

Innova

USER'S MANUAL

M545-07-1E

Innova CMMs



Quality Drives Productivity



© Hexagon Manufacturing Intelligence™, August 2017

Third party trademarks: Hexagon Manufacturing Intelligence acknowledges all trademarks and registered trademarks that are the property of their legal owners.

Hexagon Manufacturing Intelligence declares that the information provided in this document was correct on the date of publication; this information may be changed without notice to bring it into line with improvements in the performance and quality of its products.

Hexagon Manufacturing Intelligence declines all liability for any errors that may appear in the manual.

The contents of this document are strictly confidential and the consignee is obliged to use it exclusively for his own purposes.

This manual cannot be given, lent or copied, either wholly or in part, without written authorization from Hexagon Manufacturing Intelligence.

Hexagon Manufacturing Intelligence (Qingdao) Co., Ltd.

188 Zhuzhou Road Qingdao, China

P.C.266101

Tel: 0532 8089 5188

Fax: 0532 8089 5030

Web: <http://www.hexagonMI.com.cn>

Hexagon Manufacturing Intelligence (Qingdao) is part of **Hexagon Manufacturing Intelligence**. Hexagon Manufacturing Intelligence helps industrial manufacturers develop the disruptive technologies of today and the life-changing products of tomorrow. As a leading metrology and manufacturing solution specialist, our expertise in sensing, thinking and acting – the collection, analysis and active use of measurement data – gives our customers the confidence to increase production speed and accelerate productivity while enhancing product quality.

Quality Drives Productivity



Contents

Contents	i
Preface	1
Documentation Provided with the Measuring Machine.....	2
Reading the PDF Files.....	2
Conventions	2
Safety Information	2
Hexagon Manufacturing Intelligence Customer Care Center	2
System Overview	3
Main Components.....	5
Axis Sliding System	6
Axis Position Transduction System	7
Axis Drive System	7
Air Supply System	7
Pneumatic Control Unit	9
Axis Air Bearings	10
Counterbalancing the Column	10
Operating Instructions	12
Operating Safety Precautions.....	13
<u>Safety issues in need of special attention</u>	13
General Precautions.....	14
Electrical Safety Precautions	14
When Measuring Parts	14
Starting the Measuring Machine.....	15
Stopping the Measuring Machine	15
Fixing the Part to the Work Table.....	15
Technical Data	16
Mechanical Characteristics	17
Technical Characteristics	20
Operating Conditions.....	20
Conditions for Maximum Measuring Precision.....	20
Electrical Power Supply	20
Work Table.....	21
Column Counterbalancing System	21
Maintenance	22
Maintenance Safety Precautions	23

General Maintenance Information	24
Accessing Components Covered by Guards	26
Removing Fixed Guards	27
Preventive Maintenance Schedule	27
Preventive Maintenance Instructions	29
Air Bearing Guideways	29
Optical Scales	29
Counterbalancing Cylinder Rod	29
Air Supply System.....	30

Preface

The Innova Classic/Innova Performance Coordinate Measuring Machine (CMM) represents the accumulated experience of over a century in the invention, development, and manufacture of dimensional measurement equipment. Our many experiences, awards, patents, and customer testimonials and suggestions combined with innovative designs and manufacturing methods yield a machine that promises the performance, throughput and reliability you need in a highly cost effective package.

This manual was written for the users of the Innova Classic /Innova Performance CMM. It provides a description of its main technical and design features as well as instructions for use and recommended maintenance of the hardware.

An electronic copy of this manual is on a compact disk (CD) located with the machine shipment.

Note. You may print as many copies of this copyrighted manual as desired for personal use.

Documentation Provided with the Measuring Machine

The information provided with the measuring machine offers a wide range of solutions for getting to know and using its functions. The measuring machine comes with a compact disc containing the following documentation.

User's Manual: This document contains essential information on how to use the measuring machine safely and efficiently. The manual includes a detailed description of the measuring machine, the instructions for use, and the routine maintenance procedures recommended by Hexagon Manufacturing Intelligence.

Reading the PDF Files

The PDF (Portable Document Format) documents can be read using Adobe Acrobat Reader (Acrobat Reader can be started directly from the compact disc or by copying it onto a Personal Computer and then starting it). Acrobat Reader can even be downloaded to your Personal Computer from the Adobe web site at the Internet address <http://www.adobe.com>.

Conventions

The following conventions are used in this manual to distinguish between various kinds of information.

Note. Notes give important information taken from the text, which may be useful in ensuring that the equipment is used to its full potential.

CAUTION

Caution messages indicate potential damage to the equipment or loss of data and tell you how to avoid the problem.



WARNING

Warning messages indicate the potential for bodily harm and tell you how to avoid the problem.

Safety Information

All the operations described in this document for which you are responsible must be performed in respect of the national and company safety regulations.

Hexagon Manufacturing Intelligence Customer Care Center

Hexagon Metrology Customer Care Center set up service hotline (400-6580-400 free of charge) for customers and opened up speedy service channel for information consulting, machine repairs, customer complaints, difficult problems and spare parts purchase etc. meanwhile, the company conducted regular telephone visits and satisfaction investigation into the customers which enables the customers to have chance to enjoy the timely services.

System Overview

Innova Classic/Innova Performance is a moving bridge CMM designed for the dimensional inspection of small to medium size prismatic manufactured parts. Available in three size models (06.xx.06, 08.xx.06 and 10.xx.08). The three machine axes move on air bearings and are driven by motors and controlled by a direct computer control electronic system, PC-DMIS measuring software, and a hand held remote control unit. The system's computer, monitor, and printer are placed on either a customer provided or optional computer workstation table. A number of options are available for probes, computer hardware and software, and other machine accessories.

Innova Classic measuring machine is configured with H3C controller and its 10.xx.08 series are equipped with Y side cover. The machine can support the trigger measuring system.

Innova Performance measuring machine is configured with DC241 controller with all its series to be equipped with Y side covers. In addition to the trigger measuring, the machine also can support scanning measuring.



Fig 1-1 Innova Classic/Innova Performance CMM Drawing (only for 06.xx.06,08.xx.06 series)



Fig. 1-2 Innova Classic/Pioneer+ CMM Drawing (only for 10.xx.08 series)

Main Components

Fixed Parts

The fixed part of the measuring machine is made up of the granite worksurface and the machine stand (including supports).

- The worksurface is a single piece of granite that supports the part being measured and the moving parts of the machine. The worksurface includes guide ways on which the main carriage moves. The guide way for the left leg is machined directly on the upper surface of the work table, while the three guide ways for the right leg are on the surfaces of the guide machined into the body of the worktable.
- As for Innova Classic/Innova Performance 06.xx.06 and 08.xx.06 series, its worksurface is supported by machine stand. And there are three main adjustable vibration-absorbing supports and two auxiliary anti-tilting supports between the worksurface and machine stand. The machine stand is fixed on the ground through four adjustable horizontal supports.
- Innova Classic/Innova Performance 10.xx.08 series are directly fixed on the ground through three main adjustable vibration-absorbing supports and two auxiliary supports between them.

Moving parts

The moving parts of the measuring machine are the main carriage, central carriage and Z rail.

- The main carriage is made up of a beam and two legs (left and right). The main carriage moves on the work table and represents the Y machine axis. The main carriage moves along the worksurface on air bearings. On the front of the beam there is the belt for driving the X axis, while along its bottom surface there is the optical scale. At the right end of the beam is fixed the X axis drive, and the pressure regulator of the column counterbalancing system is fixed at the left end. Two elastic X axis stroke end pads are also secured at the two ends of the beam.
- The central carriage represents the X axis and is assembled on the beam of the main carriage. It runs along the guide ways machined to the surfaces of the beam. The air bearings and optical readers of the X and Z axes and the reduction unit of the Z axis are fixed to the central carriage. The cable of the column counterbalancing cylinder and the stroke end stop are fixed to the top of the frame.
- The Z-rail moves vertically inside the central carriage and moves perpendicular to the floor, thus representing the Z machine axis. The weight of the assembly made up of the column, head and tool is balanced by an air supply system. This system is used to reduce the load on the elements of the drive system to a minimum. The optical scale of the Z axis is applied to the column. At the bottom end of the column there is the flange for attaching the measuring head.

Axis Sliding System

The three machine axes move independently of one another, thus enabling the tip of the probe to move freely in any direction inside the measuring volume. The machine's measuring volume is a parallelepiped, the sides of which are directed in the same way as the axes of the measuring machine and has the same lengths as the strokes of the machine axes. The measuring machine reference system consists of three Cartesian axes, X, Y and Z, whose origin lies at the top front left corner of the measuring volume.

The axis sliding system consists of air bearings that ensure the support and friction-free movement of the moving parts of the axes (main carriage, central carriage and Z-rail). The moving parts are supported by a flow of compressed air which comes from the pneumatic control unit. The air flow supplies the bearings so as to form an air cushion between the bearings and the guideways.

CAUTION:

Do not perform any operation on the components of the drive system apart from those specified in "[Maintenance](#)". Operations performed incorrectly may cause operating problems (for example, blocking), and a deterioration in the machine's precision.

Central Carriage (X Axis)

The central carriage (X axis) is guided by six air bearings that run along four guide ways machined into the surfaces of the beam. Three bearings run along the two guide ways positioned on the front surface of the beam, another two run on the lower flat guide way, while the last bearing runs in the tilted guide way machined into the rear edge of the beam.

Main Carriage (Y Axis)

The main carriage (Y axis) is guided by seven air bearings that run along guide ways machined into the granite work table. The bearing of the left leg runs on the flat guide way machined directly into the surface of the work table, while the three pairs of bearings applied to the bottom end of the right leg run on the three surfaces of the dovetail guide way machined into the right side of the work table.

Z Rail (Z Axis)

The Z-rail (Z axis) of Innova Classic/Innova Performance 06.xx.06 and 08.xx.06 series CMM is guided by seven air bearings fixed to the central carriage. There are no dedicated guide ways in that the surfaces of the rail are used as guide ways. The front and rear surfaces of the rail move on one and three bearings, respectively, while the lateral surfaces move on one and two bearings respectively.

The Z-rail (Z axis) of Innova Classic/Innova Performance 10.xx.08 series CMM is guided by nine air bearings fixed to the central carriage. There are no dedicated guide ways in that the surfaces of the rail are used as guide ways. The rear surfaces of the rail move on three bearings, while other surfaces move on two bearings respectively.

Axis Position Transduction System

Each axis is equipped with a linear optical transducer consisting of an optical scale and a position reader. When an axis moves, the position reader generates electrical pulses which it sends to the control system. The control system counts the pulses and converts them into the corresponding axis movement. The movement of an axis is always calculated with respect to a reference point, called “zero”, which corresponds more or less to the axis stroke end position.

Axis Drive System

The movements of each axis are driven by a cog belt system and direct current motor. The moving part of the axis is fixed, by means of a drive unit, to the closed-loop cog belt attached to two pulleys (one drive and one return pulley). The drive pulley is driven by a belt reduction unit.

Air Supply System

The air supply system consists of the pneumatic control unit and the supply circuits and its function is to:

- Supply the machine axis air bearing system;
- Supply the pneumatic cylinder for counterbalancing the weight of the column;

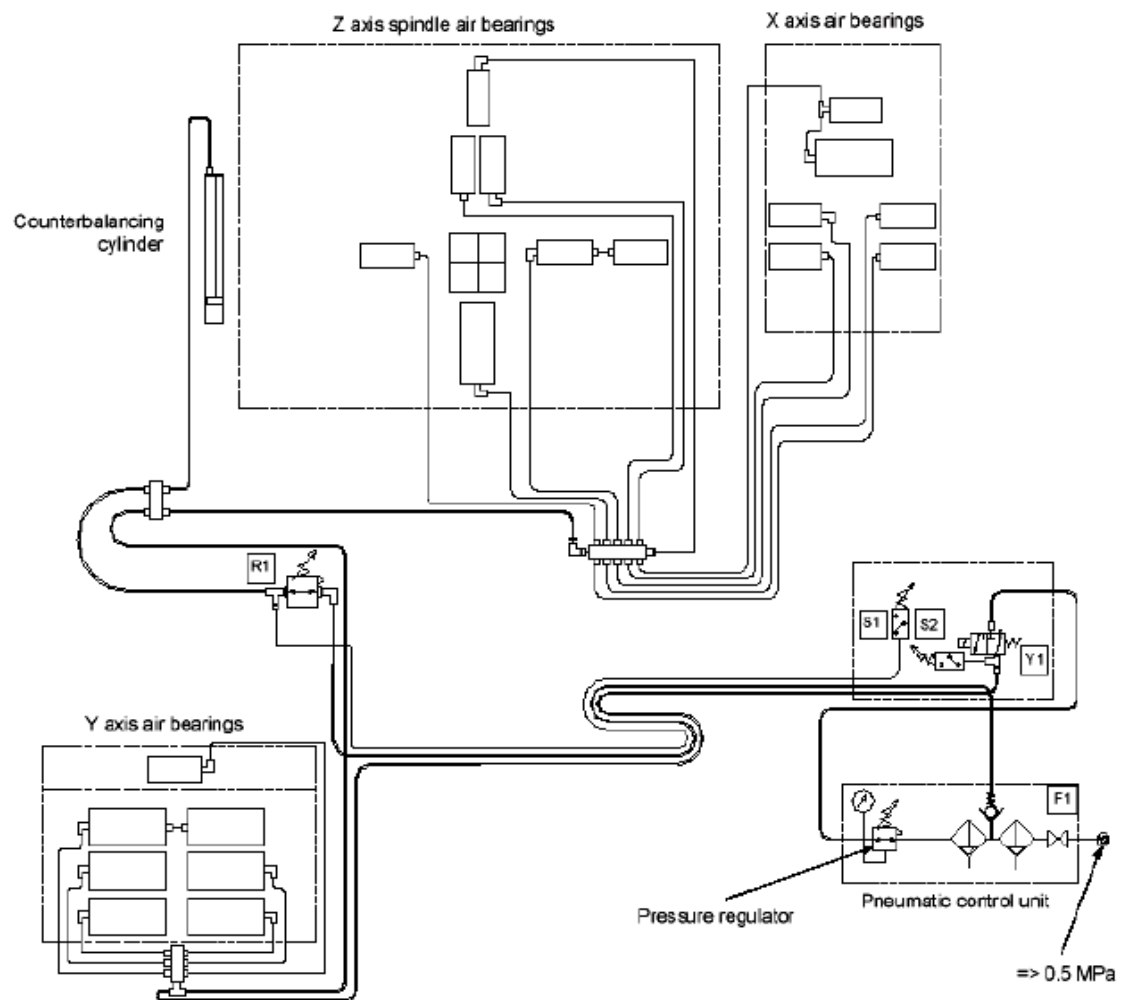


Fig. 1-5 Air Circuit Drawing (only for 06.xx.06 & 08.xx.06 Models)

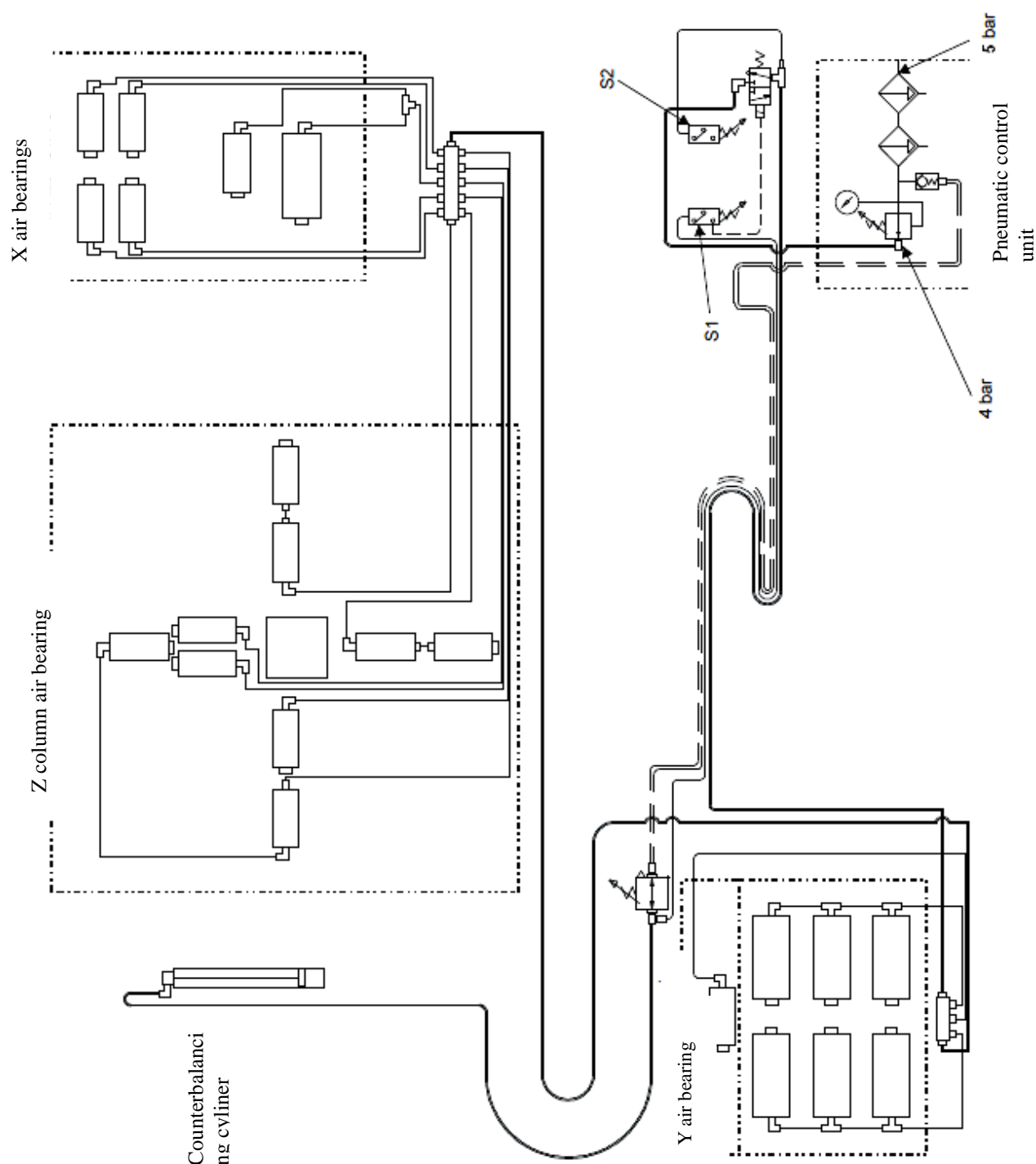
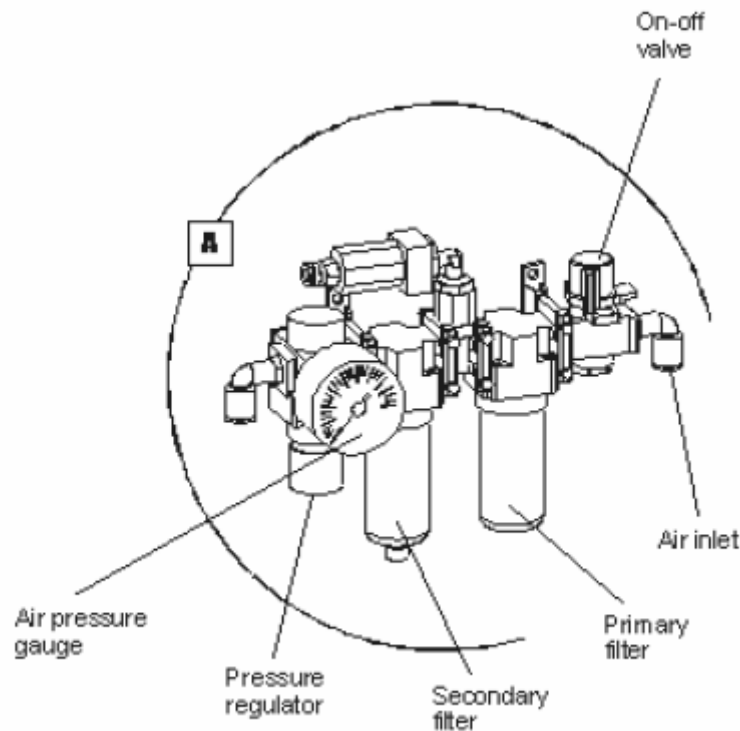


Fig 1-6 Air Circuit Drawing (only for 10.xx.08 Model)

Pneumatic Control Unit

The pneumatic control unit filters, regulates, and distributes compressed air to the circuits supplying the various machine components. The control unit is situated at the right side of the supporting stand. The filtering unit consists of a pair of self-cleaning filters (primary and secondary filter). There is also a pressure gauge and a manual pressure regulator for measuring and

regulating the air pressure at the input of the air bearing supply circuit, respectively;



Axis Air Bearings

The machine axis sliding system is made up of air bearings that run on guide ways and ensure the bearing and friction-free movement of the moving parts. The moving parts of the machine are borne by a flow of compressed air supplied by the pneumatic control unit to the air bearings so as to form a thin air cushion between the bearings and their corresponding guide ways. The pressure switch S2, situated near the main solenoid valve, measures the minimum pressure required at the input of the air bearing supply circuit and consequently only gives its consent to the axis driving motors if there is sufficient pressure.

Counterbalancing the Column

A special pneumatic cylinder counterbalances the weight of the column and the elements connected to it (for example, the head and tool). This cylinder is housed inside the column fixed to it; its rod is fixed to the top end of the frame. The cylinder generates a constant force capable of counterbalancing the weight of the column, irrespective of the position reached by the column during its movement. The force that the counterbalancing cylinder applies to the column is directly proportional to the pressure of the air inside it. For this reason, an automatic pressure regulator maintains the pressure inside the cylinder at a constant value equal to that set on the drive regulator. The drive pressure can be regulated as a function of the weight of the column and the

load applied to it, using the knob on the left of the beam. As for 06.xx.06 and 08.xx.06 series, the pressure regulator is installed inside the beam on its left. And the pressure regulator of 10.xx.08 series is installed at lower right position of beam.

The pneumatic circuit for counterbalancing the column is completed by the pressure switch S1, which is situated near the solenoid valve, and measures the pressure at the input of the counterbalancing cylinder. The pressure switch S1 gives its consent to open the solenoid valve that controls the inlet of air to the air bearing supply circuit, only if the precision value inside the counterbalancing cylinder lies within the range set. If it is not sufficient, the machine does not receive consent to move the axes.

Caution:

The drive pressure is set during machine installation and should not be modified.

Operating Instructions

This chapter contains the instructions to be followed to ensure safe and efficient use of the measuring machine.

Operating Safety Precautions

Read this section before starting to use the machine.

This machine is designed to reduce the risk of injury to the operator and damage to the machine to a minimum. It is not possible however to find precautions that cover all possible operating situations. Consequently, to reduce the risk of damage to persons and things yet further, the safety regulations indicated in this manual must be strictly respected.

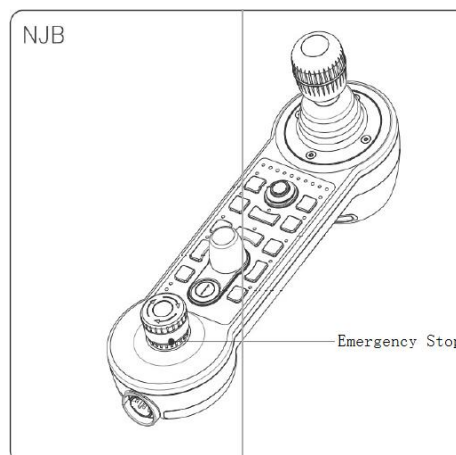
Safety issues in need of special attention



Warning:

The issues listed below need special attention, and the violation of them will cause injuries to persons and damages to parts.

- Don't let head under Z-axis spindle.
- After starting machine, check whether Z-axis spindle moves up or down slowly first, if so, please contact Hexagon Manufacturing Intelligence.
- Neither place hand on the CMM's legs nor lean on them in CMM's either standby or working mode.
- Don't place anything within the worktable guideways areas, and don't touch guideway directly with hand.
- Don't remove safety guards to repair measuring machine in private, otherwise, customer assume the responsibility caused by it.
- Don't let any part of operator's body within guideway areas or the space that movable parts of measuring machine can reach.
- Press the Emergency-stop button when loading or unloading parts.
- It's recommended strongly to contact Hexagon so as to make a complete check and maintenance at least once a year.



General Precautions

- Follow the safety regulations laid down by the company where you work. If you are not familiar with these regulations, consult your supervisor.
- Develop personal safety awareness. Observe all safety regulations and be alert for hazardous conditions. Discuss these conditions with your supervisor.
- Do not load, unload, use or adjust the machine without proper instructions.
- Never remove warning or instruction labels from the machine.
- Check the machine regularly to make sure there are no missing, loose, worn or damaged parts.
- Keep the machine clean. The work area around the machine must also be free of oil and chips.
- Make sure that all the machine's guards are in position, intact and securely fixed. Never use the machine without the guards in position.
- Do not deactivate any safety device by obstructing, excluding or disconnecting it. These devices are enabled to protect the operator and the machine itself.
- Always use the personal safety equipment indicated by your supervisor.
- Do not allow unauthorized staff to access to the machine when it is switched on.
- Never use the machine if it is malfunctioning. Stop work as soon as any error or fault occurs.
- Make a note of any faults and inform the maintenance engineers without delay. The fault must be repaired immediately.

Electrical Safety Precautions

- Make sure that the electrical system which controls the machine has an efficient ground connection.
- Make sure that the machine-numeric control assembly is connected to ground.
- Never open the doors of the control cabinet. Only allow authorized staff access to the control cabinet.
- Make sure that all external cables are enclosed in special ducts.
- If extension cables are used, check for worn insulation or exposed wires. Never use defective cables.
- Do not pass the cables into cracks or areas where there is water or oil.
- Never touch electrical equipment with wet hands. Never activate electrical circuits while standing on a wet surface.

When Measuring Parts

- Before using the machine, ensure that there are no parts, tools or materials that may prevent it from functioning.
- Keep your hands away from all guards and openings in the machine's casing while the carriage is in motion. Never cross the protective guards while the machine is working.
- Never attempt to stop or slow down any part of the machine with your hands or any makeshift devices.
- When executing a part program, perform the test cycles at a reduced speed, keeping one hand close to the emergency stop button.

- Do not move any moving parts of the machine, if the air pressure is below the required value. This would cause serious damage to the machine.
- Make sure that the arm, the measuring head and the body of the measuring tool do not strike the part.

CAUTION

Moving the machine axes manually is strictly prohibited.

Starting the Measuring Machine

Starting the measuring machine is one of the operations necessary to start the entire measuring system (measuring machine, control system and measuring software).

Before starting up the measuring machine, ensure that you have taken the precautions listed in the "[Operating Safety Precautions](#)".

Starting the Measuring Machine

1. Open the tap of the main air supply.
2. Complete the measuring system startup procedure by following the instructions given in the user manuals of the control system and measuring software.

Stopping the Measuring Machine

Before stopping the measuring machine, ensure that the machine is not moving so as to avoid damage to the machine, the parts being measured and the tools used.

Stopping the Measuring Machine

1. If possible, move the central carriage to the -Z position (at the bottom of its stroke).
2. Close the tap of the main air supply to avoid wasting air and ensure optimum safety conditions.

Fixing the Part to the Work Table

The part and the fixtures may be fixed to the bed using the threaded inserts machined into the granite bed.

Characteristics of threaded inserts	M8 x 1.25 Length of thread 20 mm.
-------------------------------------	--------------------------------------

CAUTION

Never apply a tightening torque of more than 20 Nm. Excessive tightening of the bolts may cause the inserts to come unstuck or cracks to appear in the granite work table.

Technical Data

This chapter specifies the strokes of the machine axes and the overall dimensions for all models of the measuring machine. The chapter also indicates the maximum weight of the measuring machine and the part according to the strokes of the axes, as well as the machine's technical characteristics and operating conditions.

Mechanical Characteristics

- **06.xx.06 and 08.xx.06 Models**

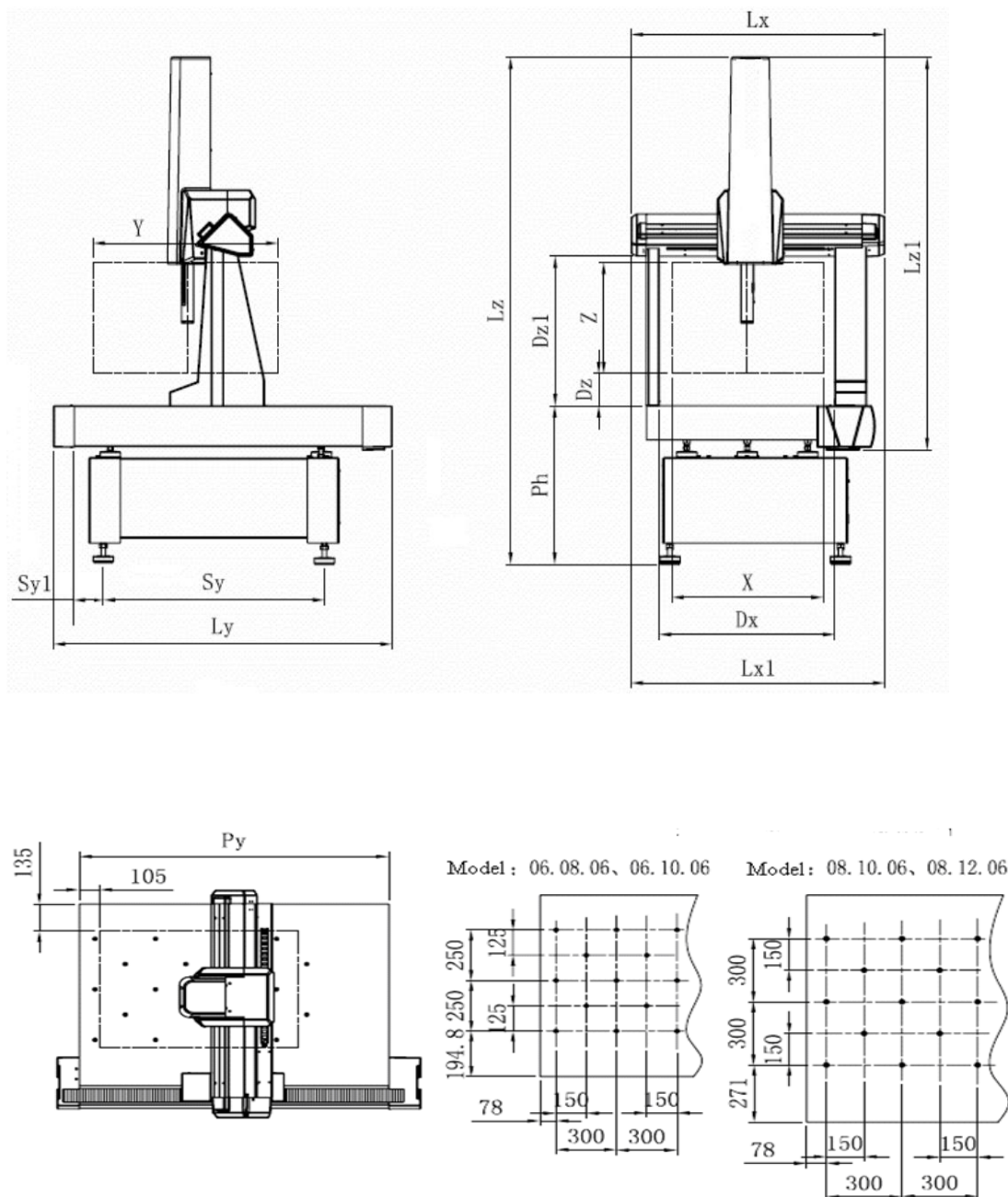
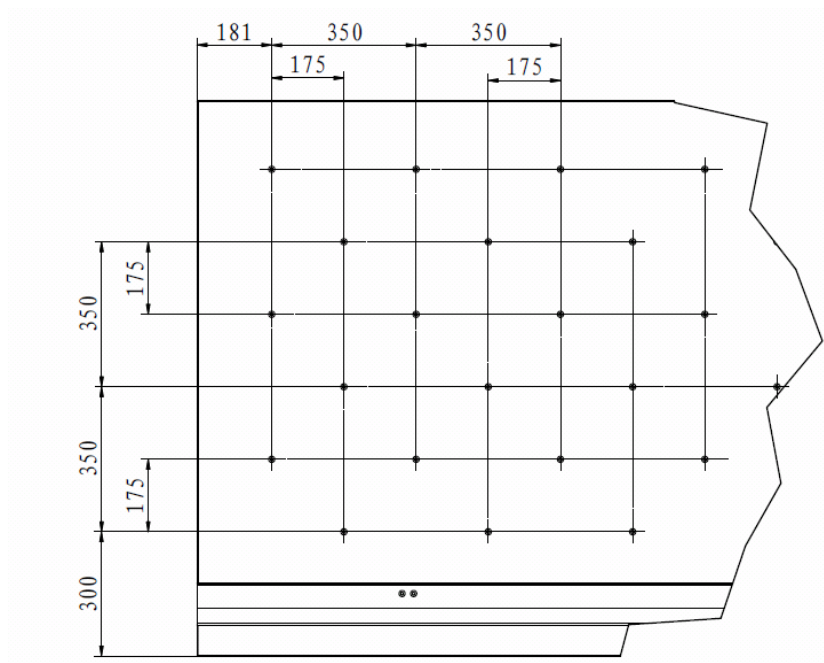
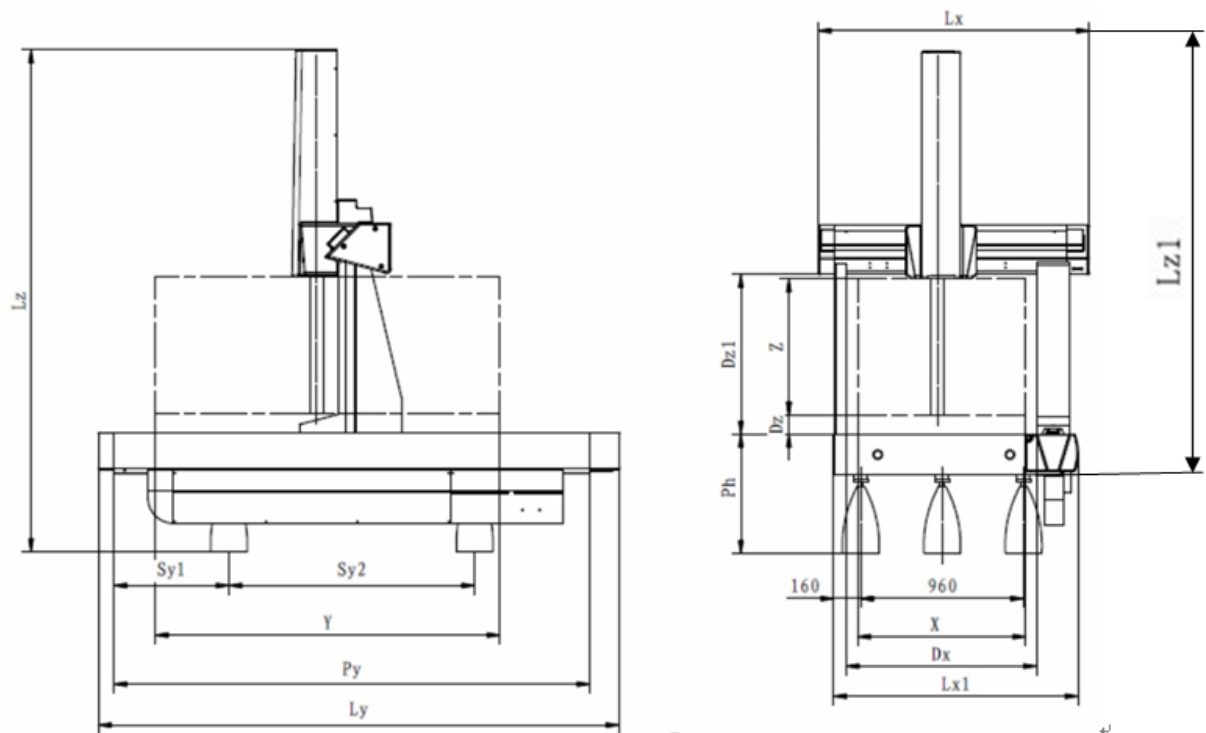


Figure 1-1 Overall Dimensions (for 06.xx.06 and 08.xx.06 series only)

10.xx.08 Models



Inserts

Figure 2-2 Overall Dimensions (for 10.xx.08 series only)

■ Explorer dimensions

Models	Strokes (mm)			Overall Dimensions(mm)					Daylights(mm)		
	X	Y	Z	Lx	Lx1*	Ly	Lz	Lz1**	Dx	Dz	Dz1
06.08.06	600	800	600	1150	1750	1623	2638	2130	734	144	794
06.10.06	600	1000	600	1150	1750	1823	2658	2130	734	144	794
08.10.06	800	1000	600	1350	1950	1823	2658	2130	934	144	794
08.12.06	800	1200	600	1350	1950	2023	2658	2130	934	144	794
10.12.08	1000	1200	800	1600	2150	2177	2936	2560	1130	118	940
10.15.08	1000	1500	800	1600	2150	2477	2946	2560	1130	118	940
10.21.08	1000	2100	800	1600	2150	3077	2946	2560	1130	118	940

Note: * represents the minimum width of the door and ** represents the minimum height of the door

■ Explorer worktable, supports and weight

Models	Surface Plate (mm)		Supports (mm)		Max. Part Weight (kg)	Machine Weight (kg)
	Ph	Py	Sy	Sy1		
06.08.06	784	1355	1037	140	300	730
06.10.06	804	1555	1237	140	300	890
08.10.06	804	1555	1237	140	500	1074
08.12.06	804	1755	1437	140	500	1196
10.12.08	690	1910	1000	455	1300	1785
10.15.08	700	2210	1200	505	1500	2090
10.21.08	700	2810	1450	680	1800	2625

Technical Characteristics

Operating Conditions

Minimum supply pressure	0.5 MPa (5 bars)
Maximum supply pressure	< 0.8 Mpa (8 bars)
Input flow rate to the control unit (ANR) UNI ISO 8778	7.5 dm ³ /s (450 NI/min)
Air consumption (ANR) UNI ISO 8778	1.5 dm ³ /s (90 NI/min)
Working temperature range	+10° ~ +45°C
Relative humidity	>20% <90% , non-condensing
Noise (weighted equivalent continuous sound pressure level)	<70 dB (A)
Air supply output temperature	20±4°C

Conditions for Maximum Measuring Precision

The best possible performance of the measuring machine is ensured during operation if the environmental requirements specified in the table below and, more generally, in the relevant Hexagon Manufacturing Intelligence procedure are strictly respected.

Environmental temperature around the machine (*)	20 ± 2°C
Maximum temporal thermal gradient in the volume containing the machine (*)	1°C/h, 2°C/24h
Maximum linear temperature gradient in the volume containing the machine (*)	1°C/m (vertical), 1°C/m (horizontal)
Vibrations on the installation site	Within the limits specified in the “ Site Preparation Guide ”.
Relative humidity	25~75 %

(*) In accordance with the ISO 10360-2 standard.

Electrical Power Supply

The measuring machine is powered by the control system. See the requirement below:

Voltage	AC 110V/220V±10%
Frequency	50/60HZ
current	15A
power	2000VA
grounding resistance	≤4Ω

Work Table

Material	Granite
Flatness	Compliant to DIN 876/III
Part fixing	M8 x 1.25 threaded inserts; thread length 20 mm.

Column Counterbalancing System

Type	Pneumatic and adjustable.
Maximum weight applicable to the column	3 kg
Maximum weight that can be added to or removed from the counterbalanced column without having to rebalance the weight of the column itself and without affecting the machine's measuring precision.	1 kg

Maintenance

This chapter provides a description of the routine maintenance procedures indicated by Hexagon Manufacturing Intelligence to ensure that the measuring machine works in a safe and continuous mode. Before proceeding to carry out any maintenance work, the maintenance staff must be familiar with all the contents of this chapter.

Maintenance Safety Precautions

Read the maintenance part of this manual thoroughly **before carrying out any maintenance work** on the machine. Failure to follow the procedures recommended in this manual may result in injury to persons or damage to equipment.

General Precautions

- Get to know the machine, including its control and safety devices and how it works, before carrying out any maintenance work.
- Since guards and safety covers often have to be removed in order to carry out the maintenance work, make sure you follow all the safety procedures listed here.
- Never remove warning and/or instruction labels from the machine.
- Never lock, override or disconnect any safety device to prevent it from performing its function. These devices are installed to protect the machine operator and the machine itself.
- Do not leave instruments, tools or other material on the bench. Do not use the bench as a work table. Scattered tools and materials may cause injury to persons or damage to things.
- If in doubt about how to perform a given maintenance operation, ask for instructions before proceeding any further.

Electrical System

- Disconnect all electrical power sources before attempting to carry out maintenance or repairs. Make sure that **nobody** can turn the power on while you are working. Put up warning notices to prevent the machine being powered unintentionally or by unauthorized persons.
- Never touch electrical devices with wet hands. Never activate electrical circuits while standing on a wet or damp surface.
- Never attempt to modify the machine's electrical power system. Any unauthorized change to the machine's wiring voids the warranty and may cause it to malfunction and create a risk of injury to persons or damage to things.

Guards and Covers

- During maintenance work, it may be necessary to remove guards and safety covers. In these cases, special attention may be paid to the exposed mechanisms. Make sure that you reassemble all guards when you have finished the maintenance work.
- When covers are removed, mechanical parts in which things may get trapped are exposed. Keep your hands and any loose clothing away from all mechanisms, even if at rest.

Air Supply System

- Before carrying out work on the air supply system, the pressure must be reduced to zero.

- Do not attempt to move the bed, carriage, ram or any moving part of the machine, when the air pressure is below the required value. Serious damage to the machine would occur.
- After carrying out maintenance work, before repressurizing the air supply system, make sure that the main air supply and the machine's pneumatic control unit is correctly connected, and that all the guards, covers and fittings are securely in place.

General Maintenance Information

The Innova Classic/Innova Performance measuring machines were designed and built in such a way as to ensure reliable operation and minimum maintenance requirements.

The maintenance operations must, in any case, be performed by trained engineers, i.e. by persons with technical know-how or experience, or who have received specific instructions about the maintenance operations to be performed.

Preventive Maintenance

The preventive maintenance operations described in this chapter are to be carried out by the Customer.

All preventive maintenance operations must be performed with great care so as not to cause deterioration in the functioning and performance of the measuring machine.

These operations are to be performed at the frequency suggested in the preventive maintenance schedule. However, the specified frequency may be adapted to the environmental conditions of the installation site and the number of hours the measuring machine is operated for.

Extraordinary Maintenance

Extraordinary maintenance operations are not described in this chapter. They must be performed by specially trained engineers. We recommend that you contact the Hexagon Manufacturing Intelligence customer service.

Hexagon Manufacturing Intelligence Customer Service

In order to ensure that the machine is kept in optimum operating conditions, we suggest you stipulate a maintenance contract with the Hexagon Manufacturing Intelligence customer service.

Preventive Maintenance Intervals

The recommended intervals for preventive maintenance are Daily, Monthly and Quarterly. These intervals are based on eight hours per day and forty hours per week of machine operation.

If the machine operates for more than eight hours a day or five days a week, the maintenance schedule should be adjusted as follows:

- Daily or every 8 hours of operation
- Monthly or every 165 hours of operation
- Quarterly or every 500 hours of operation.

For example, if a machine is operated for two eight-hour shifts per day, monthly maintenance should be carried out every two weeks. If the machine is used less than eight

hours per day or less than five days per week, the regular Daily, Monthly, and Quarterly schedules should be changed accordingly.

Accessing Components Covered by Guards

Where necessary, before carrying out maintenance operations with the machine open, remove the guards covering the components that are to be repaired so that the work can be done comfortably and safely.



WARNING

The machine must be turned off before guards may be removed and maintenance work may be carried out.

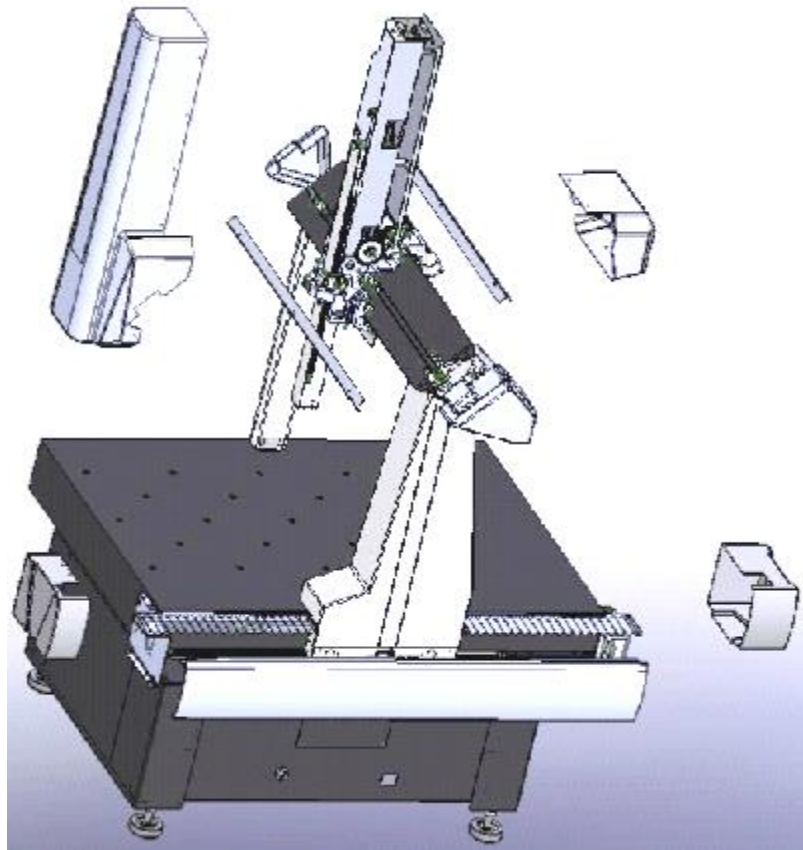


Figure 4-1 06.xx.06 and 08.xx.06 series Fixed Guards

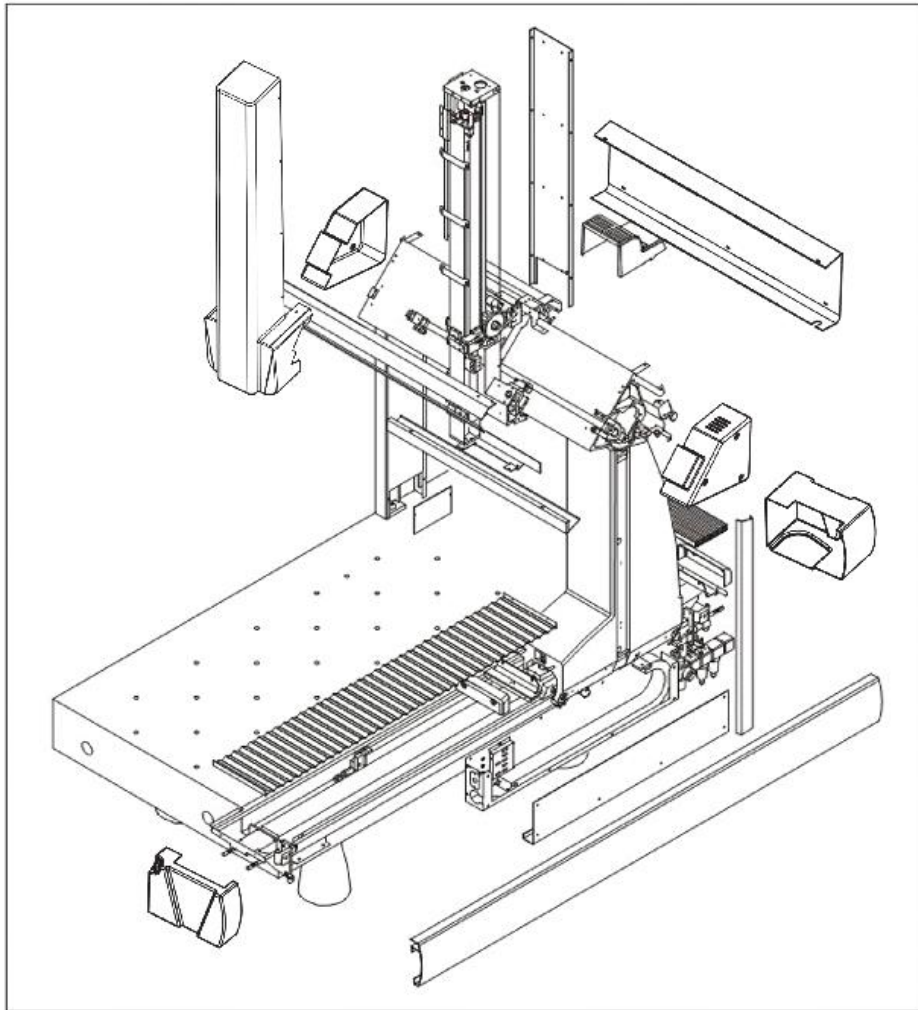


图 4-2 10.xx.08 series Fixed Guards

Removing Fixed Guards

To remove the fixed guards of the machine, simply remove the screws that secure these components to the machine structure.

Having completed the maintenance work, reassemble the guards using all the screws and washers removed during disassembly.

Preventive Maintenance Schedule

This program lists the necessary preventive maintenance operations and specifies the frequency with which these operations are to be performed.



WARNING

Turn the Main Switch to OFF, before making adjustments, removing or replacing covers, guards and components or making inspections requiring physical contact with the machine. If the inspections and adjustments require the machine to be powered, great care must be taken to prevent personal injury.

Daily or Every 8 Hours

- Make a visual inspection of the machine. Check that there are no missing or damaged parts, or abnormal vibrations.
- Check the guards and covers. Repair any damaged ones and replace any missing ones.
- Check the pressure in the air supply system on the pressure gauge of the pneumatic control unit. This is also the pressure of the air on the air bearings.
- Check the devices for automatically cleaning the filters of the pneumatic control unit.
- If necessary, clean the work table with aviation gasoline or denatured alcohol. Use a clean, soft and lint-free cloth (such as medical gauze or equivalent material).
- If necessary, clean the optical scales and the guideways (only those without protection and therefore readily accessible).
- Check that the column is correctly counterbalanced, after starting the machine and assembling the head and tools.

Monthly or Every 165 Hours

- Make a visual inspection of the machine. Check that there are no missing or damaged parts, or abnormal vibrations. Tighten any loose screws and nuts. Replace any missing screws or nuts.
- Clean the optical scales and the guideways of all the axes (where necessary, remove the guards covering them).
- Check the devices for automatically cleaning the filters of the pneumatic control unit.
- Clean the structure and painted guards of the measuring machine; use industrial detergents soluble in water (the use of other products may cause damage to the paintwork). Prevent the detergent liquid from coming into contact with the other components of the measuring machine (for example, guideways, optical scales and racks).

Quarterly or Every 500 Hours

- Check that the buttons and switches are not broken or damaged, and that they work properly.
- Check the condition of the air pipes for air leaks. Check that the cables show no signs of abrasion or wear.
- Access the pneumatic control unit to:
 - Clean the primary filter. Replace it if necessary.
 - Check the state of the secondary filter. Replace the filter if necessary.

Every five months or every 850 hours

- Grease the rod of the counterbalancing cylinder.
- Check the axis reduction and driving belts. If there are any signs of wear or they are loose, call the Hexagon Manufacturing Intelligence customer service. *Never attempt to service components of the drive system. Maintenance*

carried out incorrectly may cause functional problems or deterioration in the precision of the machine.

Preventive Maintenance Instructions

This section contains information and the instructions required to carry out the maintenance operations specified by the preventive maintenance schedule.

CAUTION

Do not use the following solvents on the machine under any circumstances: acetone (dimethylketone), chlorinated solvents (for example, trichloroethylene and chlorophen), benzene, methyl alcohol and, in general, branched-chain solvents.

Air Bearing Guideways

The guideway must be kept clean and must never be greased or treated with any substance.

To clean the guideway use a soft, clean, lint-free cloth (e.g. medical gauze or equivalent), moistened with aviation gasoline. Move the moving parts of the machine to clean the entire length of the guideway.

If, during maintenance operations, signs of abrasion or scraping are found on the guideway, do not use the machine but contact the Hexagon Manufacturing Intelligence customer service.

Optical Scales

The optical scales must be kept clean and must never be lubricated or treated with any substance.

Clean the optical scales using a soft, clean, lint-free cloth (e.g. medical gauze or equivalent), moistened with denatured alcohol or aviation gasoline. Move the moving parts of the machine to clean the entire length of the optical scale.

After cleaning, let the optical scales dry before using the measuring machine.

CAUTION

Do not perform any operations on the sliding system components other than those specified in this section. Operations performed incorrectly may cause functional problems or deterioration in the precision of the machine.

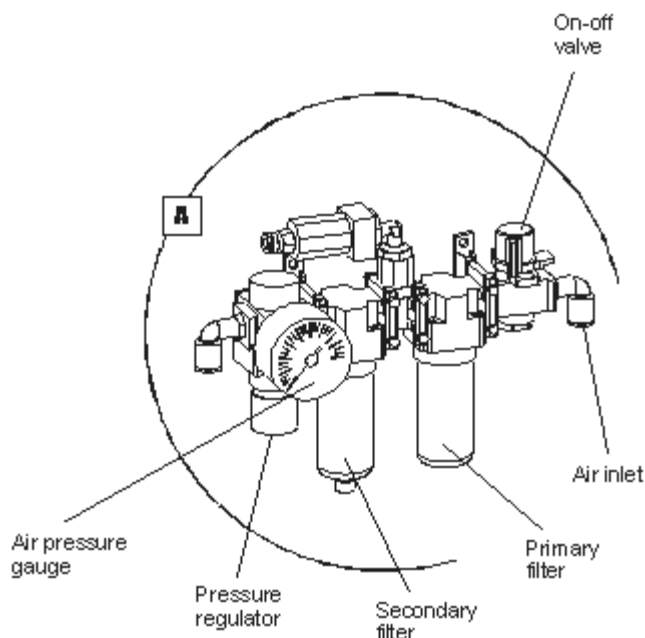
If counting errors are found after maintenance operations (or while using the measuring machine), contact the Hexagon Manufacturing Intelligence customer service.

Counterbalancing Cylinder Rod

With the frequency recommended in the maintenance schedule, spread a thin layer of grease on the pneumatic cylinder rod. Use KLÜBER MICROLUBE GL 261 grease or equivalent class NGLI 1 grease (ISO 3448).

Air Supply System

This section contains the instructions for the preventive maintenance of the air supply system of the measuring machine.



Checking and Regulating the Pressure of the Air Supply System (Air Pressure on Air Bearings)

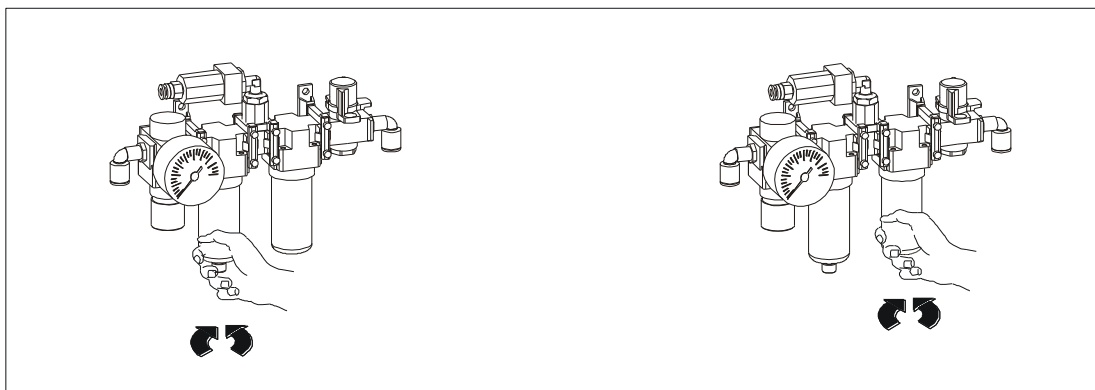
With the frequency indicated in the maintenance schedule and after carrying out maintenance work on the pneumatic control unit filters, check and, if necessary, regulate the working pressure rating using the pneumatic control unit pressure regulator.

Models	Working Pressure
06.xx.06,08.xx.06	0.45 MPa
10.xx.08	0.45 MPa

If the pressure switch situated below the pneumatic control unit sets the measuring machine in emergency status, check the state of the filters. If either or both filters are clogged, the air supplied to the pressure switch will not reach the pressure necessary to load it; in this condition, the pressure switch sets the measuring machine in emergency status. If this happens, one or both filters must be replaced.

Cleaning and Replacing the Filters

The pneumatic control unit is fitted with a pair of self-cleaning type filters; the impurities are automatically removed when the air supply is switched off.



To clean a filter:

3. Close the on/off valve.
4. Remove the transparent polycarbonate cup.
5. Remove the filter and then, with a compressed air jet, remove any solid residue from it. If the air jet is not enough to clean the filter completely, wash it with a neutral detergent (soap and water) and use the air jet again.
6. Wash the cup with neutral detergent.
7. Insert the filter in its compartment and reassemble the cup.
8. Measure and, if necessary, regulate the working pressure.

To replace a filter:

9. Close the on/off valve.
10. Remove the transparent polycarbonate cup.
11. Wash the cup with neutral detergent.
12. Insert the new filter and reassemble the cup.
13. Measure and, if necessary, regulate the working pressure.



W A R N I N G

The use of ethanol and heptane is subject to safety regulations. The legislation in force must be respected.
