Marvel

Manufacturing Company

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Operation and Service Instruction
No. 3165 Balance Indicator Arbor

General

The 3165 Balance Indicator Arbor, which mounts assemblies to be balance checked with suitable adapters, is of the horizontal suspension static type featuring high accuracy with sensitivity of indication which can be adjusted to meet requirements of the wide range of part weights within its *100 pound capacity limit.* Balance indicator movement is oil damped to minimize oscillation and time to determine a balance condition. The shaft of the arbor incorporates an inch scale marking which correlates to the "sensitivity setting" noted in individual balance procedure instruction for positioning mount adapters to produce a correct sensitivity setting for the part to be balance checked.

Balance Indication

The characteristic response of the suspended balance indicator arbor to be an installed unbalanced part is a tilting action of the arbor shaft section relative to the central suspension rod, with the direction of tilt toward the heavy point in the part. This movement is visually evident as the edge of the black disc in the end of the arbor shaft moves eccentric to the edge of a round (silver colored) collar attached to the central suspension rod. A perfectly balanced part mounted on the balance indicator arbor at the sensitivity setting specified for the part will indicate an exact balance, having an equal and concentric width of black disc exposed around the edge of the indicator collar. If the part were out of balance, the exposed ring of the black disc would become eccentric with its eccentricity increasing if the unbalance were increased. When a properly established sensitivity setting is used a part which is out of balance to its *maximum allowable* tolerance would cause the edge of the disc to become tangent to the edge of the collar. Unbalance beyond this limit would cause the disc edge to pass under the collar edge.

A balanced part installed *too high* on the arbor would cause the arbor to become unstable and could not indicate central but would stay at the limit of its travel in any direction pushed.

A balanced part installed *too low* on the arbor would indicate an exact balance but would not move to a tangent position were an unbalance equal to its allowable limit was added.

Preparation for Use

Remove the 3165 Arbor from its kit case and, if present, disassemble stored adapters from its shaft. Stand upright in bore of case.

As shipped, the top end of the arbor assembly is sealed by an internal, spring loaded seal located on the suspension rod under the indicator bushing. In addition to preventing loss of dash pot damping oil, this seal also supports the suspension rod in a fixed position in the arbor during shipment or storage. To unseat the spring loaded seal and free the suspension rod for normal operation, push the indicator bushing downward, against the spring loaded pressure, so that its bottom surface clears the black indicator disc by approximately 0.003 inch.

Release the indicator collar, if stored depressed, and Clean the arbor shaft, indicator surface at its upper (top) end of arbor shaft and the adjacent indicator collar. Depress the indicator collar to release the damping oil internal seal and position to a clearance of .004" - .006" with the arbor end. Secure lightly with its set screw and check for free movement over its full range of travel.

NOTE: Prior to storing arbor in kit case after use, release indicator collar to allow oil seal to move upward and seat. It is not necessary to retighten set screw.

Check the circular gap between the upper unit of the arbor and the tapered protector sleeve above the indicator collar for foreign material and clearance. The set screw in the protector sleeve may be loosened to lower sleeve for cleaning. A cloth dampened with mineral spirit type solvent may be used but do not immerse the arbor in solvent at any time. Reposition the protector sleeve to provide a gap of .005" - .008" when the arbor is suspended by the cable loop (or quick disconnect coupling) and secure sleeve in place with the setscrew.

Balance Indicator Damping

Damping to control oscillation of indicator movement is produced by dash pot action of a light viscosity "baby oil", contained within the arbor shaft. Oil can be added or removed thru the two screw sealed bores in the wall of the arbor shaft to adjust this action to give good indicator movement but resist excessive oscillation when balancing.

Use of heavier oil for damping or if an oil has created a deposit within the arbor, the indicator will tend to adhere at its extreme displaced positions. This can be corrected by removing the sealing screws and draining all of the oil. Flush well internally with a mineral spirit type solvent. Do not flood the area above the

indicator collar or immerse the arbor in solvent at any time. Refill to the upper seal screw bore and reseal.