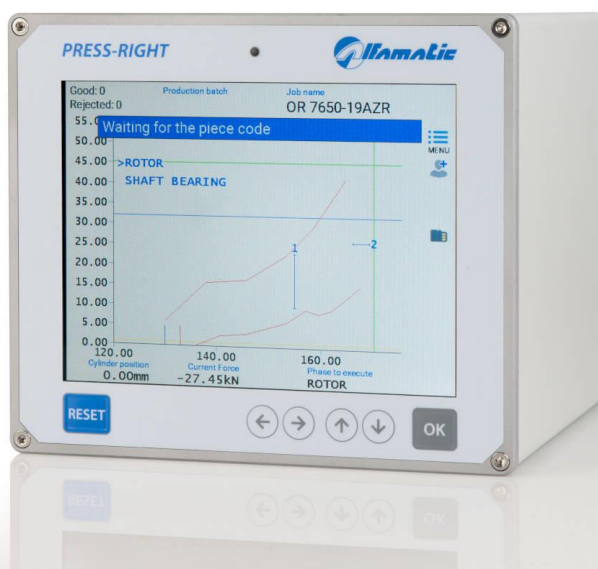


# USER MANUAL

## ***PRESS-RIGHT*** FOR PNEUMATIC AND HYDRAULIC PRESSES

- User manual





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# 1 General information

*Press-Right* is a measuring instrument which, connected to a press, guarantees the quality control of the production processes.

Connected to a position transducer and a force transducer, it continuously detects the instantaneous position and force.

## 1.1 Notes on control theory

During machining on sample pieces, the data relating to the position of the cylinder and the force exerted by it are recorded; the position-force graph can be traced which is characteristic of the work performed.

If several machining operations are performed on similar pieces, the respective position-force curves will also be similar. If, on the other hand, one of the pieces differs from the sample, the relative curve will deviate from the sample curve. It is intuitive how curve control can ensure consistent machining quality. It is clear that monitoring the curve can ensure the quality control of the production processes.

## 1.2 Control of position-force curve

From a theoretical point of view there is an ideal curve that may be obtained by manufacturing perfect pieces (in practice a sample curve may be obtained by carefully manufacturing selected pieces). Any geometric tolerance or difference in materials result in a curve that is different from the ideal curve.

In practice, there is a tolerance range around the sample curve such that, if the curve obtained from the current process does not stay inside such range, the piece is classified as rejected.

The piece is good only if the analysis of the minimum/maximum limits and the tolerance range have a positive result.

The limits control the height and force values reached. The limits are as follows: minimum force, maximum force, minimum position and maximum position. If the position reached is lower than the minimum limit or exceeds the maximum limit, the piece is rejected. In the same way, if the force reached does not exceed the minimum or exceeds the maximum one, the piece is rejected.

The check points are used to control the curve in discrete points, for example it is possible to check that in a pre-established position the measured force is between a minimum and a maximum, or that at a pre-established force the run performed is between a minimum and a maximum. If the values measured in a check point are not within the minimum and maximum values, the piece is rejected.

By acting on the reject management settings, it is possible to define how the machine should behave in the event of reject. The behavior can be set differently for each single type of reject. For example, it is possible to set that, only when the curve comes out of the upper edge of the band, the press must stop immediately or it must block with a request for a password.

### 1.3 Absolute and relative positions

The positions referred to the cylinder zero point are referred to as absolute positions. The positions referred to the contact point on the manufactured piece are referred to as relative positions. Press-Right may set both the absolute and the relative positions. In order to measure the contact point on the manufactured piece, Press-Right use the force transducer: when the force measured exceeds the **CONTACT DETECTION THRESHOLD** value, the relative zero point is set. This “zero point” is called **CONTACT POSITION**. The contact position may be monitored by using two limits, a minimum and a maximum value.

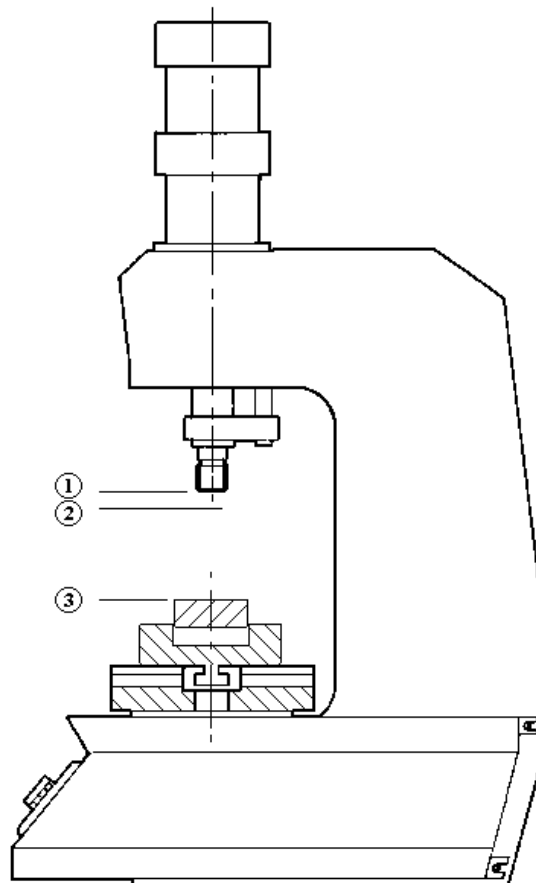


Figure 1

- ① **Cylinder rest position**
- ② **Absolute zero point (transducer zero)**
- ③ **Relative zero point (contact position)**

The accuracy of the measured contact position cannot be high. It depends on the cylinder speed and, in particular, on the type of piece to be manufactured. For example, in shrinking operations, the two pieces have chamfered edges; as a result, the contact position varies also based on the chamfer and the force used to position a piece into the other. The threshold value is set from the menu **EDIT JOB > CONTROL LIMITS > CONTACT DETECTION THRESHOLD**.

## 2 Installation of *Press-Right*

For the installation of the device on the machine, please refer to the specific manual.



### 3 Getting started

This chapter will walk you through the basics of programming and using the Press-Right instrument.

To better illustrate the operations, it is advisable to carry out the tests in practice; to do this it is very useful to have an elastic support of adequate strength to simulate repeated machining.

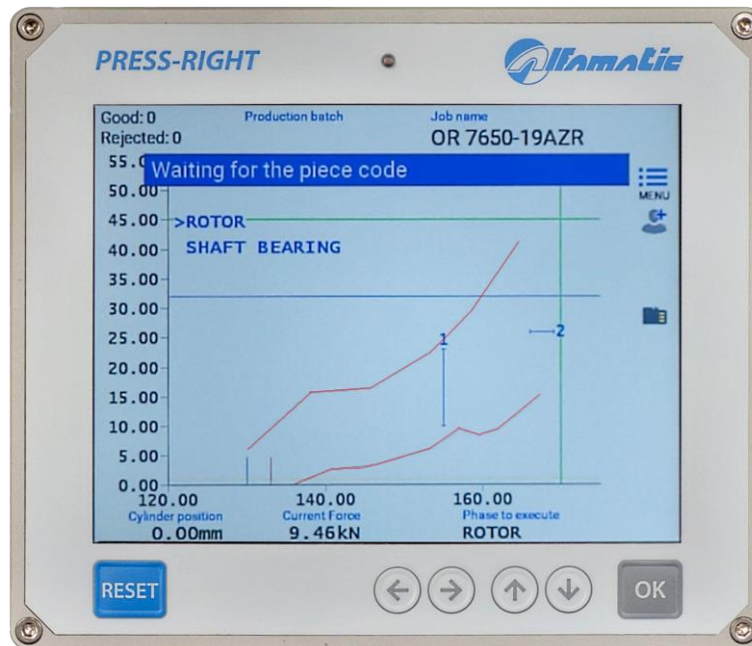


Figura 1

To turn on the instrument there is a button on the back. When it is pressed, after a few seconds, the display lights up and the graph appears.

#### 3.1 The keyboard of *Press-Right*

If you touch the menu button, the items that make up the main menu are displayed. To select an item in the menu it is possible to move with the arrow keys and press the OK key or it is possible to directly touch the item itself.

The RESET key cancels the operations and allows you to return to the main screen.

#### 3.2 First approach

A few seconds after being switched on, the display lights up and shows the main screen. The main screen displays the graph area and below it the values measured by the connected transducers.

First let's create a simple job:

- Touch the menu button
- Touch the item **JOBS LIST**
- Touch the item **CREATE A NEW JOB**
- Enter the name that identifies the job (example TEST 1) and press the OK key.

**Note:** in the rest of this manual, when it is indicated, for example, select the **JOBS LIST > CREATE A NEW JOB** command, we intend to touch the menu button, then touch the **JOBS LIST** item and finally touch the **CREATE A NEW JOB** item.

Once the job has been created, indicate to the instrument when it must stop the press by entering a stop value. The stop value can be a position value or a force value. The difference in usage is explained in chapter **Errore. L'origine riferimento non è stata trovata..** Press **EDIT JOB > STOP VALUES > STOP FORCE**, enter a value lower than the maximum force that the press can exert and confirm.

By giving the machine start command, the press will advance and exert a force that will increase to the stop value we have just entered.

If you have entered too high a stop force value, the press remains in thrust; to stop the press manually, press the RESET button. In this case the workpiece is discarded as the job has been interrupted.

Chapter **Errore. L'origine riferimento non è stata trovata.** explains in detail how to create a useful job.

### 3.3 Setting the display

The central part of the display is occupied by the position-force graph. You can change the full-scale values using the commands in the menu **EDIT JOB > GRAPH SETUP**. If the curve is not visible, these values must be changed.

### 3.4 The main menu

**Note:** Some menu items are not visible if not required.

The main menu is the first one displayed by pressing the menu button.

The main menu item **JOBS LIST** allows the selection of the job to be performed, the creation of a new job or the deletion of the job in use.

The item **EDIT JOB** allows the modification of all parameters of the job in use. See chapter **Errore. L'origine riferimento non è stata trovata..**

The **PHASE EDIT** item is visible when the job is divided into several phases. It allows the modification of all parameters of the displayed phase.

The **SHOW MEASURED VALUES** item displays the values measured during the last cycle.

The item **TOOLS** allows the configuration of the instrument to be changed.

The item **RESET COUNTERS** is used to reset the workpiece counter to zero.

## 4 The jobs

The *Press-Right* stores all settings (parameters, band and counters) for different jobs in an internal memory. Each group of settings is called a 'Job'. Each job has its own name.

In the main menu you will find the item **JOBS LIST**. Via this menu, it is possible to choose a job from those present, create a new one, or delete the job in use.

### 4.1 Creating a new job

To create a new job, use the command **LIST JOBS > CREATE A NEW JOB** and give it a name. As a name you can use the number of the drawing, the name of the customer or whatever you prefer for easy identification.

When creating a new job, you are asked if you want to make a copy of the job currently in use. If you choose to copy the job in use, the parameters of the job in use will be duplicated and will remain unchanged.

After creating the job, you will be able to set the parameters, options and band.

### 4.2 Select a job

In the **JOBS LIST** menu is the command **SELECT JOB**. When this command is selected, the list of existing jobs is displayed. Next to the name, the date and time when the job was last changed is shown.

If the list is very long, search for the name by touching the magnifying glass icon.

It is possible to prevent the job selection using a password. To do this, you need to select the **Jobs selection** option from the **TOOLS > PASSWORD > FUNCTIONS WITH PASSWORD** menu.

### 4.3 Modifying the Job Name

To change the name of a job, it is first necessary to select it. Once you have selected the job whose name you want to change, you can use the command **EDIT JOB > PROPERTIES AND OPTIONS > NAME OF JOB**.

### 4.4 Selecting a job using a bar code

If a bar code reader is connected, it is possible to select the job automatically by simply reading the bar code. To activate this function, the option **JOBS WITH IDENTIFICATION CODES** must be activated in the menu **TOOLS > SETUP > SETUP CODES**.

After activating this option, it is possible to assign up to seven codes to each job in the menu **EDIT JOB > PROPERTIES AND OPTIONS > CODES OF THE JOB**.

## 4.5 Job selection via tools recognition

Sensors can be connected to the machine to automatically recognise the equipment used. The equipment can be the tool, the set-up or simply an electric selector switch. These recognition signals can be used to automatically select the job to be used.

To activate equipment recognition, the relevant options must be configured in the menu **TOOLS > SETUP > ELECTRICAL CONNECTIONS > TOOLS**.

After configuring the equipment recognition, the automatic selection must be activated in **TOOLS > SETUP > SETUP CODES**. Finally, the jobs must be assigned the corresponding identification code in the menu **EDIT JOB > PROPERTIES AND OPTIONS > CODES OF THE JOB**.

## 4.6 Selecting a Job via Fieldbus

It is possible to select jobs through fieldbus in three different ways:

1. Through an index number.
2. Through the identification code.
3. Through the name of the job.

To select a job through the index, you must first activate the option **JOBS SELECTABLE BY INDEX** present in the menu **TOOLS > SETUP > SETUP CODES**. After activating the option, to select the job it is sufficient to write the index in register 90. It is also possible to know the index of the job in use by reading the same register 90.

To select a job through the identification code, you must first activate the option **JOBS WITH IDENTIFICATION CODES** present in the menu **TOOLS > SETUP > SETUP CODES**. After activating the option, you must assign the corresponding identification code to the jobs through the menu **EDIT JOB > PROPERTIES AND OPTIONS > CODES OF THE JOB**. Finally, to select a job, you must first write the desired job code in register 45 and then write the command 2 in the *Control Word* register.

To select a job by name, you must first write the desired job name in register 45 and then write command 3 in the *Control Word* register.

## 4.7 Changing Job Codes

To assign codes to the job, first select the job and then go to the menu **EDIT JOB > PROPERTIES AND OPTIONS > CODES OF THE JOB**. Depending on the configuration it will be possible to enter the identification codes and the equipment identification number.

*Notes:*

When the code entry window is displayed, it is possible to use the barcode reader to automatically enter the job identification code.

If an @ is entered in the code, this character will be ignored when comparing with the read code.

## 4.8 Copy a job

To copy a job, you must first select the job to copy; once the job to be copied has been selected, the new job must be created using the **JOBS LIST > CREATE A NEW JOB** command and, when asked to copy the job, answer YES.

## 4.9 Deleting a job

The **DELETE JOB** command is present in the **JOBS LIST** menu. This command allows you to permanently delete the job in use.

## 4.10 Modify a job

The **EDIT JOB** menu allows the modification of all the parameters that make up the job. If the job has several phases in this menu, it will be possible to modify the parameters common to all the phases while the modification of the parameters of each single phase will be possible from the **MODIFY PHASE** menu.

*Note:* In general, in jobs, parameters set equal to zero will be ignored by the instrument.

## 4.11 Job counters

Each job has a piece counter. To access the counter options select **EDIT JOB > SCHEDULING**.

In this menu it is possible to reset the piece counter or choose a maximum number of pieces to block the instrument.

## 4.12 The graph

The menu item **EDIT JOB > GRAPH SETUP** allows you to modify the values of the graph axes to enlarge and show the interesting part of the position-force curve.

### **AUTO RANGE**

This function adapts the scale of the graph to display the curve of the last machining performed.

### **GRAPH ORIGIN**

It is the origin value of the horizontal axis of the positions, this parameter allows you to hide all the uninteresting stroke, such as the approach stroke. If relative dimensions are used, the origin should normally be set equal to zero.

### **END SCALE POSITION**

The end scale of the dimensions indicates the maximum stroke which is displayed in the graph.

### **END SCALE FORCE**

The end scale of the forces indicates the maximum force that is displayed in the graph.

#### **4.12.1 How to set up the graph**

After executing a piece, it is possible to view the measured values. From these it is possible to obtain the values of the graph axes.

As the origin of the graph, enter a value slightly lower than the measured starting height.  
As full scale of the quotas, enter a value higher than the measured quota reached.

As full scale of the forces, choose the value higher than the measured reached force.

For convenience, the values measured in the last pressing are shown in the value entry box.

## 4.13 Options and rejected management



In the job, in addition to the generic options, there are options for waste management, options for supplementary test signals, options for machines with multiple force transducers and options for equipment control. All these options are accessible from the **EDIT JOB > PROPERTIES AND OPTIONS** menu.

## 4.14 Phase management

It is possible to manage multiple processing stages for a single job. The phases can be considered “sub jobs” which contribute to the completion of a more complex process (for example the insertion of a bearing and a gear on the same shaft).

The phase management functions are normally hidden. To make them visible, select the **JOB PHASES MANAGEMENT** option in the **TOOLS > SETUP > VISIBLE OPTIONS** menu.

To use more phases, it is necessary to enable the execution of the phases in the menu **EDIT JOB > ENABLE PHASES**.

Once you have enabled the phases, you can change their name. The list of phases is always visible in the upper part of the graph, with the keys   it is possible to change the phase displayed and modify its parameters with the **MODIFY PHASE** menu.

The phases will be performed automatically in sequence. If you want to carry out a phase individually out of sequence, select the **PHASE TO EXECUTE** menu.

## 4.15 Channel management

Up to six force transducers can be connected to the Press-Right to monitor as many force-displacement curves. While each force transducer detects the force of one channel, there is only one position transducer in common for all channels. It is possible to exclude one or more channels from the control using the **EDIT JOB > PROPERTIES AND OPTIONS > FORCE TRANSDUCERS** menu.

On the right of the graph, the color of the curve of each channel is visible. Below the graph, the strength of only one channel at a time is displayed. In order to change the displayed force channel, simply touch the list of channels on the right.

## 4.16 Functionality verification procedure

The verification procedure is used to periodically check the functioning of the machine by making sample pieces deliberately prepared out of tolerance.

This function can be activated from the **TOOLS > SETUP > VISIBLE OPTIONS** menu.

The execution of the sample pieces can be done every time the instrument is switched on, every time the job is changed, every time the job is modified, at pre-established times, every number of pieces.

For each single job it is possible to exclude the self-test function.



## 4.17 Management of supplementary control signals

In addition to curve control, up to three additional accept/reject signal can be connected to determine if the part is good or reject. In practice, the outcome of the machining can be conditioned by the logic status of three additional inputs. This logical state can be controlled at various times during the working cycle.

The functions described in this chapter are available only if at least one input has been configured for testing (TEST).

For supplementary control signal number 1 (TEST 1), the Press-Right can also activate an associated digital output before performing the check. In this case, the input status check is performed after a preset time.

To configure additional signals, you need to access the **TOOLS > SETUP > ELECTRICAL CONNECTIONS > SIGNAL OPTIONS** menu. In this menu you can change the name of signals and set the delay for signal number 1.

In the **EDIT JOB > PROPERTIES AND OPTIONS** menu, it is possible to determine for each job when and how to perform supplementary controls.

### 4.17.1 Additional control options

Below is the list of possibilities available for additional control.

#### No supplementary control

The supplementary control check is not performed.

#### Check at the start

The supplementary control check is performed when the instrument receives the start command.

#### Check at the stop

The supplementary control check is performed when the instrument wants to command the stop and the piece is determined to be good.

#### When cylinder returns

The supplementary control check is performed when the cylinder returns. The additional control is performed when the press has stopped.

#### At cylinder position

The supplementary control check is performed at a cylinder position.

**During pressing**

The supplementary control check is performed during the pressing process.

**Use as enable**

The signal is used to enable or disable the start.

## 5 Parameters

Note: In jobs the parameters set to zero will be ignored by the tool.

### 5.1 Stop values

After creating a new job, the first thing to do is to tell the instrument when to stop the press. To set the stop values, use the command **EDIT JOB > STOP VALUES**.

Press-Right can stop the press when the force reaches a certain value (Stopping force) or when the press reaches a certain height (Stopping force).

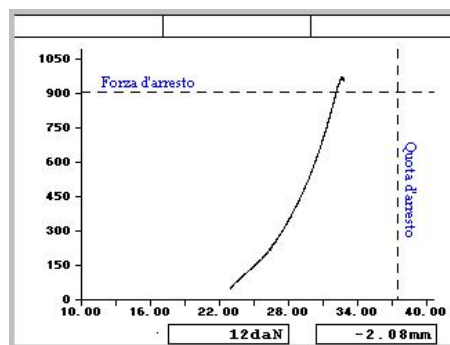


Figure 3

The press is stopped even when the maximum acquisition time expires.

#### 5.1.1 Notes on stop values

When both the stopping force and the stopping altitude are set, it is sufficient to exceed one of the two to command the stop.

It is normal to detect values reached above the stop values; this is due to the delay in intervention of the electromechanical parts.

It is possible to continue pressing when the stop values are reached for a set time. To set the press stop delay time, use the command **STOP VALUES > STOP DELAY**.

#### 5.1.2 How to choose the stop values

The stop must be set differently depending on the type of machining. Three types of processing can be distinguished:

- 1) Full shrinking, chamfering or work up to a mechanical stop.
- 2) Work up to a quota (without mechanical stops).
- 3) Bending and breaking test.

### 5.1.2.1 Stop with mechanical stop.

In most cases the press is used to carry out a driving up to a mechanical stop. In this case the curve will be similar to the one in Figure 4, i.e. the force will be zero for the entire approach stroke, once the piece is reached (at the contact level) the force will begin to increase until the mechanical stop is reached where it will increase up to the maximum force value of the press (vertical part of the curve).

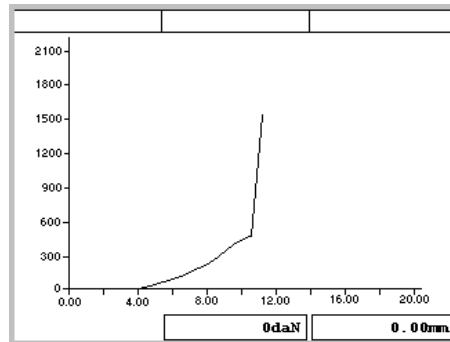


Figure 4

In this case the stopping force must be used as the force will always reach the maximum that the press can exert. If we used the stop quota this could not be reached if the piece is slightly higher than expected or it could be reached even before completing the job if the piece is too low.

The stopping force must be chosen such as to guarantee the completion of the machining.

The impact force must be less than the breaking force of the piece or worse than the tool.

The impact force must be less than the maximum force the press can exert.

### 5.1.2.2 Stop without mechanical stop

It is possible to stop the descent of the press stem at an established level by setting the stop level. In this case the instrument will switch the valve which controls the descent of the press as soon as the stop quota is reached. This valve will take some time to switch and more time will be necessary before it begins to evacuate the air under pressure in the cylinder: for these reasons, the real stop of the press will be at a higher level than the set stop value. This error will be greater the higher the descent speed and the greater the difference between the force required to do the work and the force of the cylinder.

### 5.1.2.3 Stopping during a bending and breaking test

The force that the piece under test must resist is used as the arresting force. In the event of breakage, the stopping force will not be reached, therefore it is also necessary to set the stopping value equal to a value that cannot be reached without breaking the piece.

If the piece resists the impact force, once the test is over, the maximum height measured by the Press-Right will be equal to the bending that the piece has had. It will then be possible to verify whether the deflection obtained is the one expected using the height limits.

If the piece breaks before the impact force is reached (Figure 5), at the end of the test, the maximum force measured by the Press-Right will be equal to the breaking force of the piece. Also, in this case it is possible to verify, with the force limits, if the breaking force is the expected one.

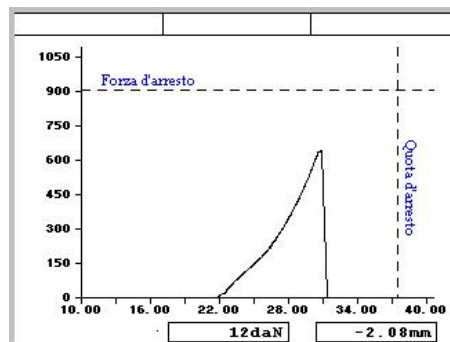


Figure 5

## 5.2 Control limits

The control limits, together with the band, determine the outcome of the work.

It is possible to set the limits of the maximum force, the limits of the maximum altitude, the limits of the initial altitude and the check points. The limits are set from the menu **EDIT JOB > CONTROL LIMITS**.

*Note:* Control limits, set equal to zero, are not used.

### Contact position limits

They control the contact dimension of the working. For a part to be classified as good, the measured contact dimension must be above the minimum contact position limit and below the maximum contact position limit.

### Peak position limits

They control the reached position during machining. For a piece to be classified as good, the measured position reached must be higher than the minimum position reached limit and lower than the maximum position reached limit.

## **Peak force limits**

They control the force reached during machining. For a piece to be classified as good, the maximum force achieved must be above the minimum force limit and below the maximum force limit.

## **Contact detection threshold**

The sensing force is the force threshold used to determine if contact has been made with the piece.

## **5.3 How to setup job**

Contact dimension limits let you control the dimensions of components even before the job begins. They can be used to check the dimensions of the pieces to be assembled or to check that there are all the parts necessary for the machining.

The choice of the reached position limits values and of the force reached limits values depend on the type of machining.

### **Limits with mechanical stop**

When there is a mechanical stop, the press will always reach the expected stopping force.

In this case the minimum force limit can simply be used to check the expected stopping force. The maximum force limit can be used to check that the maximum allowable force for the piece is never exceeded.

The reached position limits are used to verify that the dimensions of the assembly, once machining is completed, are within tolerance.

To check the required force, is necessary to use the tolerance band or the checkpoints.

### **Limits without mechanical stop**

Reached position limits can be used to verify that the final size of the assembly is right.

To check the required force, force limits or tolerance band or checkpoints can be used.

### **Limits for bending and breaking tests**

In bending tests, the force limits are used simply to verify the force that has been applied while the elevation limits are used to verify the measured deflection.

In breaking tests, force limits are used to verify the force that was required to break the piece.

## 5.4 Check points

Check points are additional tools for controlling the curve. Up to five check points can be defined. Each check point can be used to:

### Check force

Measure and check the force at a predetermined position. This check point is also useful for having a discrete value at the end of pressing to be displayed or sent via field bus.

### Check position

Measures and controls the position at a predetermined force. This check point is useful for checking the deformation of the part at a predetermined load. It is also useful for having a discrete value at the end of pressing to be displayed or sent via field bus.

### Digital force filter

This check point is useful for cleaning the curve of unwanted vibrations.

### Minimum maximum measurement

This check point is useful to have the minimum and maximum value of force in a section of the stroke to be displayed or sent via field bus.

### Check the force variation

This check point measures force at the detection position and at a certain distance verifies that the variation in force is between a minimum and a maximum.

### Localized stop

This check point commands the cylinder to stop when a predetermined force is reached. Force control occurs only in a predetermined section of the stroke. The stop can occur as soon as the force is exceeded or after a predetermined stroke.

## 5.5 Job Options

The following job options can be changed with the **EDIT JOB > PROPERTIES AND OPTIONS > OPTIONS** command.

### Use relative positions

By activating this option, the relative positions are used instead of the absolute ones (chapter 1.3).

### **Ask for the piece code**

By activating this option, before the execution of each piece, you are asked to enter a numerical code that identifies the piece itself. The piece code can also be set via fieldbus or via a barcode reader.

To show the piece code options, it is necessary to activate the **TOOLS > SETUP > VISIBLE OPTIONS > Part number management** option in the configuration menu.

### **Save curves of pieces good**

Save the curves of the good pieces on the SD memory.

### **Save curves of pieces rejected**

Saves the curves of the rejected pieces on the SD memory.

### **Do not use the rejected part basket**

Disables rejected basket control in the job.

## **5.6 Job accessories**

The following job options can be changed with the **EDIT JOB > PROPERTIES AND OPTIONS > ACCESSORIES** command.

### **IGNORE ENABLE 1 2 3**

By activating this option, the instrument does not check the related enable signal. These options are visible only if the **TOOLS > SETUP > VISIBLE OPTIONS > Exclusion of enable signals** option is active.



## 6 The tolerance range

The tolerance range is used to control the curve and consequently to control the quality of the piece.

The tolerance range consists of two lines called the upper border and the lower border.

For the piece to be classified as good the points representing the curve cannot be above the upper edge, and cannot be below the lower edge.

The figure shows a curve relative to a good piece, as it is included between the two edges of the band.

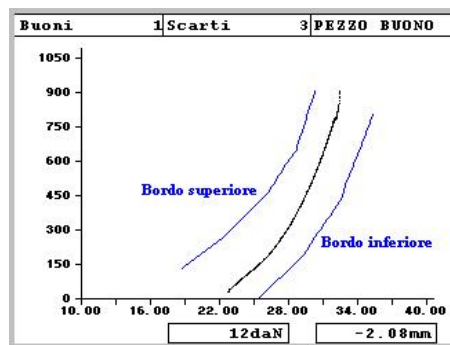


Figura 2

Each border is composed of a sequence of points joined by segments.

### 6.1 Create the tolerance range

To create a new band, use the **EDIT JOB > TOLERANCE RANGE** command. If the tolerance range does not exist, confirmation is requested for the creation of a new one. Choosing YES, a simple tolerance range formed by two points for each edge appears in the graph.

### 6.2 Modify the tolerance range

To modify the tolerance range, use the command **EDIT JOB > TOLERANCE RANGE > EDIT**. When moving the points, be careful not to switch the upper edge with the bottom edge.

The modification of the band must be performed by moving the points that determine the two edges. When the band is modified, only one point of one of the two edges is highlighted, this point is the active one, i.e. it is the one that can be moved using the keys



. It is possible to change the active point with the **Select previous point** or **Select next point** commands. To activate the points of the other border, press the command **Select the other edge**. The force and position of the active point are displayed below the graph.

You can add a point by dividing the segment following the active point in two. To do this, press the **Add new point** command.

It is possible to delete the active point with the **Delete point** command.

When using the arrow keys, it is possible to change the step by pressing the **Change size of step** command.

### **6.3 Detete the tolerance range**

To eliminate the tolerance range, use the command **EDIT JOB > TOLERANCE RANGE > DELETE**.

## 7 *Rejected parts*

When a reject part is detected, the instrument locks preventing new pieces from being made. In the standard configuration, the **RESET** key must be pressed to re-enable the instrument.

In addition, if the reject basket is present, it is necessary to pass the part through the sensor of the basket;

If the safety door is present, the **RESET** key allows to open the safety door.

### 7.1 The causes of the rejected

A piece can be good or reject. The reject can be caused by one or more different causes. The following list shows all possible causes for reject:

#### **Maximum force exceeded**

The maximum force reached has exceeded the maximum force limit. The maximum force reached may not coincide with the force of the last point of the curve.

#### **Minimum force not reached**

The maximum force reached has not reached the minimum force limit. The maximum force reached may not coincide with the force of the last point of the curve.

#### **Below lower edge (force low)**

The curve passed under the lower edge of the tolerance range.

#### **Above upper edge (force high)**

The curve passed over the upper edge of the tolerance range.

#### **Aborted by the keyboard**

Job execution was interrupted by the operator.

#### **Execution interrupted**

The cycle has been interrupted by an external signal. It is normally caused by emergency intervention. This message appears when the start signal is removed before the end of the cycle.

#### **Time expired**

The pressing lasted too long. You can increase the maximum time by reducing the acquisition frequency via the Press-Right Setup program.

#### **"Additional" beyond the maximum**

The additional transducer value is higher than the additional maximum limit.

**"Additional" below the minimum**

The additional transducer value is lower than the additional minimum limit.

**"Supplementary" control**

The supplementary control causes the reject.

**High speed**

The speed is higher than the maximum speed limit.

**Low speed**

The speed is below the minimum speed limit.

**Maximum position exceeded**

The maximum position reached exceeded the maximum position limit. The maximum altitude reached may not be the same as the height of the last point on the curve.

**Minimum position not reached**

The maximum altitude reached has not reached the minimum position limit or has not reached the band. The maximum altitude reached may not be the same as the height of the last point on the curve.

**Maximum contact position exceeded**

The contact position is greater than the maximum limit.

**Contact before minimum limit**

The contact position is less than the minimum limit.

**Maximum checkpoint limit**

The value measured in the checkpoint is higher than the maximum value.

**Minimum checkpoint limit**

The value measured in the checkpoint is less than the minimum value.

## **7.2 Management of reject**

For each reject cause, it is possible to indicate to the instrument how to classify the piece and how to behave. For the configuration, choose the desired reject cause in the list that appears with the command **EDIT JOB > PROPERTIES AND OPTIONS > REJECTED MANAGEMENT**. Selected the rejected cause the following submenus appear:

**Immediate stop**

For each reject cause, you can immediately stop the press as soon as the cause of reject is detected.

**Ask for the passwords**

For each reject cause, you can or request the entry of the unlock password.

### **Block the return of the press**

For each reject cause, you can lock the press in work

### **Normal / Special**

For each reject cause, it can be classified as normal or special. This allows you to classify rejects by separates. For example, recoverable and irrecoverable waste can be separated. When there is a special waste, the Press-Right activates the second rejected output and counts the piece separately. In this way it is possible to know for example how many pieces are discarded by mistake of the operator.

## 8 *Measured values*

The Press-Right stores the displacement-force curve and measures certain quantities that can be controlled thanks to the limits. The stored curve can be analyzed with the analysis cursor. The measured quantities can be displayed at the end of each process and can be read by an external controller via serial.



### 8.1 The window of measured values

In the main menu there is the command **SHOW MEASURED VALUES**. This command shows the measured values of the last piece performed. This window can be displayed at the end of each processing by changing the option in the **TOOLS > DISPLAY OPTIONS > Do not show measured values**.

### 8.2 Analysis cursor

You can know the force at a given position using the cursor. The cursor appears, in the graph, as a vertical line. When the cursor is displayed, the force of the curve at the position indicated by the cursor and its current position are shown below the graph.

To display the cursor, touch the horizontal ruler of the graph.

The cursor can be moved left or right with the keys  .

## 9 The tools menu

Using the tools menu, you can configure the *Press-Right*. When the *Press-Right* is already connected to the machine, there is no need to configure it.

In this menu there are the following submenus:

### DISPLAY OPTIONS

Allows you to change the view.

### SETUP

It allows the configuration of the instrument.

### DIAGNOSIS

In this submenu you can calibrate the transducers and control the operation of the inputs and outputs. To view the real-time status of the inputs and outputs, you can activate the option **TOOLS > DISPLAY OPTIONS > Display the status of the command signals**.

### 9.1 Display options

Display options change the view.

#### Do not show measured values

At the end of processing, normally, a window is shown that contains the measured values and the result of the processing, enabling this option the window will not appear automatically, but you will have to manually choose the command **SHOW MEASURED VALUES** in the main menu.

#### Do not remove old curves

By activating this option, all curves will be superimposed on each other creating a strip representing the dispersion of forces.

#### Displays the status of the control signals

By activating this option, the status of the inputs and outputs is displayed above the graph.

## **10 Special configurations**

Special configurations are available on request.

### **10.1 Transducer of additional force**

It is possible to collect a small force transducer to the instrument for greater precision in operations requiring reduced forces. The Alfamatic precision transducer has been designed to withstand the maximum force exerted by the cylinder.

#### **10.1.1 Additional force transducer configuration**

In order to connect an additional force transducer, the instrument must have inputs for two load cells. You also need a sensor that remains active if the smaller load cell is not mounted under the press. This way the instrument can know when to use the normal load cell.

The sensor that feels the absence of the smallest load cell must be connected to an input configured as TEST SIGNAL 3 in the menu **TOOLS > CONFIGURE > ELECTRICAL CONNECTIONS > SETUP INPUTS AND OUTPUTS > INPUTS**.

The smallest load cell must be connected to the X22 terminal block.

To configure a second load cell, activate channels 1 and 2 from the menu **TOOLS > CONFIGURE > ELECTRICAL CONNECTIONS > TRANSDUCERS**.

#### **10.1.2 Use of additional force transducer**

Jobs to be able to use the additional force transducer must have the option of Use force reduction transducer in the **Properties > OPTIONS** menu.

### **10.2 Tool recognition**

You can program the tool to recognize the equipment mounted on the press.

Thanks to the equipment recognition, the operation of the press can be prevented if the equipment is not that required by the work, or you can have the correct work selected according to the mounted equipment or you can have the work phase selected automatically according to the tool in use.

Up to three RFID transceivers can be connected to the instrument for equipment recognition, or the binary combination of some inputs can be used.

#### **10.2.1 Tool recognition configuration**

To set how tools are identified you need to access the menu **TOOLS > ADVANCED OPTIONS > CONFIGURE > ELECTRICAL CONNECTIONS > EQUIPMENT**.



### **10.2.2 RFID pad writing**

To write the equipment identification number you need to access the menu TOOLS > CONFIGURE > ELECTRICAL CONNECTIONS > EQUIPMENT.

### **10.2.3 Selection of gear to be used**

To indicate the tool to be used for the operation you must access the menu Properties> CONTROL MANAGEMENT.

### **10.2.4 Automatic selection of work with tool**

To automatically select the job according to the tool mounted on the press, activate the relative option in the menu TOOLS > CONFIGURE > JOB SELECTION.

## 11 Password

The Press-Right can store a list of users with their identification codes. To identify the user, a password is used. The password consists of a visible initial digit and three hidden digits. Each user must have a different initial digit from all other users. For example, the password 2345 indicates user number 2 with password 345.

For each user it is possible to define the permissions which functions can be accessed.

There is a special password that allows access to all functions. This administrator default password is 9724.

Passwords can be changed: to do this you need to know the previous password.

For convenience, some functions remain unlocked after entering the password. To relock all functions, you can use the **REACTIVATE PASSWORD** command.

### 11.1 Functions with password

It is possible to protect many functions of the instrument so that to access them, it is necessary to enter the password of a user who is authorized for that specific function. To choose which functions should be protected with a password, you need to access the **TOOLS > PASSWORD > FUNCTIONS WITH PASSWORD** menu.

This submenu defines which functions of the instrument are accessible only by entering the password.

### 11.2 User management

You can add or remove users in the menu **TOOLS > PASSWORD**. When adding a user, you need to indicate the name (for example Maintenance or Marco), the password and the permissions that the new user will have.

## 12 Field bus

The *Press-Right* instrument can communicate via Modbus TCP (standard), PROFINET (optional) or EtherNet/IP (optional) fieldbuses.

### 12.1 Organization

The instrument has a list of registers that can be read or written via fieldbus communication.

Each register has an address. From the fieldbus the registers can be accessed by indicating the address of the register.

With PROFINET and EtherNet/IP buses there is direct access to 11 registers read and 11 registers write. Access to a larger number of registers requires access via the address.

### 12.2 Status e Control

The register at address 1 contains the status bits of the instrument.

The register at address 24 allows the instrument command.

When writing a command (other than zero) the CMD\_BUSY bit of the status register is raised.

If the command is valid the RUN bit of the status register is raised.

If the command is invalid the ERROR bit of the status register is raised.

When the command execution is complete, the RUN bit is reset and the COMPLETED bit is turned on.

The CMD\_BUSY bit is cleared if zero has been written as the command and if execution has terminated.

The COMPLETED and ERROR bits are reset to zero when a new command (other than zero) is written.

## **12.3 Modbus/TCP**

The instrument acts as a server and opens TCP port 502 in reception.

If a client with bank addressing is used, the value 40001 must be added to the address given in the table. For example, to access register 90 the address 40091 must be used. With Siemens PLCs, the MB\_MODE parameter must be 0 for reading and 1 for writing. The registers must be read individually.

## **12.4 PROFINET e EtherNet/IP**

From PLC there is access to 16 input and 16 output variables.

Via the first four input variables (CTRL\_INPLC, SUBINDEX\_INPLC, INDEX\_INPLC, PV\_INPLC) and output variables (CTRL\_OUTPLC, SUBINDEX\_OUTPLC, INDEX\_OUTPLC, PV\_OUTPLC), it is possible to have read and write access (if allowed) via address/data to all instrument parameters.

The input word STATUS\_WORD\_INPLC contains the instrument status bits (register 1).

The CONTROL\_WORD\_OUTPLC output word contains the commands to be given to the instrument (register 24).

The contents of 11 input words (VAR1\_INPLC ... VAR11\_INPLC) and 11 output words (VAR1\_OUTPLC ... VAR11\_OUTPLC) are configurable by the user using the "Press-Right Setup" software.

The default content of these words is as follows:

FSetupFieldBus				
PLC variable	Register description	Register name	Register...	
VAR1_IN	Actual job number	ActJob	90	Click to modify
VAR2_IN	Actual phase number	ActPhase	91	Click to modify
VAR3_IN	Actual position of cylinder (lower word)	ActPositionH	3	Click to modify
VAR4_IN	Actual force value (lower word)	ActForceH	7	Click to modify
VAR5_IN	Causes of the rejected piece (A bits)	CauseA	2000	Click to modify
VAR6_IN	Causes of the rejected piece (B bits)	CauseB	2001	Click to modify
VAR7_IN	Causes of the rejected piece (C bits)	CauseC	2002	Click to modify
VAR8_IN	Last peak value of force	PeakForce	2008	Click to modify
VAR9_IN	Last peak value of position	PeakPosition	2014	Click to modify
VAR10_IN	Last measured contact position	ContactPos	2015	Click to modify
VAR11_IN	Last measured value A at check point 1	ChkPnt1ValA	2017	Click to modify
VAR1_OUT	Actual job number	ActJob	90	Click to modify
VAR2_OUT	Actual phase number	ActPhase	91	Click to modify
VAR3_OUT	Target position for direct moving	TargetPositi...	32	Click to modify
VAR4_OUT	Speed for direct moving	Speed1	33	Click to modify
VAR5_OUT	Dummy register	Dummy	0	Click to modify
VAR6_OUT	Dummy register	Dummy	0	Click to modify
VAR7_OUT	Dummy register	Dummy	0	Click to modify
VAR8_OUT	Dummy register	Dummy	0	Click to modify
VAR9_OUT	Dummy register	Dummy	0	Click to modify
VAR10_OUT	Dummy register	Dummy	0	Click to modify
VAR11_OUT	Dummy register	Dummy	0	Click to modify

Modify... OK Annulla

## 12.4.1 Access by address/data

### Initialization

Load in CTRL\_OUTPLC the value 0x00

Wait for CTRL\_INPLC to contain 0x00

### Reading a 16-bit register.

Load into INDEX\_OUTPLC the address of the register.

Load into CTRL\_OUTPLC the value 0x40

Wait for CTRL\_INPLC to contain 0x10

Read the value from PV\_INPPLC

Load into CTRL\_OUTPLC the value 0x00

Wait for CTRL\_INPLC to contain 0x00

### Reading a 32-bit register

Load into INDEX\_OUTPLC the address of the register.

Load into CTRL\_OUTPLC the value 0x10

Wait for CTRL\_INPLC to contain 0x20

Read the value from PV\_INPPLC

Load into CTRL\_OUTPLC the value 0x00

Wait for CTRL\_INPLC to contain 0x00

### Writing a 16-bit register

Load into INDEX\_OUTPLC the address of the register.

Load into PV\_OUTPLC the value to be written

Load into CTRL\_OUTPLC the value 0x20  
Wait for CTRL\_INPLC to contain 0x10  
In case of an error CTRL\_INPLC will contain 0x70  
Load into CTRL\_OUTPLC the value 0x00  
Wait for CTRL\_INPLC to contain 0x00

#### **Writing a 32-bit register.**

Load into INDEX\_OUTPLC the address of the register.  
Load into PV\_OUTPLC the value to be written  
Load into CTRL\_OUTPLC the value 0x30  
Wait for CTRL\_INPLC to contain 0x20  
In case of an error CTRL\_INPLC will contain 0x70  
Load into CTRL\_OUTPLC the value 0x00  
Wait for CTRL\_INPLC to contain 0x00

### **12.4.2 PROFINET Interface Notes.**

To install the GSD file in the library you must select tools > manage device description file.  
In the library it is located in Additional field equipment > PROFINET IO > General > Alfamatic > PressRight.

The Device name and address is set from TIA:

Open TIA, under "Online Accesses" select "Update Accessible Nodes." It should appear immediately below with name CompactCom 40 PIR.

Open the device and in the "Functions" branch find set IP and set Name.

A new module is found automatically if it has the same IP address and name.

## **12.5 Strings**

Strings are composed of single 8-bit ASCII characters.

This is why it is recommended to avoid accented letters.

Since each register has 16 bits two characters find their place in a single register.

The high byte of the register contains the first character of the pair.

The low byte of the register contains the second character of the pair.

The following is an example of reading the job name, which we assume to be "Job 2."

ASCII codes:

<b>J</b>	<b>0x4A</b>
<b>o</b>	<b>0x6F</b>
<b>b</b>	<b>0x62</b>
<b>space</b>	<b>0x20</b>
<b>2</b>	<b>0x32</b>

The following registers will have the following contents:

register 1000 will contain "jo" 0x4A6F

register 1001 will contain "b " 0x6220

register 1002 will contain "2 " 0x3200

## 12.6 Execution of commands

Writing in the CONTROL\_WORD\_OUTPLC will command the press.

The command must be written until the command busy bit of STATUS\_WORD\_INPLC becomes high; at this point zero must be written into CONTROL\_WORD\_OUTPLC.

Regardless of whether the command involves movement or not, as long as the command is present bit 11 of STATUS\_WORD\_INPLC will remain high.

## 12.7 Table

Name	Description	Type	Addr	Access
Dummy			0	
Status and Flags	Bit 0 (BYTEH.0) Ready Bit 1 (BYTEH.1) Home position Bit 3 (BYTEH.3) Start request (Set from command 10; command 20 to clear) Bit 4 (BYTEH.4) Press (approach valve) Bit 5 (BYTEH.5) Booster (booster valve) Bit 6 (BYTEH.6) Start enabled ( <i>from version 2.19</i> ) Bit 7 (BYTEH.7) New Part Number Bit 9 (BYTEL.1) Result OK ( <i>from version 2.27</i> to reset use control word = 16 or 17) Bit 10 (BYTEL.2) Result KO ( <i>from version 2.27</i> to reset use control word = 16 or 17) <b>Field bus status bits:</b> Bit 11 (BYTEL.3) Command BUSY Bit 13 (BYTEL.5) Command ERROR Bit 14 (BYTEL.6) Command COMPLETED Bit 15 (BYTEL.7) Command EXECUTE	UINT16	1	Read only
PositionAct	Current position of the cylinder	INT32	2	Read only
SupplAct	Current value of additional transducer	INT32	4	Read only
ForceAct	Current force	INT32	6	Read only
Control Word	0 no command Write 2 to select job by bar-code (&45) Write 3 to select job by name (&45) Write 4 to set the part number (&45) Write 6 to forcing flag "ask part number" Write 10 to start phase ( <i>from version 3.35</i> ) Write 20 to stop phase ( <i>from version 3.35</i> ) Write 16 to enable start command) ( <i>from version 2.19</i> ) Write 17 to disable start command ( <i>from version 2.19</i> ) Write 18 to reset job pieces counters ( <i>from</i>	UINT16	24	Write

	<i>version 2.19)</i> Write 30 to Set new Order number (&45) ( <i>from version 1.92</i> ) Write 32 to Reset rejected ( <i>from version 3.35</i> )			
ToolA	ID of tool A ( <i>from version 2.19</i> )	UINT16	42	Read only
ToolB	ID of tool B ( <i>from version 2.19</i> )	UINT16	43	Read only
ToolC	ID of tool C ( <i>from version 2.19</i> )	UINT16	44	Read only
StringBuffer	Text buffer	STRING 24L	45	Write/read
JobIndex	Job index	UINT16	90	Write/read
PhaseAct	Phase number The first phase is number 1	UINT16	91	Write/read
PhaseValue	Phase number to accessing values With zero, you access to phase to execute	UINT16	92	Write/read
MainCounter	Main counter	UINT32	95	Read only
JobNumOK	Number of good pieces (to reset use control word = 18)	UINT32	97	Read only
JobNumNOK	Number of rejected pieces (to reset use control word = 18)	UINT32	99	Read only
MaxNumOK	Maximum number of good pieces	UINT32	101	Write/read
PartNumber	Code	STRING 28L Read only	103	Read only

DecimalsY	Number of decimals digit of force values	UINT16	207	Read only
DecimalsX	Number of decimals digit of position values	UINT16	209	Read only
DecimalsP	Number of decimals digit of probe values	UINT16	211	Read only
InstrumentName	Name of the instrument (len max: 15 characters)	STRING 7L	213	Read only
JobName	Name of current job (len max: 24 characters)	STRING 12L	1000	Read only
StopPosition	Stop position	UINT16	1014	Write/read
StopForce	Stop force	UINT16	1015	Write/read
StopDelay	Delay before return ( <i>from version 1.86</i> )	UINT16	1024	Write/read



ContactForce	Force for contact sens ( <i>from version 1.94</i> )	UINT16	1025	Write/read
PeakPosMin	Value minimum of reached position	UINT16	1027	Write/read
PeakPosMax	Value maximum of reached position	UINT16	1028	Write/read
PeakForceMin	Value minimum of reached force	UINT16	1029	Write/read
PeakForceMax	Value maximum of reached force	UINT16	1030	Write/read
InitPosMin	Value minimum of contact position	UINT16	1031	Write/read
InitPosMax	Value maximum of contact position	UINT16	1032	Write/read
CP1par1	First value of check point 1	UINT16	1033	Write/read
CP1par2	Second value of check point 1	UINT16	1034	Write/read
CP1par3	Third value of check point 1	UINT16	1035	Write/read
CP1par4	Fourth value of check point 1	UINT16	1036	Write/read
CP1par5	Fifth value of check point 1	UINT16	1037	Write/read
CP2par1	First value of check point 2	UINT16	1038	Write/read
CP2par2	Second value of check point 2	UINT16	1039	Write/read
CP2par3	Third value of check point 2	UINT16	1040	Write/read
CP2par4	Fourth value of check point 2	UINT16	1041	Write/read
CP2par5	Fifth value of check point 2	UINT16	1042	Write/read
CP3par1	First value of check point 3	UINT16	1043	Write/read
CP3par2	Second value of check point 3	UINT16	1044	Write/read
CP3par3	Third value of check point 3	UINT16	1045	Write/read
CP3par4	Fourth value of check point 3	UINT16	1046	Write/read
CP3par5	Fifth value of check point 3	UINT16	1047	Write/read
CP4par1	First value of check point 4	UINT16	1048	Write/read

CP4par2	Second value of check point 4	UINT16	1049	Write/read
CP4par3	Third value of check point 4	UINT16	1050	Write/read
CP4par4	Fourth value of check point 4	UINT16	1051	Write/read
CP4par5	Fifth value of check point 4	UINT16	1052	Write/read
CP5par1	First value of check point 5	UINT16	1053	Write/read
CP5par2	Second value of check point 5	UINT16	1054	Write/read
CP5par3	Third value of check point 5	UINT16	1055	Write/read
CP5par4	Fourth value of check point 5	UINT16	1056	Write/read
CP5par5	Fifth value of check point 5	UINT16	1057	Write/read

JobPhase	Name of current phase	STRING 14L	1100	Read only
JobCode1	Code of current job	STRING 24L	1114	Read only
JobCode2	Code of current job	STRING 24L	1128	Read only
JobCode3	Code of current job	STRING 24L	1142	Read only
JobCode4	Code of current job	STRING 24L	1156	Read only
JobCode5	Code of current job	STRING 24L	1170	Read only
JobCode6	Code of current job	STRING 24L	1184	Read only
JobCode7	Code of current job	STRING 24L	1198	Read only
OrderNumber	Order number	STRING 24L	1212	Read only

Issue A	BIT0: STOP FROM USER INTERFACE BIT1: STOP FROM INPUTS SIGNALS BIT2: TIME OUT BIT3: MAX PROBE BIT4: MIN PROBE BIT5: PROBE ERROR BIT6: HIGH SPEED BIT7: LOW SPEED	UINT16	2000	Read only
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Issue B	BIT0: MAX POSITION BIT1: MIN POSITION BIT2: MAX CONTACT BIT3: MIN CONTACT BIT4: MAX CHECK POINT BIT5: MIN CHECK POINT BIT6: TEST INPUT 2 BIT7: TEST INPUT 3	UINT16	2001	Read only
Issue C	BIT4: MAX FORCE BIT5: MIN FORCE BIT6: MAX BAND BIT7: MIN BAND	UINT16	2002	Read only
PeakForce	Force reached	UINT16	2008	Read only
PeakPosition	Position reached	UINT16	2014	Read only
ConctactPos	Contact position	UINT16	2015	Read only
ProbeValue	Probe measured	UINT16	2016	Read only
CP1ValueA	Value A at check point 1	UINT16	2017	Read only
CP1ValueB	Value B at check point 1	UINT16	2018	Read only
CP2ValueA	Value A at check point 2	UINT16	2019	Read only
CP2ValueB	Value B at check point 2	UINT16	2020	Read only
CP3ValueA	Value A at check point 3	UINT16	2021	Read only
CP3ValueB	Value B at check point 3	UINT16	2022	Read only
CP4ValueA	Value A at check point 4	UINT16	2023	Read only
CP4ValueB	Value B at check point 4	UINT16	2024	Read only
CP5ValueA	Value A at check point 5	UINT16	2025	Read only
CP5ValueB	Value B at check point 5	UINT16	2026	Read only

\* In order to have the signal ready it is necessary to reset the signal rejection piece. To enable auto reset, the option "Disable scrap reset from keyboard" must be enabled.