

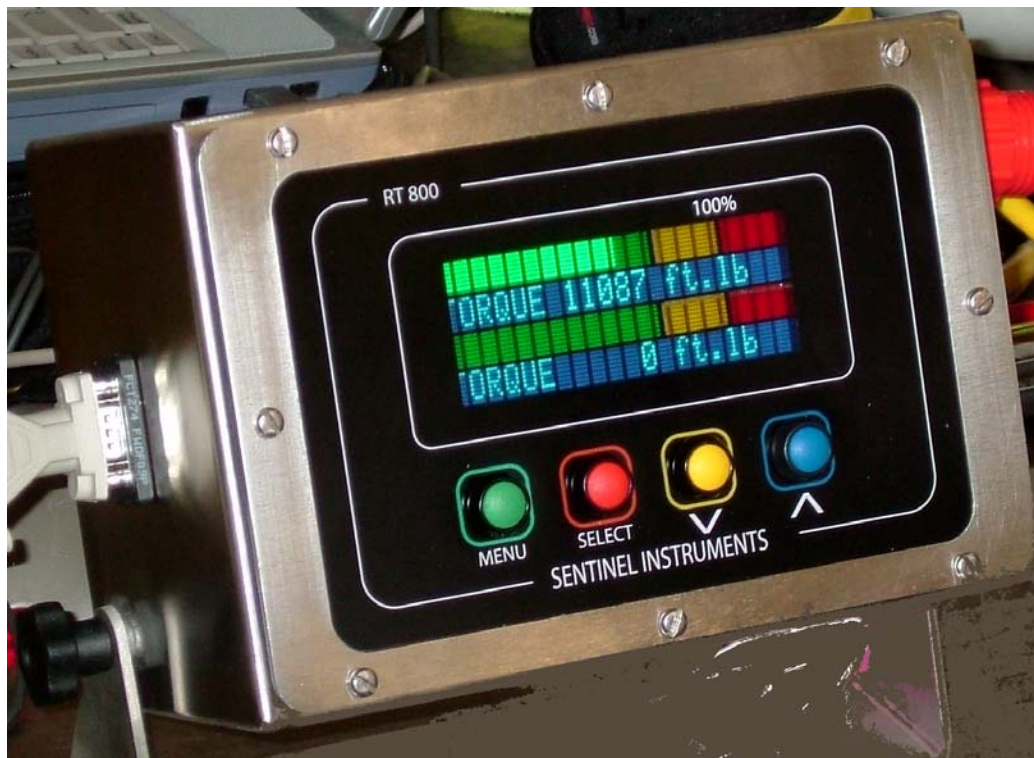
RT 800

Patent Pending

**Reaction Torque Arm Load
Measurement**

Guarding Your Load[®]

Operator friendly four-line display with clear indication of Applied Torque from two torque wrenches. Tri-color bar graph torque scale indicates minimum, maximum and overload conditions.



Typical Dual Machine Display, RT-800 (Driller's Console)

SENTINEL
The Load Management People[®]

Proudly Serving the Petroleum Industry Since 1984.

- Rugged Construction
- Outstanding Accuracy
- Easy Maintenance
- Simple Diagnostics
- Semi-automatic Calibration
- Solid State for Reliability

© 2008 Sentinel Instruments (USA), Inc. and Sentinel Instruments, Ltd. All Rights Reserved.

Sentinel Instruments (USA), Inc.
8100 Lockheed Ave
Houston, TX 77061
Tel: 713-643-9990 Fax: 713-643-9991
E-mail: sales@sentinelinstrumentsusa.com

Sentinel Instruments, Ltd.
Unit 20, Robert Leonard Centre Kirkhill Ind. Estate
Dyce, Aberdeen AB21 0GG
Tel: 44-1224-775830 Fax: 44-1224-775831
E-mail: sales@sentinel-ins.co.uk

Remote Driller's Console Display (One Supplied)

The remote display is intended for use at the Driller's control station to permit supervision and monitoring of riser bolt torquing operations. The Driller's display unit is equipped with data recording features which, when used in conjunction with a notebook computer, enables date and time stamping, as well as operator identification.

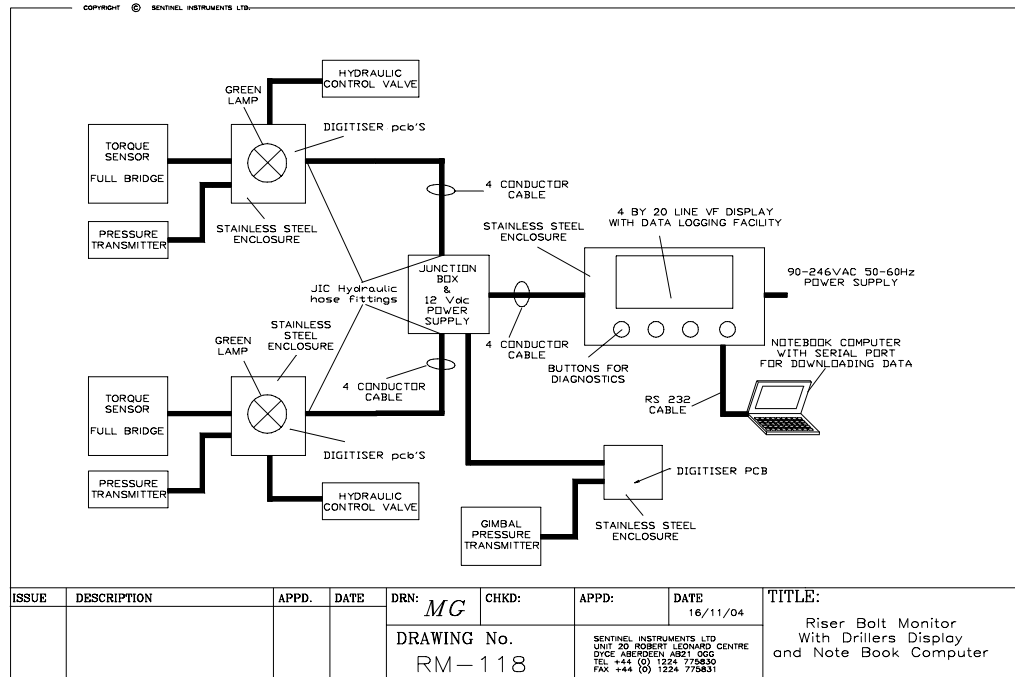
The Remote Display presents actual torque in a digital format for both reaction sensors. In addition, a three (3) color bar graph indicates the approach to minimum and maximum torque. The display is driven by mains power, 90-246 Volts, 50-60 Hz.

Local Indicator Lamp & Enclosure (Two Supplied)

An in-line indicator lamp and enclosure is provided for mounting in close proximity to the torque wrench work area. The lamp provides an instantaneous visual indicator of the minimum make-up torque pre-set in the Driller's Console Display on-board memory. The lamp is mounted in a heavy duty stainless steel enclosure with electrical leads exiting to the local junction box, reaction arm electronics, and pressure sensor electronics. Power for the indicator lamp and system electronics is provided from the Driller's Console Display, which is wired in to mains power supply in the Driller's shack or other suitable location.

The electrical leads from the reaction bar load cell and pressure sensor are encapsulated in 1/2" x 5,000 psi working pressure hydraulic hose to ensure mechanical integrity and to prevent water ingress. Sealing at the end fittings is achieved with high pressure hydraulic fittings. This construction practice provides for a very rugged system/user interface and is designed to enhance reliability and extend in-service life.

The lamps incorporate a low power LED light head with "reflector cell" technology which enhances brightness – even in direct sunlight conditions. General arrangement of the system is illustrated below.



Automatic Bolt Torque Limiter (Optional)

The system may be equipped with a solenoid operated, hydraulic directional control valve (4-port, 2-way) with return spring, and mounting plate for installation in the hydraulic power control circuit of each torque wrench. The valve will, on receipt of a signal (when 16,500 ft-lbs or any other selected value of torque is applied) from the controlling digitiser smart amplifier (DSA), block the hydraulic supply pressure applied to the ram and vent the ram extend pressure back to the return (tank) line thus limiting the maximum torque output of the wrench.

In addition to the torque limiting capability of the solenoid valve, the system also permits the operator to program the minimum make-up torque that will illuminate a green indicator lamp on the lamp/digitizer enclosure. This feature, together with the torque limiting function described above, permits the operator to define a “torque window”, the lower value being the minimum make-up torque and the higher value being the maximum torque. When the minimum make-up torque is achieved the green lamp illuminates, and when the maximum torque is achieved the solenoid valve functions and dumps the supply pressure to the “Ram Extend” function.

The torque control function of the system is triggered by actual torque measurements sensed with each reaction arm transducer. The system is not controlled by supply pressure, which is measured and recorded for information only.

A typical system layout is illustrated below (excluding solenoid control valves).



Technical Specifications (Reaction Torque Transducer)

Torque Capacity:	Up to 50,000 ft-lbs, continuous
Overload:	150% of Capacity without damage 300% of Capacity without failure
Transducers (2):	Full bridge 1000 ohm strain gauge Load Reaction Pin (compression) manufactured of high alloy steel
Accuracy & Non-Linearity:	< +/- 0.25%
Non-Repeatability:	< +/- 0.05%
Display Input Power	90-246 V AC, 50-60 Hz
Excitation Voltage:	10 Vdc recommended, 15 Vdc maximum
Insulation Resistance:	> 500 Mohms @ 100 vdc
Data Exchange:	Instrument grade data cabling
Data Output:	RS232C serial port and data cable
Operating Temperature:	20 to 135 degrees F
Compensated Temperature Range:	14 to 135 degrees F
Zero Temperature Coefficient:	< +/- 0.010 of Rated Load/degF
Span Temperature Coefficient:	< +/- 0.010 of Rated Load
Environmental Protection Level:	IP67 (heavy pressure washing)
Calibration Error:	+/- 0.1% Capacity, full scale
Interface Capability	RS232 (Serial Port of Notebook Computer)



Compression Style Reaction Torque Transducer
 (Power Tork, Typical)**



Compression Style Reaction Torque Transducer
 (Francis Torque, Typical)

** In addition to compression style transducer, drop down style torque transducer is available for Power Tork machines.

© 2008 Sentinel Instruments (USA), Inc. & Sentinel Instruments, Ltd. All rights reserved.