



Australian Government
Department of Industry,
Innovation and Science

National Measurement Institute

Certificate of Approval NMI 6/20A/1

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.

RDS Model Loadmaster 9000 Weighing Instrument

submitted by RDS Australia Pty Ltd
6 Logan Court
Mt Ommaney QLD 4074

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 76, *Non-automatic weighing instruments, Parts 1 and 2*, dated July 2004.

This approval becomes subject to review on 1/11/21, and then every 5 years thereafter.

DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern & variants 1 & 2 provisionally approved – interim certificate issued	12/07/02
1	Pattern & variants 1 & 2 approved, variant 3 provisionally approved – interim certificate issued	21/02/03
2	Pattern & variants 1 & 2 approved, variant 3 provisionally approved – certificate issued	4/06/03
3	Pattern & variants 1 to 3 reviewed – variants 4 to 6 approved – certificate issued	28/11/08
4	Variant 7 provisionally approved – interim certificate issued	20/03/09
5	Pattern & variants 1 to 7 reviewed & updated, variant 3 & 7 approved – certificate issued	20/10/16

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI (or NSC) 6/20A/1' and only by persons authorised by the submitter.

It is the submitter'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.

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

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 NMI 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 submitter (RDS Australia Pty Ltd) 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*.



Dr A Rawlinson

TECHNICAL SCHEDULE No 6/20A/1

1. Description of Pattern **provisionally approved on 12/07/02** **approved on 21/02/03**

The RDS model Loadmaster 9000 class Y(b) automatic catchweighing instrument of 5000 kg maximum capacity with a verification scale interval of 50 kg fitted to a Volvo model L90D wheeled loader.

The RDS model Loadmaster 9000 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.

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

The electronic equipment and sensors are described below.

1.1 Pressure Sensor(s)

One or two Danfoss type MBS 4050 (RDS Part No. S/SR/500-2-027) pressure sensors are used, depending on the type of lifting system involved. The strain gauge type pressure sensors measure the pressure acting on the piston in the lift cylinder(s), and if necessary the back pressure.

1.2 Temperature Sensor

The temperature sensor is clamped to the outside of the hydraulic pump, connected to the main lift cylinder. The system is inhibited from working until the hydraulic fluid has reached a suitable operating temperature.

1.3 Position Reference/Lift Speed/Direction Sensors

The correct position for a weight determination is when the loading arm is between these two sensors. The first sensor detects the magnet attached to the loading arm as it passes and initiates the weight determination. The second sensor is activated when the magnet passes it. The time between activation of the two sensors is related to the speed of lift and can provide alarms if the lift speed is outside acceptable limits.

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

1.4 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.

1.5 Level Sensor/Junction Box

A level sensing device attached to the vehicle detects the degree to which the vehicle is tilted from its reference (level) condition and allows the system to disable weight determination if acceptable levels of tilt are exceeded.

The level sensor is contained within a junction box which also houses terminations for the inputs and outputs of the other sensors.

1.6 Loadmaster 9000 Computing and Display Unit

The Loadmaster model 9000 electronic computing, keyboard and display unit (Figure 2) has a liquid crystal display (LCD) on which the weighing results are displayed as well as instructions, and alarm or error messages. The LCD also provides legends for the various menu operation keys located to the right of and below the LCD screen.

Another fifteen keys to the right of the LCD screen include a numeric keypad, an enter button (↵) and the power ON/OFF button.

1.7 Printer

A printing unit (typically an RDS model ICP 200 or ICP 300, Figure 3) is attached to the Loadmaster 9000 computing and display unit.

This 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).

1.8 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).
- A 'live last bucket' facility allowing adjustment of the final lift quantity. Once the quantity has been adjusted the load receptor must be lowered and re-lifted before the weight value is entered.
- 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.

1.9 Alternative Load Receptors

It is possible for the system to be calibrated with a number of different load receptors (i.e. different attachments to the lifting system). The system shall be verified for each different 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 of the instrument display.

1.10 Power Supply

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

1.11 Zero

A zero setting operation may be selected through the menu system (the system uses various pictograms) or it may be requested automatically by the system (e.g. after completion of a delivery, or after a number of lifts have been carried out without zeroing).

Zero is set (to within $\pm 0.25e$) by raising the empty load receptor a number of times (according to instructions on the display). When zero has been set, this is indicated by arrows around the indication (i.e. '>0.00t<').

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

1.12 Tare

The instrument may have provision for a subtractive keyboard entered pre-set tare value of up to maximum capacity to be entered. When a pre-set tare is in operation, the word 'NET' will be shown in the display.

1.13 Sealing Provision

The calibration and set-up of the indicator can be secured with a personal identification number (PIN) code. To check that the code been set, attempt to enter the calibration menu – a PIN code should be requested. Pressing the 'MAIN' key will exit this 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 as part of the power-on 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.

1.14 Descriptive Markings and Notices

Instruments are marked with the following data, together in one location, in the form shown at right:

Manufacturer's mark, or name written in full
Name or mark of manufacturer's agent
Indication of accuracy class, e.g. class Y(b)
Pattern approval number for the instrument	NMI (or NSC) 6/20A/1
Maximum capacity	<i>Max</i> kg #
Minimum capacity	<i>Min</i> kg #
Verification scale interval	<i>e</i> = kg #
Serial number of the instrument

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

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).

1.15 Display Check

A display check is initiated whenever power is applied.


1.16 Verification Provision

Provision is made for the application of a verification mark.

2. Description of Variant 1 **provisionally approved on 12/07/02** **approved on 21/02/03**

The RDS model Loadmaster 9000 as described for the pattern but configured as a class 4 non-automatic weighing instrument.

The instrument is as described above for the pattern (i.e. as an automatic catchweighing instrument) except as detailed below:

- When operating in the non-automatic configuration, a 'kick-out' relay is fitted in the control wiring for the hydraulic lifting system of the loader. This allows the Loadmaster 9000 to stop the lifting arm at the appropriate weighing location, as signalled by the Position Reference/Lift Speed/Direction Sensors. The weight reading is then taken whilst the lifting arm is stationary in the weighing location.
- Automatic entry (totalisation) of weight values is not possible. Weight values must be accepted manually.
- The marking of accuracy class shall be .

3. Description of Variant 2 **provisionally approved on 12/07/02** **approved on 21/02/03**

The RDS model Loadmaster 9000 class Y(b) automatic catchweighing instrument or class 4 non-automatic weighing instrument similar to the pattern or variant 1 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. Instruments configured to operate as non-automatic weighing instruments (variant 1) shall not have less than 100 verification scale intervals

4. Description of Variant 3 **provisionally approved on 21/02/03**

The RDS model Loadmaster 9000 class Y(b) automatic catchweighing instrument or class 4 non-automatic weighing instrument similar to the pattern and variant 1 but fitted to various forklifts of various maximum capacities. Figure 4 shows a typical installation.

Instruments are approved for use with up to 250 verification scale intervals. Instruments configured to operate as non-automatic weighing instruments shall not have less than 100 verification scale intervals.

5. Description of Variant 4 **approved on 28/11/08**

The pattern or variants using an RDS model 9000i display unit and known as an RDS model 9000i weighing instrument.

The RDS model 9000i display unit (Figure 5 – also known as a “type PSI” display unit) is similar to that of the pattern, except that it includes a digital memory card reader/writer, and incorporates a later software version (version PS314-002) that has provision for additional features including a ‘re-weigh’ function which facilitates the subtraction of a reading of the weight of material left in the ‘bucket’ after it has been only partly emptied.

The digital memory card reader/writer has provision for storing client and product data. In addition, for each weighing request, weighing results together with identification including date and time may be stored to the storage device.

The use of stored weighing results for trade use is subject to the agreement of the applicable trade measurement authority (as the stored data is not protected against alteration, it is suggested that this data should not be used in lieu of a printer attached to the instrument).

In any case, data from the storage device shall only be used for trade if the format of the output complies with NMI General Supplementary Certificate S1/0/A.

Note: A Martel Instruments model MCP7800 printer (also known as an RDS model ICP300) may be used with the pattern or variants (the ICP200 printer described in the Technical Schedule of the pattern is a typical example only – other model printers may be used).

6. Description of Variant 5 **approved on 28/11/08**

The pattern or variants using an RDS model 9000i DMM display unit and known as an RDS model 9000i DMM weighing instrument.

The RDS model 9000i DMM display unit is similar to the model 9000i, except that it incorporates modified software (version PS306-051) which implements additional printing and data management facilities.

7. Description of Variant 6 **approved on 28/11/08**

The pattern or variants using an RDS model 9000i Scanner Module display unit and known as an RDS model 9000i Scanner Module weighing instrument.

The RDS model 9000i Scanner Module display unit is similar to the model 9000i, except that it incorporates modified software (version PS309-003) which permits data input (e.g. regarding client or product information) via scanner devices (e.g. barcode scanner), as well as manually.

8. Description of Variant 7 **provisionally approved on 20/03/09**
approved on 20/10/16

With a retractable lifting mechanism (boom) with a boom extension sensor to ensure that the boom is fully retracted during weighing (see Figure 6). In addition, four Danfoss model MBS3050 (or RDS model S/SR/500-2-067) load sensors are fitted to check the lift/crowd/compensation rams.

TEST PROCEDURE No 6/20A/1

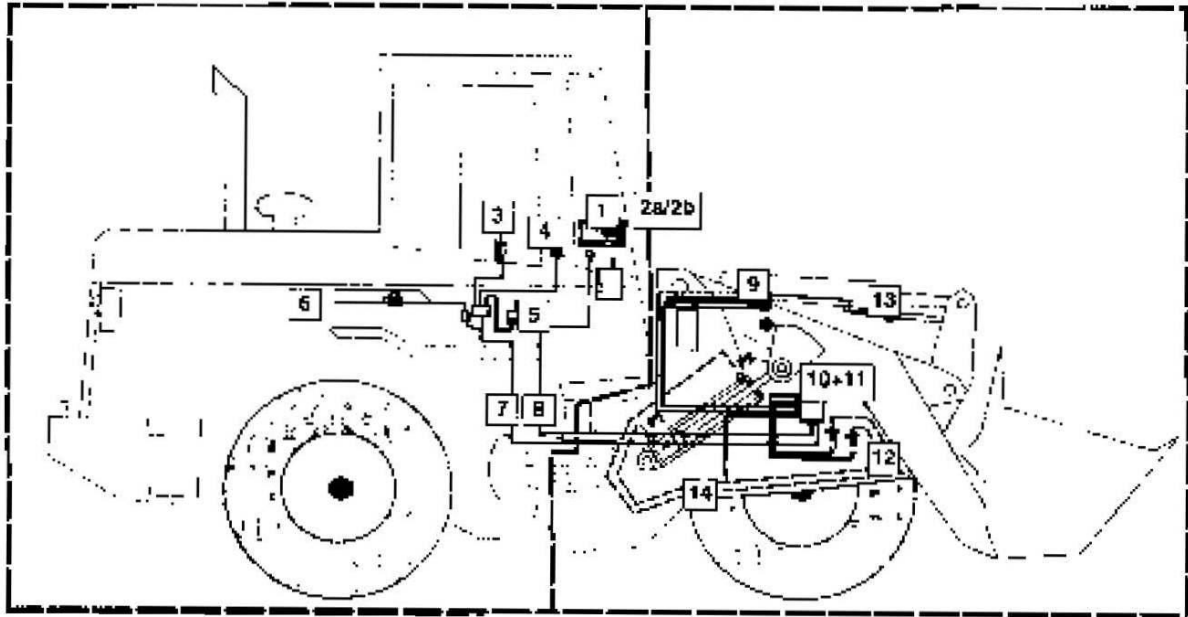
Instruments shall be tested in accordance with relevant tests for this category of instrument.

The instrument shall not be adjusted to anything other than as close as practical to zero error, even when these values are within the maximum permissible errors.

Maximum Permissible Errors

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

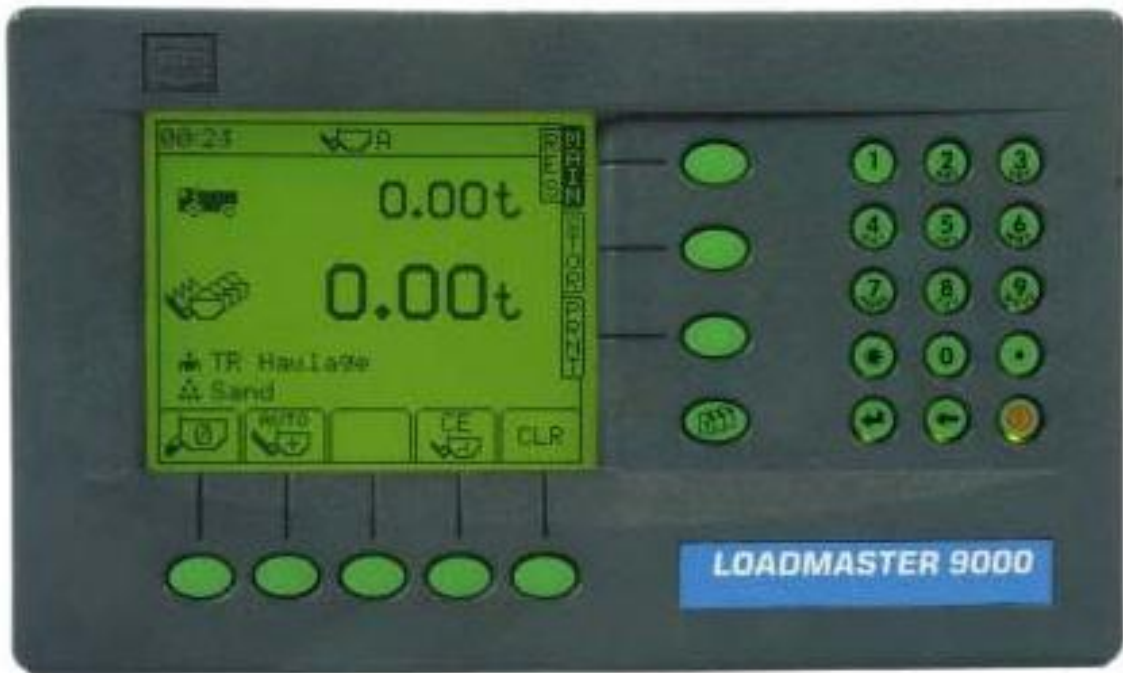
FIGURE 6/20A/1 – 1



- | | |
|----------------------------------|--|
| 1 – Computing & display unit | 8 – Instrument connecting cable |
| 2a – Printer | 9 – Reference/direction sensor plus magnet |
| 2b – Data card module (optional) | 10 – Junction box |
| 3 – Remote entry switch | 11 – Angle sensor |
| 4 – External alarm (optional) | 12 – Pressure sensors (2) |
| 5 – Kickout relay | 13 – Bucket 'crowd' sensor |
| 6 – Power supply | 14 – Temperature sensor |
| 7 – Junction box link cable | |

RDS Model Loadmaster 9000 Weighing Instrument - The Pattern

FIGURE 6/20A/1 – 2



Loadmaster Model 9000 Computing and Display Unit - The Pattern

FIGURE 6/20A/1 – 3



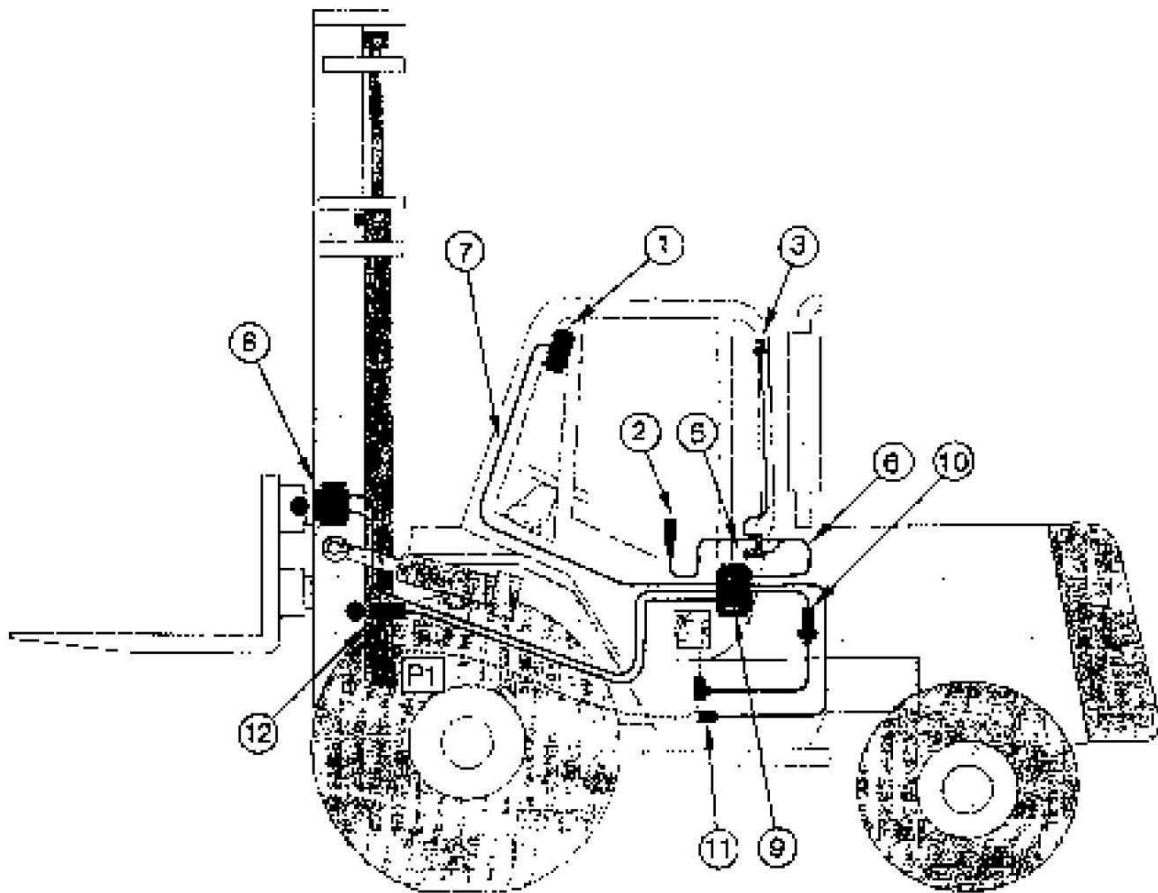
ICP 200



ICP 300 →

RDS Model ICP 200 & ICP 300 Printers

FIGURE 6/20A/1 – 4



- | | |
|------------------------------|-----------------------------------|
| 1 – Computing & display unit | 7 – Instrument connecting cable |
| 2 – Remote entry switch | 8 – Reference/direction sensors |
| 3 – External alarm | 9 – Junction box and angle module |
| 4 – Kickout relay (optional) | 10 – Pressure sensor |
| 5 – Power supply and fuse | 11 – Temperature sensor |
| 6 – Link cable | 12 – Carriage tilt sensor |

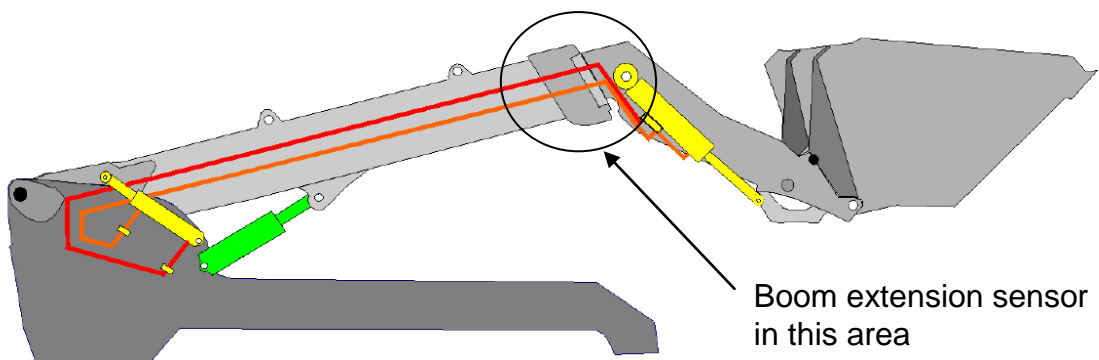
Typical RDS Model Loadmaster 9000 Forklift System Instrument - Variant 3

FIGURE 6/20A/1 – 5



RDS Model 9000i Display Unit (also known as type PSI) – Variant 4

FIGURE 6/20A/1 – 6



Retractable Lifting Mechanism (boom) – Variant 7

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