Australian Government
Department of Industry, Science, Energy and Resources

National Measurement Institute

36 Bradfield Road, West Lindfield NSW 2070

Certificate of Approval

NMI 6/20A/3

Issued by the Chief Metrologist under Regulation 60
of the
National Measurement Regulations 1999

This is to certify that an approval for use for trade has been granted in respect of the instruments herein described.

Loadrite Model LR916 Wheeled Loader Weighing Instrument

submitted by Loadrite (Auckland) Limited
(formerly Trimble Loadrite Auckland Limited)
45 Patiki Road
Avondale 1026
New Zealand

NOTE: This Certificate relates to the suitability of the pattern of the instrument for use for trade only in respect of its metrological characteristics. This Certificate does not constitute or imply any guarantee of compliance by the manufacturer or any other person with any requirements regarding safety.

This approval has been granted with reference to document NMI R 51, *Automatic Catchweighing Instruments,* dated August 2009.

This approval is subject to review at the decision of the Chief Metrologist in accordance with the conditions specified in the document NMI P 106.

DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern & variant 1 provisionally approved – interim certificate issued	2/08/02
1	Pattern & variant 1 approved – variant 2 provisionally approved – interim certificate issued	3/06/03
2	Pattern & variants 1 & 2 approved – certificate issued	29/10/03
3	Pattern amended (zero device) – notification of change issued	26/11/03
4	Variants 3 to 5 approved – certificate issued	7/02/06

DOCUMENT HISTORY (cont...)

Rev	Reason/Details	Date
5	Pattern & variants 1 to 5 amended (address) & reviewed – notification of change issued	16/06/08
6	Variant 6 provisionally approved – interim certificate issued	2/11/09
7	Variant 6 approved – certificate issued	9/04/10
8	Variants 7 & 8 approved – certificate issued	2/09/11
9	Pattern & variants 1 to 8 reviewed & updated – variant 9 approved – certificate issued	29/08/14
10	Variant 10 approved- certificate issued	13/12/16
11	Submittor name & pattern amended and review date removed– certificate issued	29/06/22

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI (or NSC) 6/20A/3' and only by persons authorised by the submittor.

Instruments purporting to comply with the pattern and variants 1, 2 or 6 and currently marked 'NSC P6/20A/3' may be re-marked with approval number 'NMI (or NSC) 6/20A/3' and only by persons authorised by the submittor.

It is the submittor's responsibility to ensure that all instruments marked with this approval number are constructed as described in the documentation lodged with the National Measurement Institute (NMI) and with the relevant Certificate of Approval and Technical Schedule. Failure to comply with this Condition may attract penalties under Section 19B of the National Measurement Act and may result in cancellation or withdrawal of the approval, in accordance with document NMI P 106.

Auxiliary devices used with this instrument shall comply with the requirements of General Supplementary Certificates No S1/0/A or No S1/0B.

This approval shall NOT be used in conjunction with General Certificate No 6B/0.

Special Conditions of Approval:

For this type of instrument, the ability to perform within the specified maximum permissible errors can depend substantially on characteristics of the wheeled loader to which it is fitted. Some designs of wheeled loaders simply may not be suitable for attachment of this weighing instrument, however the National Measurement Institute is unable to clearly define particular wheeled loaders, or categories of wheeled weighers, for which the instrument is unsuitable.

It is the responsibility of the submittor (Loadrite (Auckland) Limited) to exercise control over any installation to ensure compliance with this approval and to ensure performance within the appropriate maximum permissible errors.

In the event of unsatisfactory performance this approval may be withdrawn.

Signed by a person authorised by the Chief Metrologist to exercise their powers under Regulation 60 of the *National Measurement Regulations 1999*.

Darryl Hines
Manager
Policy and Regulatory
Services

TECHNICAL SCHEDULE No 6/20A/3

1. Description of Pattern

provisionally approved on 2/08/02
approved on 3/06/03
amended on 29/06/22

The Loadrite model LR916 class Y(b) automatic catchweighing instrument of 5000 kg maximum capacity with a verification scale interval of 50 kg fitted to a Volvo model 120 wheeled loader.

The Loadrite model LR916 automatic catchweighing instrument comprises electronic equipment and sensors attached to a wheeled loader (i.e. typically 'front end loader') which automatically determine the load lifted by the lifting mechanism of the loader during the lifting process. Figure 1 shows a typical installation.

The electronic equipment and sensors are described below.

Instruments may be fitted with output sockets (output interfacing capability) for the connection of auxiliary and/or peripheral devices.

1.1 Pressure Sensor(s)

One or two Loadrite model LC965 or LC340 pressure sensors (Figure 2) are used, depending on the type of lifting system involved.

1.2 Position Reference/Lift Speed/Direction Sensor (Figure 3)

The system has either a Loadrite model LM960 optical arm-location sensor or a Loadrite model LR908 spring-loaded rotary encoder type arm-location sensor. The sensor is programmed for a number of trigger points and can provide alarms if the lift is outside acceptable limits.

In addition the sequence of operation of the trigger points establishes the direction of travel of the lifting arm (ascending or descending).

1.3 Load Receptor ('Bucket') Location Sensor

This sensor is located to detect when the load receptor (bucket) is in the correct location (i.e. the bucket is fully rotated 'crowded' back, so that the load will fall into the centre of the bucket). The system will inhibit weighing if the load receptor is not in this location.

1.4 Loadrite Model LR916 Computing, Keyboard and Display Unit

The Loadrite LR916 electronic computing, keyboard and display unit (Figure 4) has a liquid crystal display (LCD) on which the weighing results as well as instructions, alarm or error messages are displayed.

A keyboard for operation of the unit is also provided.

1.5 Printer

A printing unit (typically that shown in Figure 5) is attached to the LR916 computing, keyboard and display unit.

The printing unit can print load tickets automatically or by manual command. The printout will print information to identify the particular 'delivery' (a unique job number, time and date), the weight value of each load (lift), together with a total of the loads.

Additional information may also be printed (product description, customer name etc).

1.6 Additional Features

The system has certain additional functions:

- A function in which a particular target total weight is set. The material is delivered (e.g. loaded into a truck) by a number of lifts, and after each lift the display provides an indication of the material still to be delivered to obtain the target total weight.
- A totalisation facility.
- An ‘auto enter’ facility allowing each weight value to be automatically accepted (added to total and printed).
- Provision for storage of customer details.
- Provision for storage of product details.
- Provision for storage of pre-set target total values.
- Provision for storage of batch data (e.g. recipes of various target totals of different products).

The instrument may have other additional functions. These functions (other than the indications of measured mass - i.e. gross, tare, net, totals - displayed either on the indicator or on an auxiliary or peripheral device), are not approved for trade use.

1.7 Alternative Load Receptor

It is possible for the system to be calibrated with an alternative load receptor (i.e. different attachment to the lifting system). The system shall be verified/certified for each load receptor, and clear identification of the attachment shall be provided and shall correspond to the identification of the attachment in use which is indicated at the top right of the instrument display (i.e. as ‘Ready 1’ or ‘Ready 2’).

1.8 Power Supply

The instrument is powered by the vehicle power supply (battery) of 12 or 24 V DC.

1.9 Zero

A zero setting operation may be selected using the zero button of the instrument, or it may be requested automatically by the system (e.g. after completion of a delivery, after a time period, or after a number of lifts have been carried out without zeroing).

Zero is set (to within ±0.25e) by raising the empty load receptor a number of times (according to instructions on the display). The display show ‘ZERO UPDATED’ to indicated when zero has been set.

The instrument has an initial zero-setting device with a nominal range of not more than 20% of the maximum capacity of the instrument.

1.10 Display Check

A display check is initiated whenever power is applied.

1.11 Descriptive Markings and Notices

Instruments carry the following markings:

Manufacturer's mark, or name written in full	Loadrite (Auckland) Limited (*)
Name or mark of manufacturer's agent	.....
Indication of accuracy class	class Y(b)
Pattern approval mark for the instrument	NMI (or NSC) No 6/20A/3
Maximum capacity	*Max* ..... kg #1
Minimum capacity	*Min* ..... kg #1
Verification scale interval	*e* = ... kg #1
Serial number of the instrument .	..... #2

#1 These markings shall also be shown near the display of the result if they are not already located there.

#2 Serial numbers of some components of the system (e.g. indicator, sensor) may be displayed when the indicator is in 'STANDBY' mode, which can be accessed by pressing the 'EXIT' button.

(*) 'Loadrite (Auckland) Limited' may also be shown as 'Trimble Loadrite Auckland Limited' or 'Actronic Ltd'.

In addition, the value of the calibration event counter at the time of verification shall be recorded on a destructible adhesive label attached to the instrument (refer to clause 1.13).

1.12 Verification Provision

Provision is made for the application of a verification mark.

1.13 Sealing Provision

The calibration and set-up of the indicator shall be secured with a password. To check that a password has been set, attempt to enter the calibration ('SET UP') menu as follows:

- Press '6' ('MENU SETUP' is displayed) and then press 'ENT' ('SETUP CODE?' is displayed).
- Press '1', '2', '3', '4', and 'ENT'.
- 'ACCESS DENIED' should be displayed to show that entry to the SET UP menu is password protected.

Pressing the EXIT key will exit this mode and return to the main menu.

In addition a non-resettable calibration event counter increments each time that the calibration mode is accessed. The value of the calibration event counter is shown in the display (e.g. "CAL 123") as part of the power-up display sequence, and the value at the time of verification shall be recorded on a destructible adhesive label attached to the instrument.

Any subsequent alteration to the calibration or parameters will be evident as the recorded value and the current calibration event counter value will differ.

2. Description of Variant 1 provisionally approved on 2/08/02
approved on 3/06/03

The Loadrite model LR916 class Y(b) automatic catchweighing instrument similar to the pattern but fitted to different wheeled loaders which may also have different maximum capacities.

Instruments are approved for use with up to 250 verification scale intervals.

3. Description of Variant 2 provisionally approved on 3/06/03

The Loadrite model LR916 class Y(b) automatic catchweighing instrument similar to the pattern and variant 1 but fitted to various forklifts of various maximum capacities.

Instruments are approved for use with up to 250 verification scale intervals.

4. Description of Variant 3 approved on 6/2/06

The Loadrite model LR918 which may also be known as the Loadrite model PRO. The instrument is as for the pattern (and variants 1 and 2) except that a model LR918 (PRO) computing, keyboard and display unit is used (Figure 7); this unit is the same as the model LR916, except that it has a redesigned housing, modified keyboard layout, and a number of minor software modifications.

5. Description of Variant 4 approved on 6/2/06

The Loadrite model LR917 computing, keyboard and display unit which may also be known as the Loadrite model EXPRESS (Figure 8); this unit is similar to the model LR918, but has a reduced set of features, and a corresponding alteration to the keyboard layout.

6. Description of Variant 5 approved on 6/2/06

The Loadrite model LR913 computing, keyboard and display unit which may also be known as the Loadrite model FORCE (Figure 9); this unit is similar to the model LR917, but has a further reduced set of features. The instrument does not have any facilities for entering product, customer or vehicle information, nor does it have data capture facilities.

7. Description of Variant 6 provisionally approved on 2/11/09
approved on 8/04/10

The Loadrite model L-2180 class Y(b) automatic catchweighing instrument which is similar to the pattern (model LR916) and the model LR918 except that it uses two Loadrite model LC965B/LC965C pressure sensors, a Loadrite model LR966 angle sensor and the Loadrite model L-Series 2180 computing, keyboard and display unit (Figure 10).

The model L-2180 has a date capture facility using a LD951 data module or wireless link.

Instruments are approved for use with up to 350 verification scale intervals.

8. Description of Variant 7 approved on 2/09/11

The Loadrite model LR917 Express instrument which is similar to model L-2180 except that a model LR917 Express computing, keyboard and display unit is used (Figure 11); this unit is similar to the model L-Series 2180, but has a reduced set of features, and a corresponding alteration to the keyboard layout.

Instruments may be fitted with an alternative Loadrite model 20709 tilt sensor.

9. Description of Variant 8 approved on 2/09/11

The Loadrite model LR913 Force instrument which is similar to variant 7, except that a model LR913 Force computing, keyboard and display unit is used (Figure 12); this unit is similar to the model LR917 Express but has a further reduced set of features. The instrument does not have any facilities for entering product, customer or vehicle information, nor does it have data capture facilities.

10. Description of Variant 9 approved on 29/08/14

The Loadrite model L2150 instrument (Figure 13a) which is similar to variant 7, but has a modified keyboard layout and a dedicated key for entering target weights (as indicated in clause 1.6, this function is not approved for trade use).

The software is designated number 60439 and version 2.xx, where xx refers to the identification of non-legally relevant software as shown Figure 13b.

The software number and version can be seen in the switch-on display sequence (when the power is first applied to the instrument).

11. Description of Variant 10 approved on 13/12/16

The pattern or variants, using a Trimble Loadrite model LC985A or LC985B pressure sensor with a pressure range of 0 – 400 bar (rather than the LC340, LC965, LC965B or LC965C pressure sensors mentioned elsewhere in this certificate).

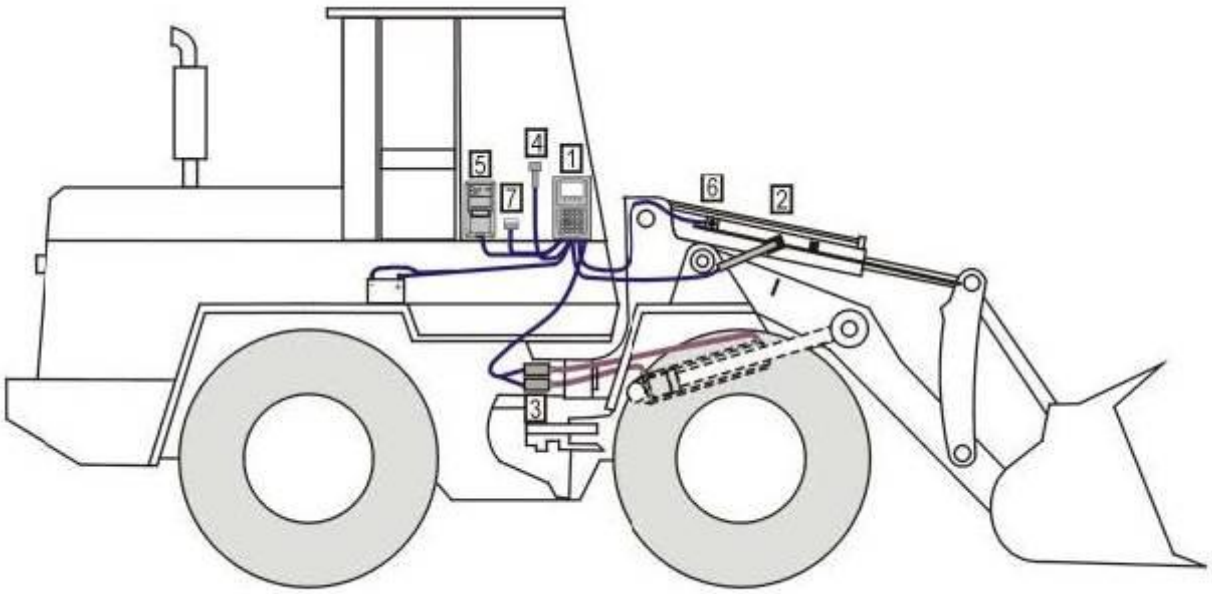
TEST PROCEDURE No 6/20A/3

Instruments shall be tested in accordance with any relevant tests specified in the National Instrument Test Procedures.

Maximum Permissible Errors

The maximum permissible errors are specified in Schedule 1 of the *National Trade Measurement Regulations 2009*.

FIGURE 6/20A/3 – 1



1. Indicator
2. Arm-location sensor
3. Pressure sensors
4. Add button
5. Printer
6. 'Crowded back' sensor
7. Tilt sensor

Typical Loadrite Model LR916 Wheeled Loader Weighing Instrument (Pattern)

FIGURE 6/20A/3 – 2

Typical Loadrite Model LC965 Pressure Sensor Installation

Typical Loadrite Model LC340 Pressure Sensor Installation

FIGURE 6/20A/3 – 3

Typical Loadrite Model LM960 Optical Sensor Installation

Typical Loadrite Model LR908 Rotary Sensor Installation

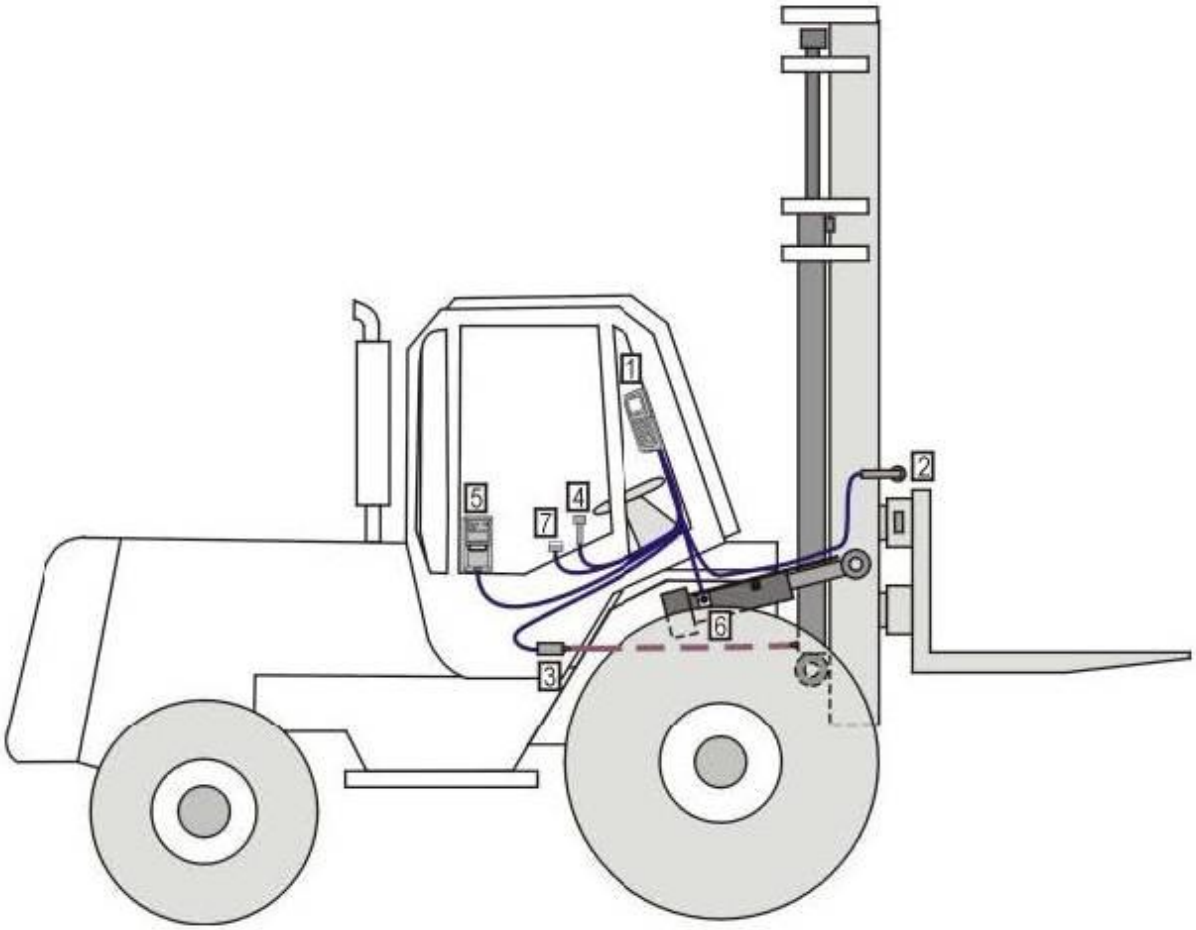
FIGURE 6/20A/3 – 4

Loadrite Model LR916 Computing, Keyboard and Display Unit (Pattern)

FIGURE 6/20A/3 – 5

Typical Printer

FIGURE 6/20A/3 – 6



1. Indicator
2. Arm-location sensor
3. Pressure sensors
4. Add button
5. Printer
6. 'Crowded back' sensor
7. Tilt sensor

Typical Model LR916 Wheeled Loader (Forklift) Weighing Instrument (Variant 2)

FIGURE 6/20A/3 – 7

Model LR918 (aka PRO) Computing, Keyboard and Display Unit (Variant 3)

FIGURE 6/20A/3 – 8

Model LR917 (aka EXPRESS) Computing, Keyboard and Display Unit (Variant 4)

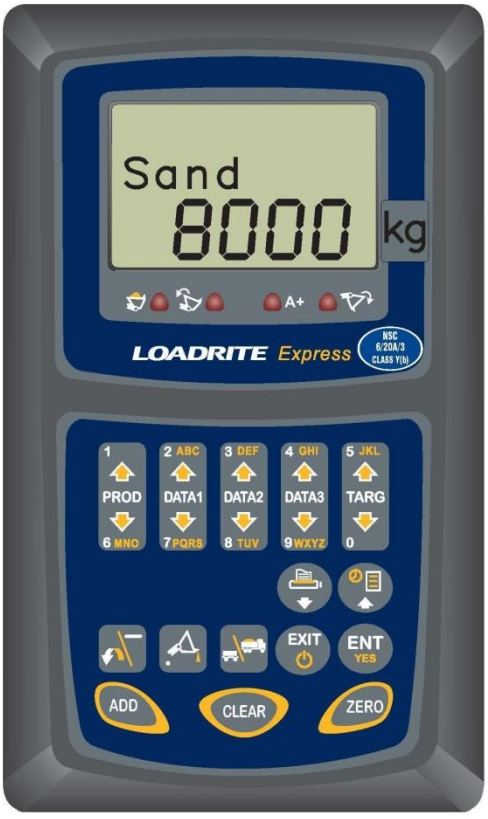


FIGURE 6/20A/3 – 9

Model LR913 (aka FORCE) Computing, Keyboard and Display Unit (Variant 5)

FIGURE 6/20A/3 – 10

Model L-Series 2180 Computing, Keyboard and Display Unit (Variant 6)

FIGURE 6/20A/3 – 11

Model LR917 Express Computing,
Keyboard and Display Unit
(Variant 7)

FIGURE 6/20A/3 – 12

Model LR913 Force Computing,
Keyboard and Display Unit
(Variant 8)

FIGURE 6/20A/3 – 13

(a) Model L2150 Computing, Keyboard and Display Unit (Variant 9)

(b) Model L2150 – Display of Software Version and Number (Variant 9)

~ End of Document ~