE GS01	19956
22	Backplane BP-EXB101-2 16TE GS01	19957
23	Backplane BP-EXB101-4 28TE GS01	19958
24	Backplane BP-EXB101-8 52TE GS01	19959
25	Backplane connection BP-EXB (Crimp)	21441
26	Backplane connection BP-EXB (Solder)	18159
27	Board rack BGT07 84TE	17390
28	Board rack BGT08 42TE	17391
29	Evaluation Board AEB101 GS07	26534
30	Evaluation Board AEB101 GS09	110302
31	Supply Board PSC101 GS01	19949
32	Communication Board COM-AdC101 GS02	23152
33	Communication Board COM-FSE101 GS02	22867
34	Communication Board COM-FSE101 GS04	110206
35	Communication Board COM-WNC101 GS01	22503
36	Communication Board COM-FSFB101 GS02	22443
37	Communication Board COM-FSFB101 GS04	110279
38	Communication Board COM-RP101 GS01	21626
39	Communication Board COM-RP101 GS03	110338
40	Input/output Board IO-EXB101 GS02	110323
41	Diagnostic System FDS101 GS01 for FAdC	21117
42	Diagnostic System FDS102 GS01 for FAdC	26795
43	Alstom specific FDS101 SNMP GS01	21118
44	Patch Cable UTP Cat.5e 1.0m yellow	15709
45	Patch Cable S/STP Cat.6 Crossover 0.5 m grey for hotlink	21058
46	Patch Cable S/STP Cat.6 Crossover 1.0 m grey for hotlink	21059
47	Patch Cable S/STP Cat.6 Crossover 2.0 m grey for hotlink	21060
48	Patch Cable S/FTP Cat.6 0.5 m green	18058
49	Patch Cable S/FTP Cat.6 1.0 m green	18059
50	Patch Cable S/FTP Cat.6 2.0 m green	18060

51	Advanced Service Display ASD101 GS01 (R2) – Version 2.4.1	20865
52	Tool set for mounting and maintenance	17707
53	Testing plate (Dummy wheel) PB200	21512

Table 1 – FAdC R2 Hardware required for Type Approval.

Note: In this revision, the above table has been updated to reflect the addition of new items, the removal of obsolete components, and the replacement of existing ones where applicable. The item number have also been revised to match the outdated structure.

Annexure 2 – Type Approval Conditions

General

1. This is a generic product type approval. The suitability of the type approved product for the proposed site specific application must be assessed against site specific requirements, interfaces, hazards, and conditions and must be supported with an assurance argument as detailed in the TfNSW frameworks and standards.
2. Usage shall be in accordance with TfNSW standards, the RIM's operational standards and procedures, the manufacturer's documentation and application constraints.
3. The manufacturer/vendor must promptly notify TfNSW AMB of any changes made to the product or system that may alter its identification, performance, functional characteristics, risks, assurance, form, fit, or required processes for correct usage. This is to allow a review of the type approval status.
4. TAOs utilising this product or system must verify that the product configuration, including but not limited to model(s), type(s) and version(s), complies with the configuration specified in the type approval.
5. Conclusions about suitability for use under conditions other than what is specified in this approval are not made. Reliance on this approval by any other organisation is entirely at that organisation's own risk.
6. Only items listed in Annexure 1 above ‘Hardware Items for Type Approval’ and 'Software Items for Type approval' shall be utilised.
7. Details of the type approval evaluation are contained in report Frauscher FAdC R2 Type Approval Evaluation version 1.0 ref DSYD2018/637002
8. Details of this revision to the type approval are contained in RP SCE25-0301 Frauscher Advanced Counter (FAdC R2) Component Release Version Update Type Approval Report version 1.0, March 2025.

Equipment

9. BSI0004 Surge protection modules shall be used for connections to RSR180 wheel sensors
10. Clamp mounted detection heads are permitted to be used.
11. Relay interlocking interface to the FAdC R2 shall be via parallel interface board (IO-EXB).
12. Noise suppression is required when driving a BRB Q style relay by the IO-EXB. Suppression is to be placed across the relay coil
13. Not permitted in locations with temperature ranges exceeding -40°C to +70°C

Communications

14. Data communication links for safety communications with this equipment shall be implemented in accordance with TfNSW standard TS 05377 and EN 50129:2020.

15. Interface between the Frauscher FAdC R2 and CBI shall be via COM-XXX board as defined within section 8.1 of the type approval evaluation report. A review of the compatibility with other CBI systems not covered by this approval shall need to be evaluated for future projects.

Design

16. Safety Related Application Conditions (SRACs) to be reviewed and applied in all new or updated applications/installations.

17. To increase availability, system design/architecture shall ensure axle counters are split between up and down line sections.

18. For the deployment of any new system, Cyber Security shall be considered in accordance with TS 04991 Cybersecurity for IACS – Baseline Technical Cybersecurity System Requirements and Countermeasures and its associated documents

19. Maximum interface cable lengths shall be run in compliance to Frauscher's requirements as identified in Table 4.6 of the 'System Documentation' document (D21001 V5.0).

20. The design TAO shall have successfully completed Frauscher’s official training course and hold the corresponding competencies on their Certificate of Competence (CoC).

21. Duplicated COM-XXX boards shall be used for defined high traffic and critical sites.

22. Duplicated PSC boards shall be used for defined high traffic and critical sites.

23. All FAdC R2 system data shall be treated as signal design data and not be modified in the field.

Installation Commission and Maintenance

24. To avoid mutual interference of 2 wheel sensors, the spacing between them shall be at least 2 sleeper bays.

25. Surface run cables running from the wheel sensor to the GAK, laid over ballast, shall be appropriately protected and securely restrained.

26. The Frauscher testing plate shall be used for all testing and set-to-work activities.

27. Both Construction TAOs and Maintenance Personnel shall have completed Frauscher's official installation training course and hold the corresponding competencies on their Certificate of Competence (CoC).

Rolling Stock

28. To ensure conformity to Frauscher's Vehicle Type 20 requirements, any change in Sydney Trains wheel profile type shall require review to ensure conformity to the min/max condemning tolerances allowed by the Type 20 document. Document ref: D5686 Project Specific documentation FAdC R2 – TSC -0x67D1A087 and 0xDC1A2F4B Vehicle Type 020 – RSR180 version 6

29. Maintenance vehicle usage shall be subject to review, with appropriate safeworking measures implemented to enable all vehicle types to operate safely on the network.

Axle Counter Reset

30. Operational Reset procedure shall be required prior to operational use (To be produced as part of the implementation stages of the system)

31. Resetting of the FAdC R2 via direct interface with a Microlok II shall require a reset pulse length to be in the range of 1 to 6 seconds.

32. A review of the compatibility with other CBI systems will need to be evaluated for future projects.

Documentation

33. Applicable Safeworking procedures shall be developed (To be produced as part of the implementation stages of the system)

34. All documentation and manuals from the supplier shall be in English. The Supplier shall advise of any updates to the documents.