

New ladle slide gate “R-Gate” and automated refractory exchange system “REX-ROBO”

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1 Overview

Slide gate mechanism is used world-wide by steel manufacturers to control the flow of molten steel in the steel making process. However, slide gate operation and refractory exchange still depend on the experience and the skills of operators. New ladle slide gate “R-Gate” has been supplied 174 units to 23 customers worldwide and it has provided simple operation and secure refractory exchange. Additionally, we have developed an automated refractory exchange system “REX-ROBO”.

We will introduce the features of R-Gate and REX-ROBO.

2 R-Gate

2.1 Dual frame design

R-Gate consists of two main frames such as Upside and Slide frame, and a pair of Spring box is provided on both sides of the Upside frame. Thus makes gate structure simple, consequently, both daily operation and maintenance work become easy.

2.2 Tool free face pressure loading

Tool free face pressure loading/unloading is realized by the combination of the ramped liner and hydraulic cylinder.

2.3 New plate clamping

Upper and lower plate can be set with single action by means of the latches provided in the frame. A combination of the fitting boss in the frame and the window cut on the plate refractory face assures a right positioning of the plate refractory in each frame.

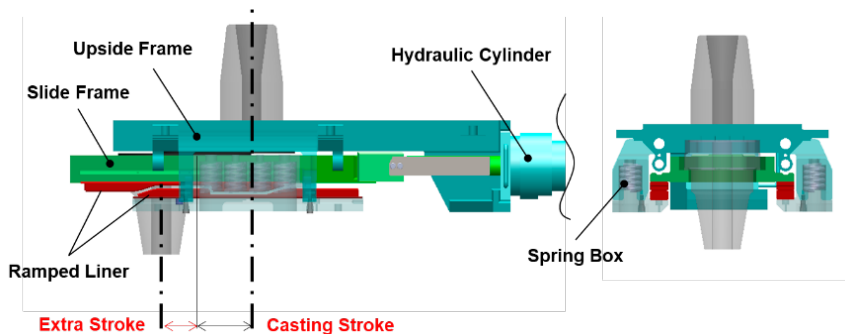


Fig.1 Tool free face pressure loading

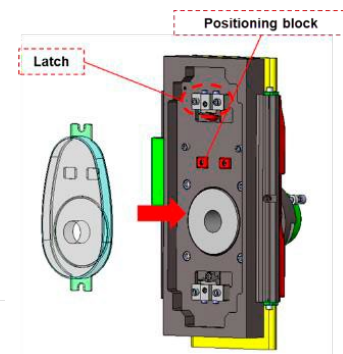


Fig. 2 New plate clamping

3 REX-ROBO

3.1 Automated attachment and detachment of hydraulic cylinder

REX-ROBO catches the correct gate position for secure operation. The tool on REX-ROBO handles and attaches/detaches the hydraulic cylinder to/from the gate. This operation helps operators from heavy work.

3.2 Automated refractory exchange

The tool on REX-ROBO handles and attaches/detaches refractories to/from the gate. This operation helps operators from very hot refractories.

3.3 Automated inspection

REX-ROBO inspects the plate setting condition and the face pressure loading condition. This inspection is programmed in the system in order to eliminate the human error. As a result, the slide gate can be operated more stably and securely.

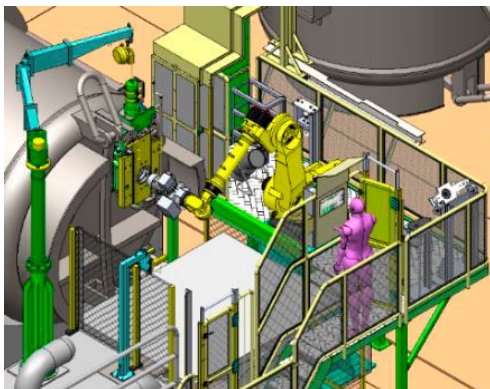


Fig.3 Layout



Fig.4 REX-ROBO