

Safety Precautions and Technical Details

iXcenter L
iXcenter XL

Note on applicability

Illustrations in this publication may deviate from the product supplied. Errors and omissions due to technical progress expected.

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1 Explanation of symbols

1.1 Symbols used in the user documentation

This chapter explains the symbols that are used in user documentation to call attention to dangers and important notes.



This symbol warns against a direct, imminent danger to the life and health of individuals.

Failure to observe this danger warning may result in severe health impairment, such as perilous injury and even death.



These symbols indicate important notes for the proper operation of the machine.

Failure to observe this information may result in damage to or malfunction of the machine or its components.



This symbol warns against a direct, imminent danger from electricity.

Failure to observe this danger warning may result in severe health impairment, such as perilous injury and even death.

1.2 Information and safety instructions on the machine

All information and safety instructions directly on the machine must be observed and must be kept in a fully legible condition.

Various symbols and warnings may be found on the machine, depending on the design of the machine and its intended use.

2 General information on safe operation

2.1 Intended use

The iXcenter robot cell is an industrial robot system for the automatic loading and unloading of INDEX single-spindle lathes and turn-mill centers. In addition, the system can be used for setting up (e.g., tool change) of INDEX single-spindle lathes and turn-mill centers.

2.2 Reasonably foreseeable misuse

All applications deviating from the intended use are considered impermissible misuse, including, e.g.:

- Operating the system without an INDEX Werke single-spindle lathe and turn-mill center
- Overriding or tampering with safety devices
- Automated operation of buttons and control units
- Transporting people and animals
- Use as a climbing aid
- Use outside the permissible ambient conditions
- Use in explosive environments
- Use in underground mining

2.3 Technical specifications

The technical specifications of the robot cell must be observed. See user documentation of the respective robot cell.

2.4 Space limits

The space limits of the robot cell and the machine are defined in the installation plan.

Further details in the installation plan:

- Interfaces to lathes and turn-mill centers
- Customer extension modules
- Supply and disposal facilities

2.5 Ambient conditions

The following ambient conditions apply:

- Ambient temperature during transport and storage: 0°C to 45°C
- Ambient temperature at the location of use: 10°C to 40°C
- Relative humidity: max. 50%
- Maximum altitude: 1000 m above sea level
- Vibration acceleration: 4.9 m/s²(0.5 G) or less
- Environment free from aggressive gases

3 Safety instructions



People must be kept away from below hanging or suspended loads.



Before opening the robot cell, the end effector and materials clamped in it must be moved to a defined, safe location (as close to the floor as possible).



The user documentation and, in particular, the document "Safety Instructions and Technical Specifications" must be observed.



The documentation of the manufacturer of the robot (FANUC) must be observed.

3.1 Safety instructions for transport and setup

All covers and doors must be closed and secured.

Interchangeable accessories (e.g., gripper, setup material, ...) must be dismantled before transport and transported while separately secured.

The pallets of the optional pallet module must be removed before transport and transported while separately secured.

The prescribed transport locks must be used. Only suitable, trouble-free transport means having sufficient load-carrying capacity may be used. Damaged transport means must not be used.

The transport means must be attached to the fastening points provided for this purpose. The cargo must be secured for transport with suitable lashing straps.

People must be kept away from below hanging or suspended loads.

Danger areas must be avoided, and the required safety distances must be observed when the robot cell is maneuvered/moved. The transport route must be kept free of obstacles and checked for levelness, floor damage, ascending or descending slopes, etc.

The system must be installed according to the specified installation plan and with all specified materials (included in the system's scope of delivery).

3.2 Safety instructions for setup mode



People must be kept away from below hanging or suspended loads.

In setup mode, especially when the safety doors are open, the operator is responsible for opening and closing the grippers and the associated consequences.

In setup mode, the Safe Zones DCS of the robot cell must be tested for collision-free operation with the respective end effector (with a workpiece).

3.3 Safety instructions for production mode

In the delivery state of the robot cell, the envelope curves of the axis and space limits in the software are designed for:

- Separating safety device of the robot cell
- Interference contour of the gripper / end effector

The envelope curve must be adapted to the respective conditions.

When changing the end effector and the workpiece, the envelope curve of the end effector holding a workpiece, as well as the defined Safe Zones DCS of the robot cell, must be observed. The dependencies must be checked during setup.

The speed, acceleration, and deceleration of the robot must be adapted to the respective conditions. The technical specifications of the quick-change system, the gripper, and also the combination between the gripper fingers and workpiece (coefficient of friction) must be taken into account.

4 Safety functions and safety devices

Some machine components, aside from their technical functions, also fulfill a safety function that is designed to protect personnel from dangers at the machine.

For this reason, safety functions must not be tampered with, disabled, or removed.

In case of damage to or failure of safety functions or equipment, the machine must be shut down immediately.

Removal of safety functions is only allowed during repair work on the machine. Once the repairs are finished, all safety equipment must be reinstalled and checked for proper functioning.

In the event of a fault, the system is shut down, and a fault message/signal is output. The system must not be put back into operation until the cause of the malfunction has been eliminated and the safety equipment is active again.

4.1 Shutdown of the system in case of emergency

EMERGENCY STOP devices are provided for emergency shutdown. In case of emergency, the iXcenter, including the machine, can be brought to a standstill by pressing an EMERGENCY STOP button.



- **Never disable any safety devices.**
- **After safety devices have responded, do not restart the system until the cause of the fault has been eliminated and there is no hazard for people or property.**

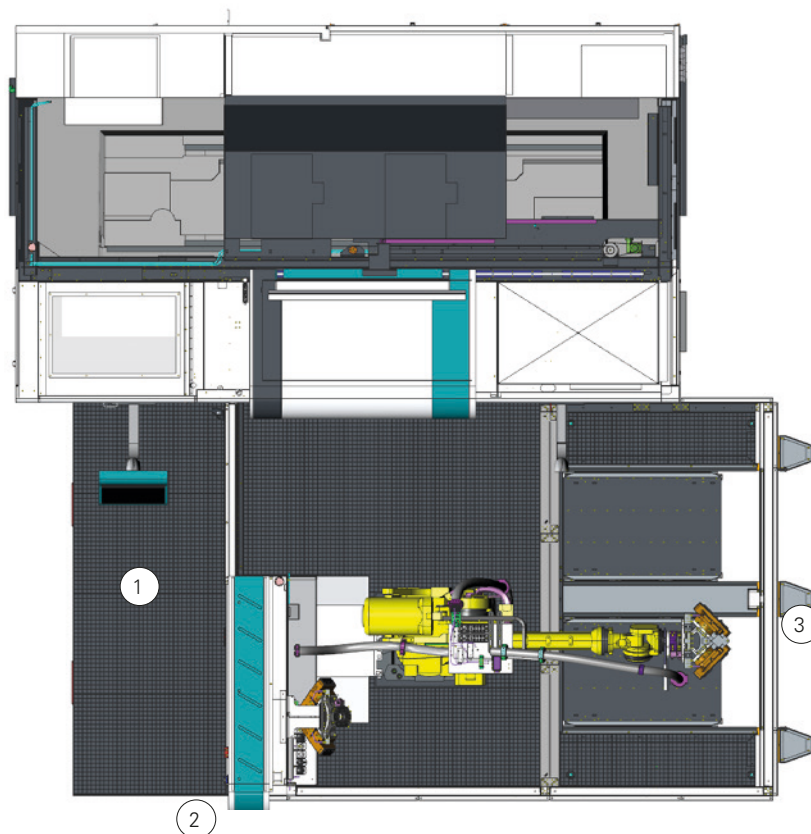


Ensure the EMERGENCY STOP devices are accessible and visible at all times.



- When actuated, all hazardous movements are switched off as quickly as possible, and a safe state is established.
- The system is not disconnected from the power supply.

Example shown



- 1 EMERGENCY STOP on operating terminal of basic machine
- 2 EMERGENCY STOP on FANUC handheld control unit
- 3 EMERGENCY STOP at pallet module (option)

4.2 Preventing unexpected starts when access doors are open

Some functions of the robot cell are (pneumatically) de-energized when the access doors are open. This prevents unexpected start-up due to malfunctions. Due to the de-energized state, there is a residual risk for the following functions.

4.2.1 Pneumatic gripper without gripping force limiter:

Technological leaks in the pneumatic system lead to the risk of parts being lost in the de-energized state. If operational access to the work area of the robot system is required, the workpiece must be unloaded before access, or the workpiece clamped in the gripper must be moved to a position that is inaccessible or safe for the operator.



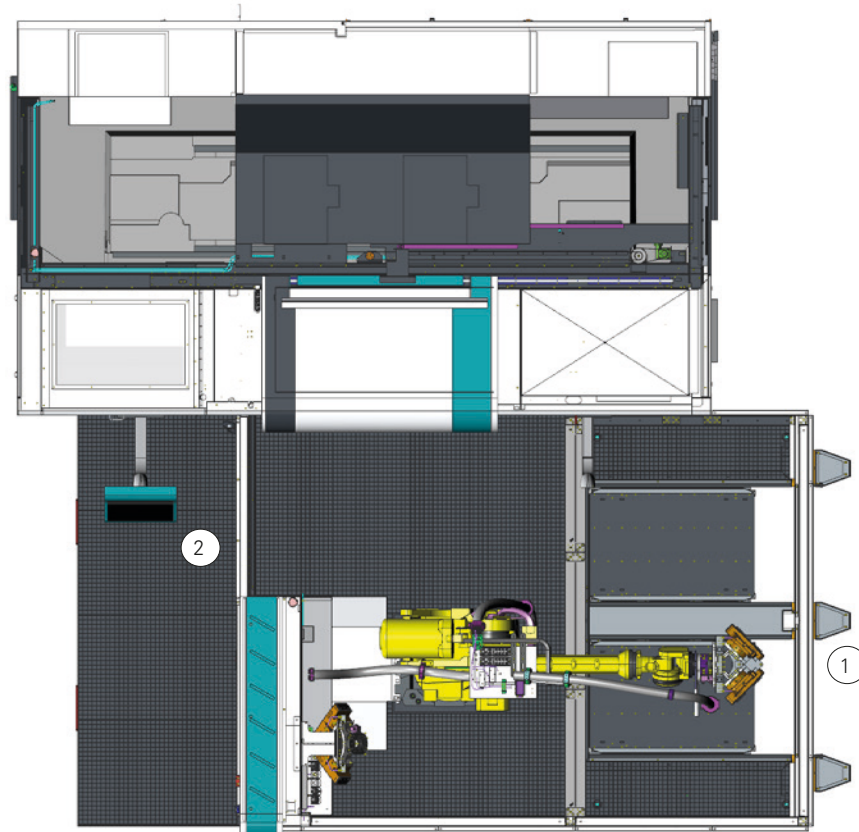
People must be kept away from below hanging or suspended loads.

5 Workplace of the operator



See the respective valid document "Structure and Functions".

Example shown



- 1 Operator position on the pallet module
- 2 Operator position at safety door of robot handling

It is always possible to enter the robot cell.
To enter the robot cell in automatic mode, the request button must be pressed.
This interrupts the operation of the robot cell and starts it automatically after the access door is closed.

It is recommended to maintain a free working area of at least 1 m around the machine with attachment units for operator activity.

Workspaces can vary depending on the activity.

Production operations may involve the following activities:

- Operating the machine at the operating terminal.
- Loading and unloading workpieces.
- Emptying the chip container.
- Monitoring and maintaining the process at the operating terminal and inside the work area.
- Checking operating material (such as hydraulic fluid, lubricant, cooling lubricant) and topping up if necessary.
- Changing the tool at the tool magazine.

Activities for which access to the robot cell may be necessary:

- Removing chips as required in the work area and at the chip conveyor.
- Removing and measuring workpieces.
- Monitoring and maintaining the process at the operating terminal and inside the work area.
- Changing the tool in the workspace.
- Making adjustments for tool wear in the machine control as needed.

Be sure to follow the access requirements for the robot cell during these activities.

Different workplaces may apply during the following activities:

- Setup
- Inspection and testing
- Cleaning work
- Maintenance work

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