

Variable Speed Rod Feeder



For the accurate addition of
master alloys in rod form

One model rod feeder fits all

The KBM Affilips rod feeder fully meets the requirements of the aluminium industry. Hundreds of these reliable machines are in continuous operation in casthouses around the world.

The DA model is capable of feeding up to two rods simultaneously at a speed range of 5-635 cm/min. This range covers virtually all prevailing casting conditions. The rod feeder is engineered specifically for sophisticated casting installations and incorporates practical standard features such as built-in recorder output and interruption alarm. Its rugged construction is designed to withstand harsh casthouse conditions for many years.

The use of solid state electronic components ensures simplicity of repair and the long term availability of spare parts. The complete unit consists of an electronic drive motor and an in-line reducer gearbox coupled to the feed mechanism, all securely mounted on a heavy section aluminium base plate with a strong eye bolt for hoisting and handling. The separate electronic control unit completes the equipment.

Any coil holding equipment is not part of the rod feeder as most casthouses have different requirements due to e.g. space constraints, preference for horizontal or vertical coil holders, the use of non-standard coil size, etc. A local engineering workshop is usually able to provide a tailor made solution.



Machine description

Manual

A comprehensive operating manual accompanies every rod feeder. It contains a spare part list, technical drawings, electrical circuit diagram and instructions for use and service.

Dimensions and weight

All components are to metric dimensions.

Rod feeder:

800 x 390 x 390 mm, weight 80 kg

Control box:

400 x 300 x 135 mm, weight 10 kg

The drive motor

The feeder is powered by a fully enclosed DC electric motor suitable for operating at temperatures up to 80°C.

Power rating: 370 Watt.

Degree of protection: IP44.

The feeder mechanism

An integral in-line gearbox reduces the motor speed to the required rod feeding speed. Its lubrication system permits a wide variety of mounting positions with no sacrifice on smooth efficient running. A flexible coupling connects the motor reducer to the heavy duty splined drive roll. The twin rod feed system has two independent pressure rolls. Feed stock is accepted up to 10 mm rod diameter. Note that if two rods are fed simultaneously these will have identical speed. Robust brackets allow the feeder to be bolted securely on the casting installation.

Electronic control

The control unit

The electronic control unit is dustproof and equipped with printed circuit boards to give shortest possible downtime in case of repairs. It is specifically designed for regulating the speed and torque of DC motors.

The control unit is connected to the feeder unit through 8 meters of armoured cable with plug connectors.

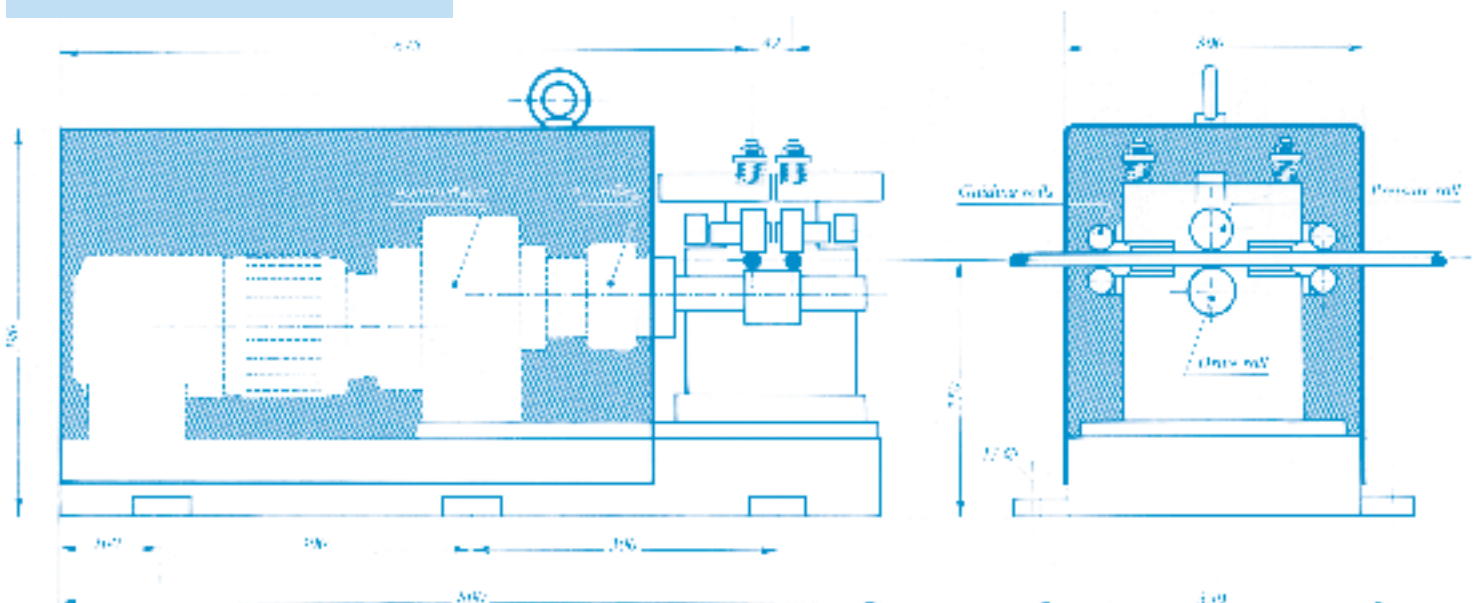
Power requirements: 220/230 Volt AC, 50/60 cycles, 3 Amp.max.

An individual incremental decoder on each idle roll registers rod movement independently in either direction. The true feed rate (not the pre-set feed rate) is displayed permanently on a separate digital read out for each rod. The touch of a selector switch allows the display to either show cm/minute or kg/minute.

Permanent monitoring of the actual feed rate offers the best possible production control in the casthouse. The KBM Affilips rod feeder features a standard 0-10 V output signal which can be linked to e.g. a chart recorder or data logging equipment.

Speed control is by 10-turn potentiometer. External rod speed control is optional.

The electronic components are sensitive to overheating. The control unit should therefore be sited away from the furnace, preferably in a casting control console or process control room and protected against direct heat radiation. Ambient temperature should not exceed 45°C.



Interruption alarm

Interruption of the rod addition as a result of e.g. coil jamming can have a serious effect on the quality of the final product. As an additional safeguard the DA rod feeder incorporates an alarm device. The decoder mechanism will detect interrupted rod movement after a 3 second halt. This triggers a warning light and simultaneous audible alarm for each rod. An additional relay switch offers direct output to auxiliary alarm equipment. For safety reasons a prominent emergency stop is also fitted.

Accessories

Manual speed control is standard. As an option the rod feeder can be equipped with an external input/output unit allowing remote speed control by standard process control signals such as 0-10 V, 0-20 mA or 4-20 mA from e.g. a PLC or process computer. The unit is housed in a second control box of the same dimensions on top of the standard control box. Manual override is possible at any time. The preferred signal type has to be indicated when ordering this option.

Installation and operation

Maximum benefits of continuous inoculation can only be achieved with a well engineered layout of coil and feeder. This must ensure the correct location of rod entry point and distribution of the master alloy in the molten metal stream.

It is important that the rod enters the liquid metal at the highest temperature zone available in the launder system, preferably fed vertically into the metal flow, while allowing sufficient dissolution time.

The addition should be aimed at the center of the metal stream utilising zones of maximum flow for sufficient mixing. The risk of inadequate dispersion with slow moving metal transfer can be avoided by building a local restriction in the launder cross-section to increase metal velocity at the point of the rod entry. A short length of pipe secured at an appropriate location on the launder is a simple method to ensure optimum rod addition.

Two rods fed simultaneously can effectively improve the distribution of the master alloy in extreme cases.

The grain refining particle TiB₂ has great affinity for aluminium oxide. The rod should therefore be inserted into a clean metal stream free from surface oxide. A simple baffle arrangement will hold back the oxide skin. Molten metal filtration systems are not normally expected to remove grain refining nuclei. Consequently it is common practice to feed the rod on the inlet side of a filter unit.

Location of the rod feeder and the coil should be visible and readily accessible to interrupt operation should an emergency arise. The coil holder must allow the rod to unwind smoothly and permit simple coil changes. If necessary the moving rod can be directed into the molten metal by guide rollers or a shaped tube of approximately 40 mm diameter. A minimum bend radius of 1000 mm is recommended.

Further details are given in our Technical Information Sheet TIS 106.

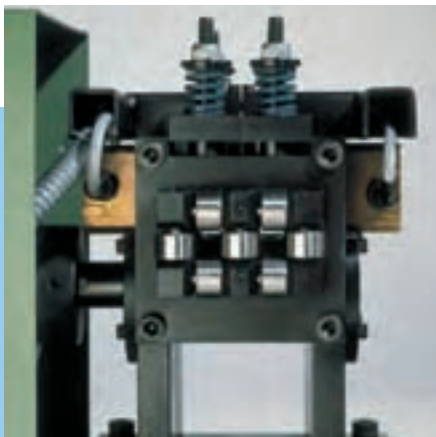
Installations should be custom engineered to suit the particular plant layout of furnaces and casting equipment. KBM Affilips technical personnel are available to discuss a specific installation on site and assist in production trials if required.

Spare parts

KBM Affilips also handles the supply and distribution of spare parts. This simplifies ordering and ensures the long term availability of spares. Your regular KBM Affilips contact will help you. Spare parts are usually available from stock.



Rod Feeder and control box



Twin roller mechanism



Control box with printed circuits and selector switch for digital read out.



Multi-plug connecting cable

Machine specifications

Nominal data dual rod feeder

Model	KBM-DA
Speed range	5-635 cm/min, deviation 1% nominally (4% at very low speed)
Overall dimensions and weight	
Rod feeder	800 x 390 x 390 mm, 80kg
Control box	400 x 300 x 135 mm, 10kg

Suggested coil holder dimensions

Reel diameter	330 mm
Distance between flanges	350 mm (>280 mm)
Diameter of flanges	865 mm (for 180 kg coils)
Diameter of shaft	38 mm

Machine specifications

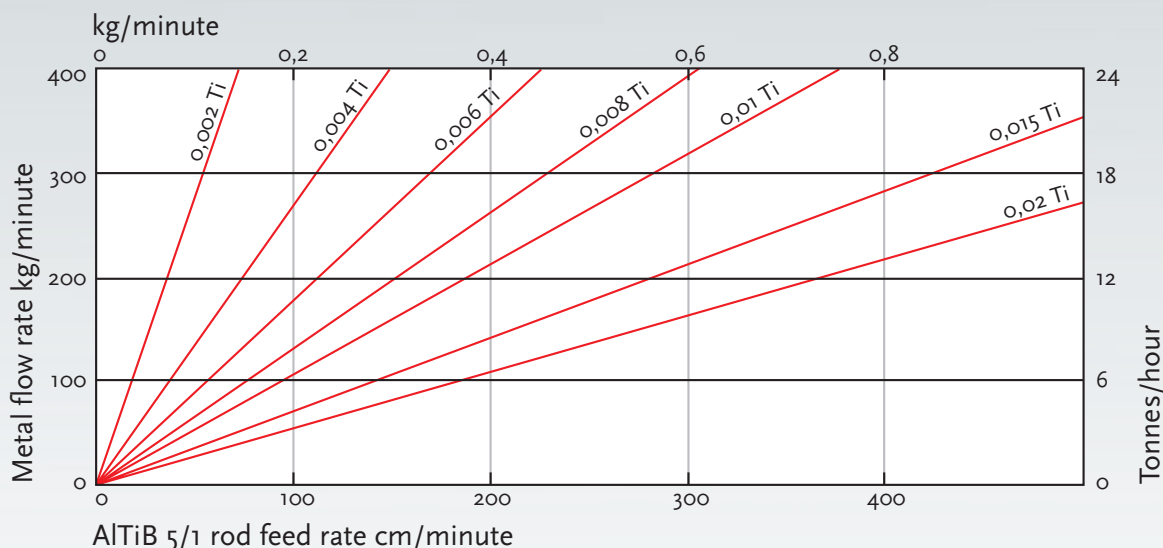
Nominal data master alloy rod

Rod diameter	9.5 mm
Weight per inch	0.005 kg
Weight per meter	approx. 0.195 kg



Coil range

Standard coil weight (±20 kg)		180 kg	270 kg	360 kg	450 kg
Inner diameter (± 25 mm)		360 mm	360 mm	360 mm	360 mm
Outer diameter (approx.)		720 mm	890 mm	970 mm	1040 mm
Height (± 25 mm)		280 mm	280 mm	280 mm	280 mm



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