

Digital R/F

FLEXAVISION Series R/F Systems – Offered in a Broad Range of Configurations to Accommodate Clinics to Hospitals –

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1. Introduction

With the impending aging of society, medical diagnostic systems will need to accommodate a wider variety of examinations for an increasing number of diseases. However, they must also have less impact on those being examined (patients). In the case of R/F systems, customers are increasingly demanding image digitization and electronic storage to accommodate the trend toward computerization. Shimadzu's new FLEXAVISION R/F systems meet these requirements by offering flexibility, ease-of-use, and compatibility with computerization.

2. FLEXAVISION Development Concept

Each unit of the R/F system, including the R/F table, X-ray high voltage generator, imaging chain, and X-ray tube, can be freely configured to create the optimal system for specific facility plans or examination requirements. Therefore, it provides the flexibility to accommodate a wide variety of applications, ranging from digestive tract screening examinations to specialized examinations of the urinary organs or for orthopedics.

FLEXAVISION systems are offered in three base package configurations, the SF package (with cassette), the FD package (with I.I.-DR), or the HB package (cassette/I.I.-DR hybrid), which can be customized by selecting from several choices available for each component unit, such as the X-ray tube. Optional functionality can be added for various specific types of examinations as well.



Fig. 1 Overview of FLEXAVISION System

	FLEXAVISION SF Package	FLEXAVISION HB Package	FLEXAVISION FD Package
X-Ray Generator (selectable)	50 kW (32 kW if single-phase) or 80 kW		
X-Ray Tube (selectable)	200 kHU, 300 kHU, or 400 kHU		
Image Intensifier (I.I.) (selectable)	9-inch single or 12-inch dual (12/9)		
Table Tilt	+89 to -30 degrees		
Table Elevation (selectable)	69 cm to 95 cm (for elevating table type)		
Patient Coverage	133 cm (90 cm tube stroke plus 17-inch [43 cm])		
Imaging Chain Extension	1.5 m (standard) or 1.8 m / 2.0 m (factory option)		
Oblique Projection	±30 degrees (factory option)		
TV Camera	EIA/CCIR 400,000 pixel CCD	1-megapixel CCD	
Monitor	14-inch CRT	17-inch LCD	
Cassette Radiography	Multi-size cassette spotfilming		Single image cassette
Digital Image Processing Unit	Not available	SPOT, serial (3 f/s)	
External Device Connectivity	Not available	DICOM Print (standard) DICOM Storage (optional) DICOM MWM (optional)	

Table 1 FLEXAVISION Base Package Specifications

3. System Features

FLEXAVISION was designed for ease of use and space efficiency on a total system basis. R/F table and high voltage generator controls are integrated into a single compact control console. Depending on the available space, the control console is available in an integrated desk model (Fig. 2) or desktop model (Fig. 3). For control rooms with limited space, selecting the desktop model allows placing the console on an existing desk or benchtop, allowing more flexible layout of the control room.



Fig. 2 Integrated Desk Model
a) 14-inch CRT (SF package)
b) 17-inch LCD (HB and FD packages)



Fig. 3 Desktop Model

Previous systems had separate control cabinets for the R/F table and X-ray high voltage generator, but FLEXAVISION integrates the control cabinets into a single unit to minimize space requirements in the examination room.

4. Features of Key System Components

4.1. R/F Table

The R/F table is offered in two models – one with and the other without table elevation (Fig. 4 and Fig. 5). The imaging chain offers a wide movement range to allow a wide field of vision for full-body coverage. Furthermore, a 1.5 meter X-ray tube extension feature is provided standard for imaging the chest or observing swallowing (Fig. 6). These features allow the system to accommodate a wide variety of examination applications.



Fig. 4 With Table Elevation



Fig. 5 Without Table Elevation

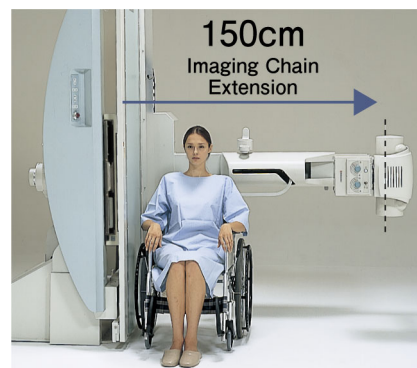


Fig. 6 Imaging Chain Extension

4.2. Cassette Radiography Unit

Two types of imaging systems are available – a cassette spotfilming model (Fig. 7), able to use cassettes ranging from 8 x 10 inches to 14 x 17

inches, and a cassette tray model (primarily for I.I.-DR).

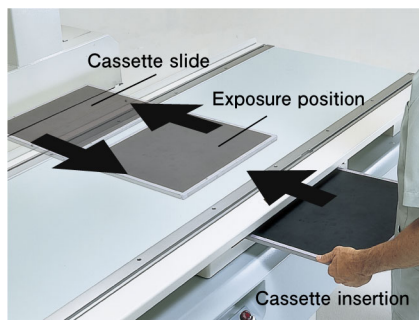


Fig. 7 Cassette Spotfilming Model

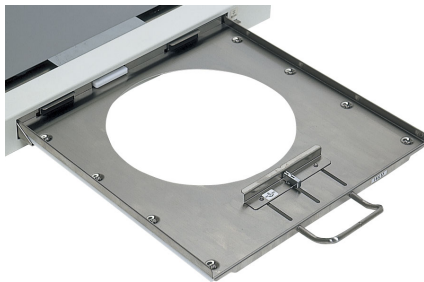


Fig. 8 Cassette Tray Model

4.3. X-Ray High Voltage Generator

X-ray high voltage generators are available in various outputs (32 kW, 50 kW, or 80 kW), depending on the facility planning. The control cabinet is a single unit, regardless of the output level (combined with the R/F table control cabinet).

4.4. Imaging System

Two types of imaging systems are available – an I.I.-DR model, which uses a 1-megapixel CCD camera to provide fully digital, high-definition, real-time radiography and fluoroscopy, or a general purpose model, which uses a high performance CCD camera to allow real time fluoroscopic observation via the monitor. Since MS-Windows is used as the operating system for the I.I.-DR model, it can be operated using simple mouse and keyboard operations. This facilitates a more rapid work flow and is compatible with all types of networks.



Fig. 9 I.I.-DR Model with 1-Megapixel CCD

4.5. X-Ray Tube

X-ray tubes are available in outputs ranging from 200 kHU to 400 kHU, depending on the planned system and operating parameters.

4.6. Image Intensifier (I.I.)

The I.I.-DR model is available with a 12-inch dual I.I. model (two fields of view) and the general purpose model is available with a 9-inch single I.I. (one field of view) or a 12-inch dual I.I. model (two fields of view).

4.7. Options

In addition to choosing the key units, FLEXAVISION is available with a variety of additional options. Options include a oblique projection unit, which is useful for orthopedic and enema examinations, imaging chain extension (1.8 or 2 m) option, which allows more sophisticated examinations of the chest using the R/F table tube, an X-ray tube swing-out unit, used in combination with a stand-alone radiography table for chest radiography, a 4-field phototimer option, which allows radiography using better suited X-ray parameters, and a dual tube unit, which allows expanding the system according to system plan. Adding optional functionality as needed, allows even further flexibility in accommodating various types of examinations.

5. Summary

FLEXAVISION offers the flexibility to perform a variety of examinations, yet the compact and simple-to-operate design is friendly for patients and operators alike. It offers the flexibility and user-friendliness necessary to accommodate the coming aging of society. Furthermore, it is able to provide high image quality on a total-system basis and offers digital technology to support the computerization of clinics and hospitals.