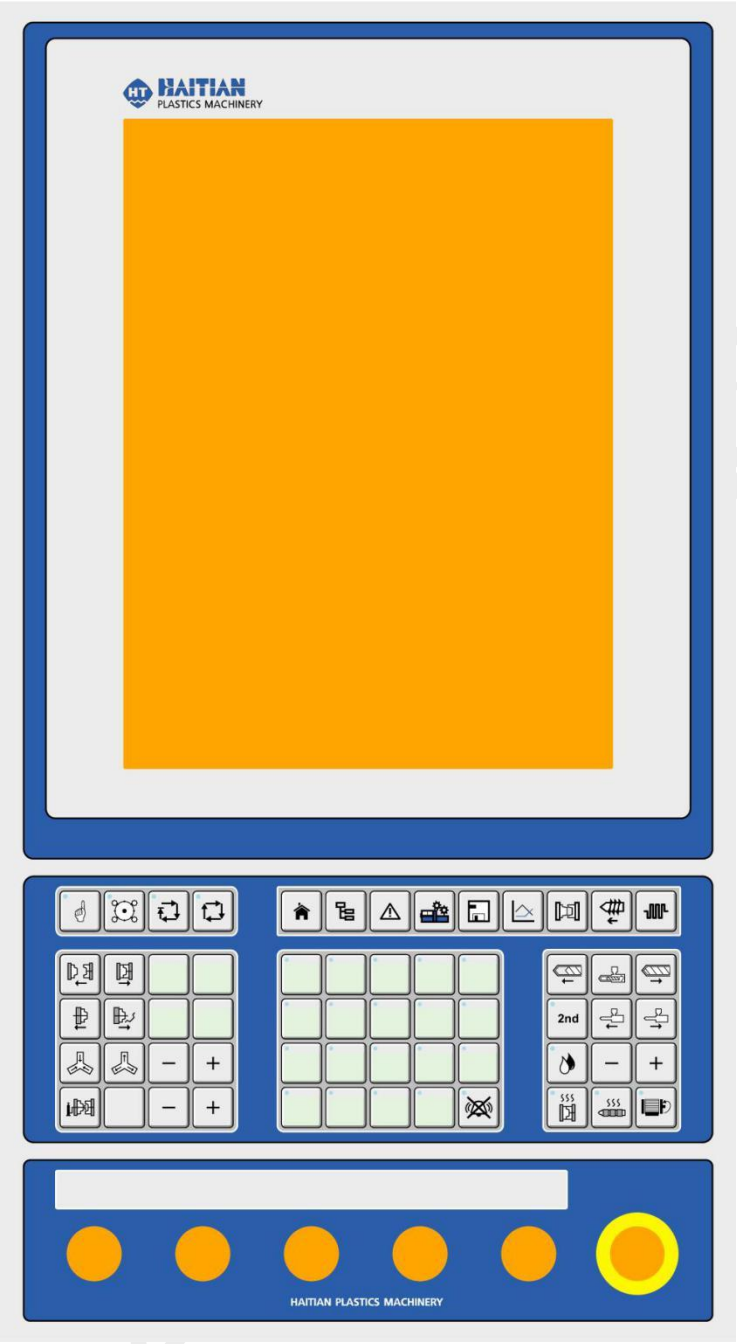
HAITIAN
PLASTICS MACHINERY

Volume 3
Operation manual



Doc No.	Name	Description
V1.1	KEBA i2000/i5000（JU Series）	Haitian JU Machine Operation Manual（KEBA Controller）

Table of Contents

Preface

Documentation purpose:

This document mainly describes the menu and primary operation procedures of the controller and the friendly prompt information of the operation.

Target groups and requirements for the users

The users shall be qualified as follows to use this Manual.

Target Groups	Required Knowledge and Skills
Machinery setting personnel	Basic technical education or operation training. Required knowledge: ● Safety standard training; ● Injection molding machine or die change functions; ● Edit parameter setting of touch screens; ● Operate and set an injection molding machine.
Machinery operators	Operation training: Required knowledge: ● Safety standard training; ● Injection molding processes; ● Edit touch screen displaying.

3. 1 Introduction

3. 1. 1 Introduction of push button panel and keys

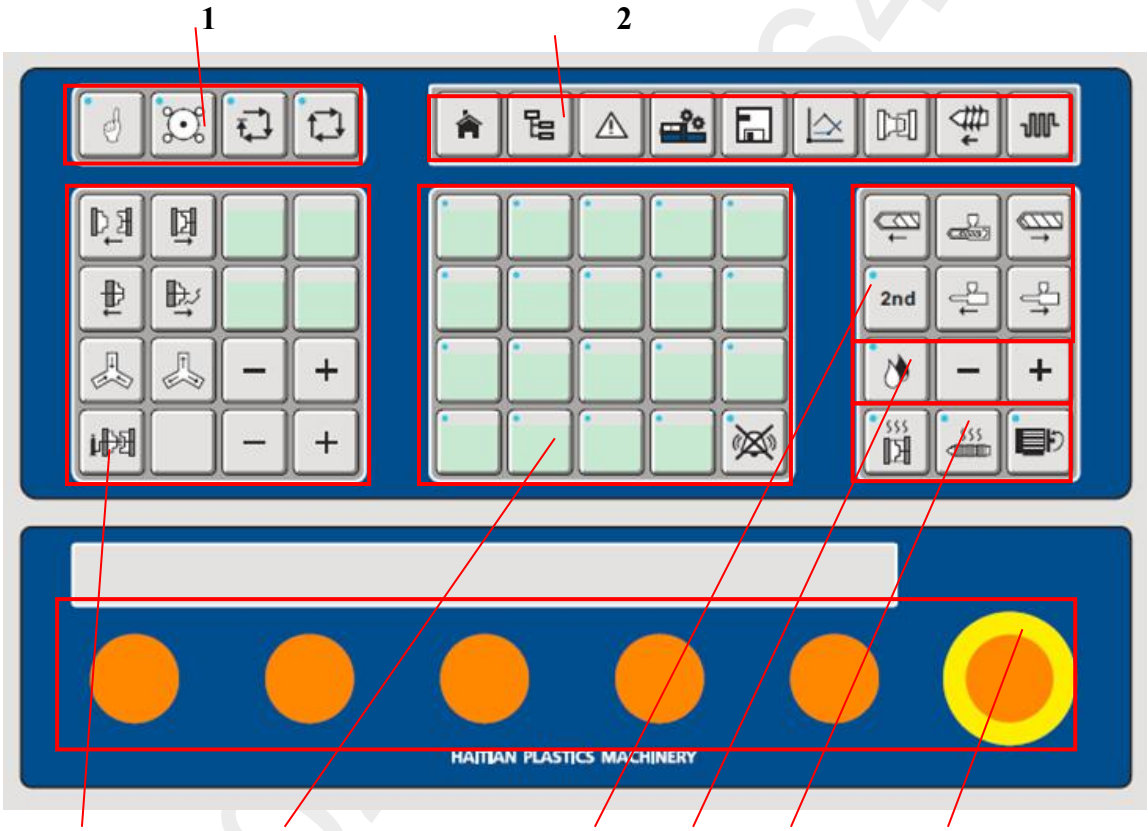
General rules

The user shall be familiar with the operation panel buttons of the controller before using. The panel is comprised of many action buttons and quick buttons of the injection molding machine. The control panel buttons allow you to switch among different machinery operation modes and operate the machine manually.

Section overview

- General introduction of controller button panel;
- Detailed introduction of controller buttons.

I. General introduction of controller button panel



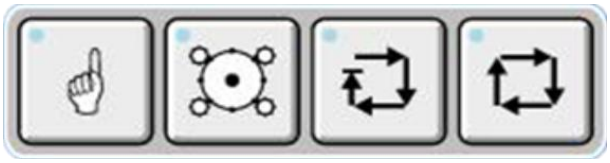
controller button panel

[1] operation mode selection
[2] panel menu shortcut key
[3] manual button of clamping unit
[4] extending unit and alarm reset button
[5] manual button of injection unit
[6] lubrication unit button
[7] power enabling unit button
[8] change-over switch area button

Notice: Different machines have different extending buttons, which shall comply with electric drawings.

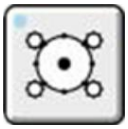
II. Detailed introduction of controller buttons

（1）Operation mode button



Manual Adjust Semi-Auto Full Auto

Manual button: This button has many functions, which can be used to switch the machine from any operation modes to the manual operation mode, cancel any abnormal situations, and emergency stop any actions of other modes. When the button lights up, it means the machine is under the manual operation mode.

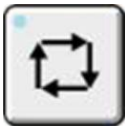


Mould adjusting button: Mould adjusting mode is used to load the mould and debugging. The pressure and speed of actions under this mode are comparatively lower.

Many functions can be used under this mode, for example, rod pulling up action, brake switch and automatic mould adjusting functions.

When the button lights up, it means the machine is under mould adjusting mode.

Semi-Auto button: Press this button, the machine is under the semi-auto mode. For every circulation, you have to open or close the safety door to start the next circulation. When the button lights up, it means the machine is under the semi-auto mode.



Full Auto button: Press this button, the machine will operate automatically and execute every circulations. When the operation times achieve the set value or there is failure, the controller will stop running and alarm. When the button lights up, it means the machine is under the full auto mode.

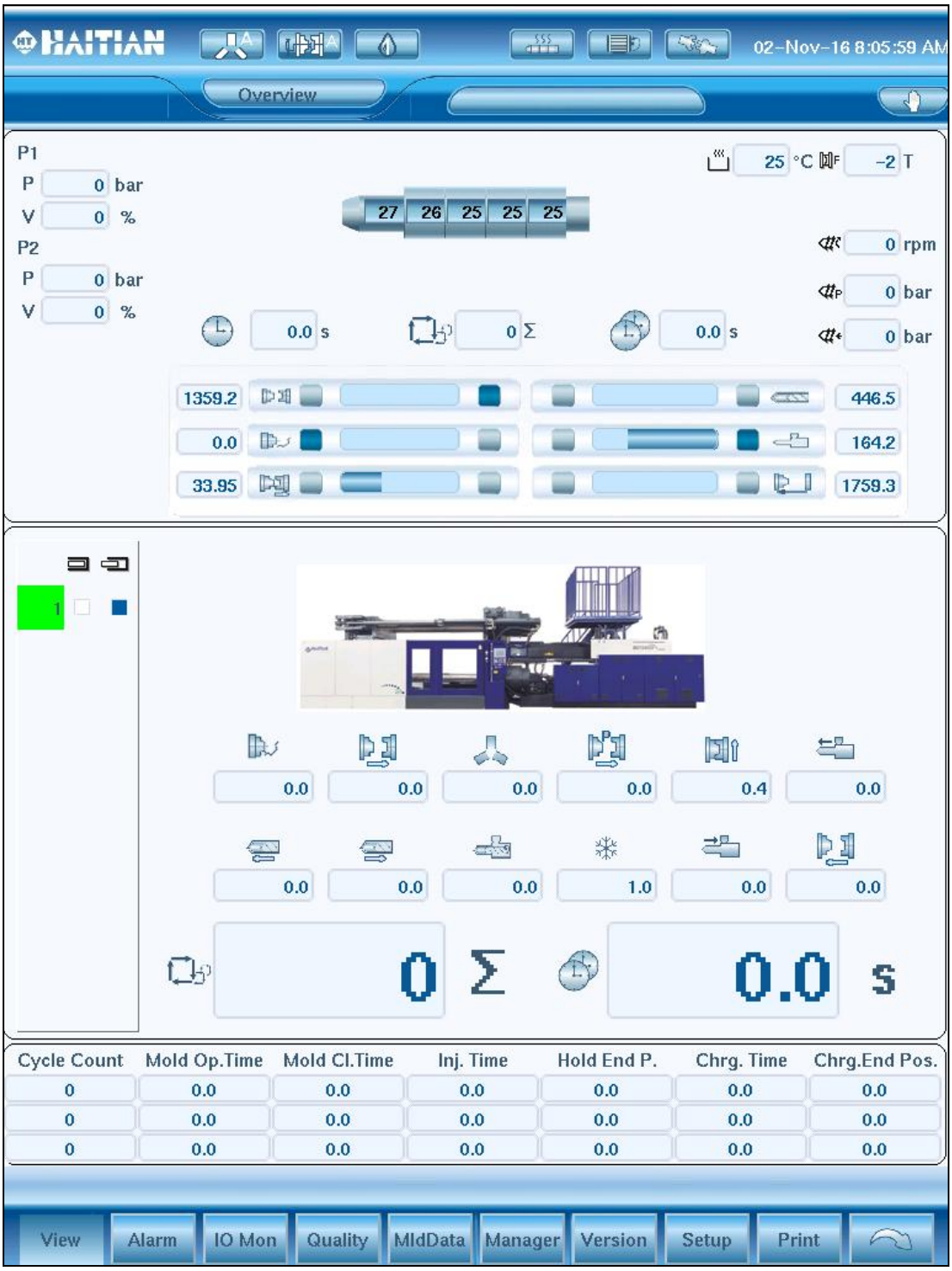
（2）Shortcut key

Situation Menu Alarm Set Mould parameter PDP Mould opening and clamping Injection Heating

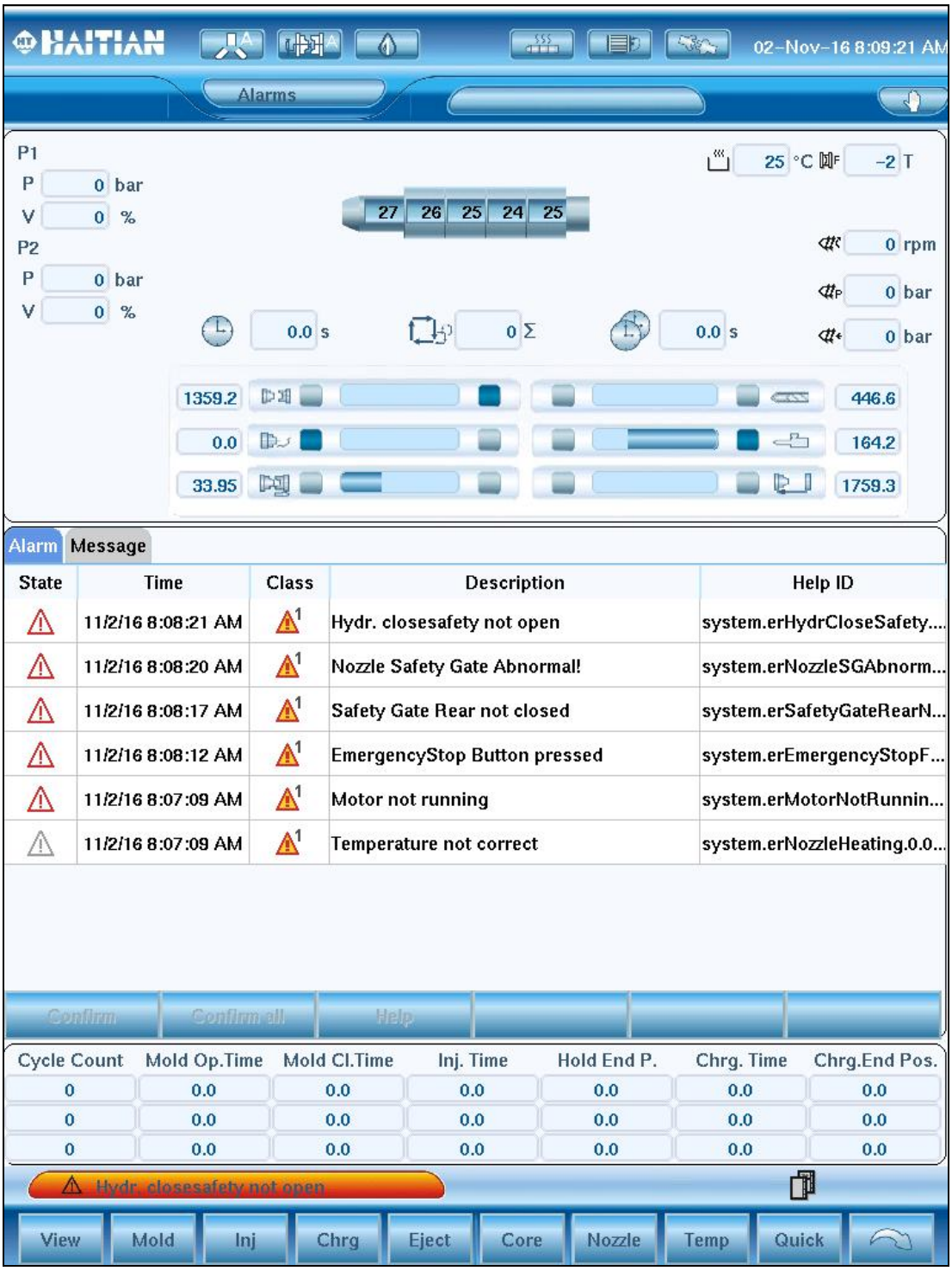
These keys are the shortcut keys of the relative specific pictures. Press the keys to enter the corresponding menus.

Screenshots of the above keys as follows:

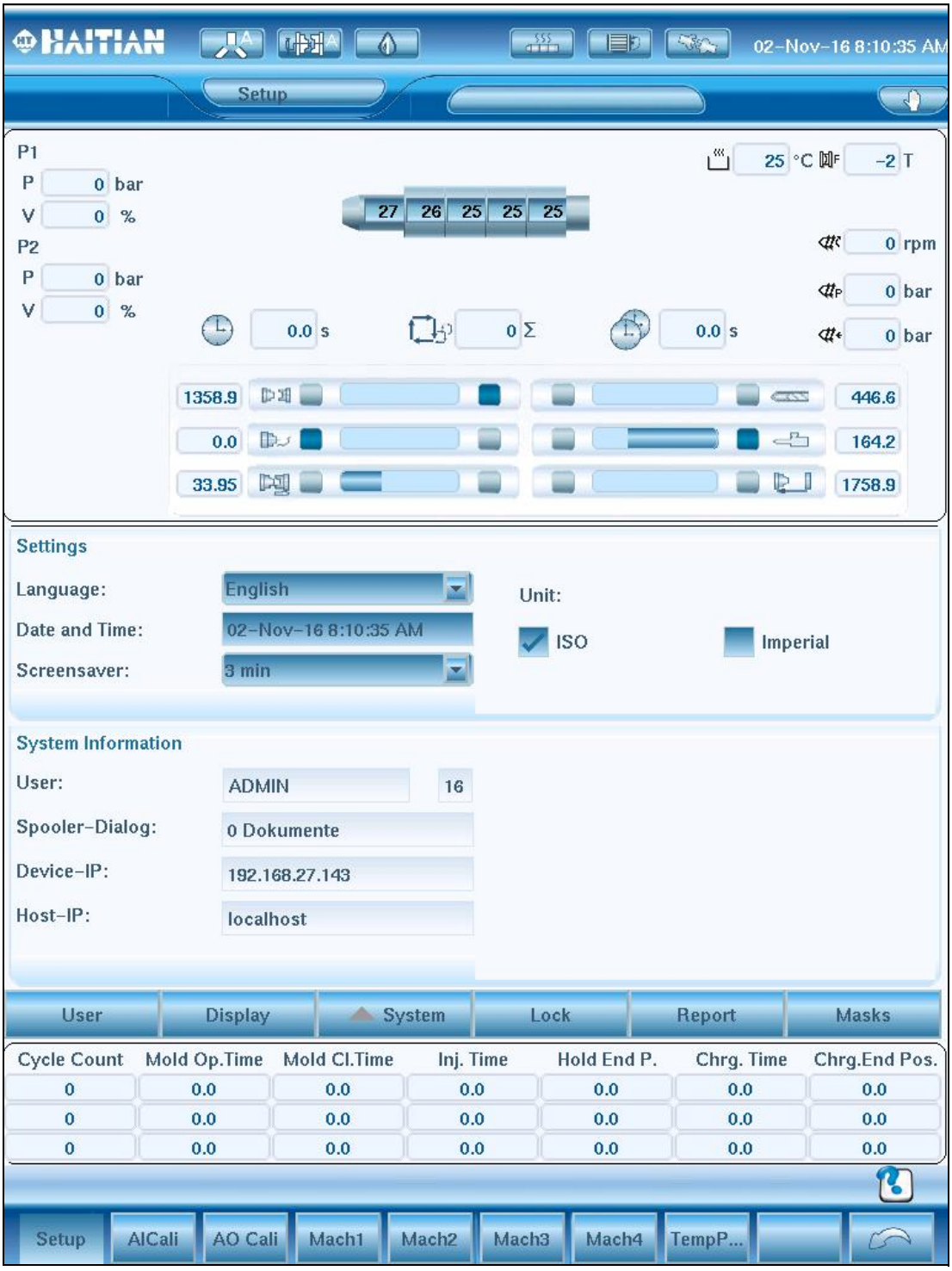
1.  （situation menu shortcut ke）



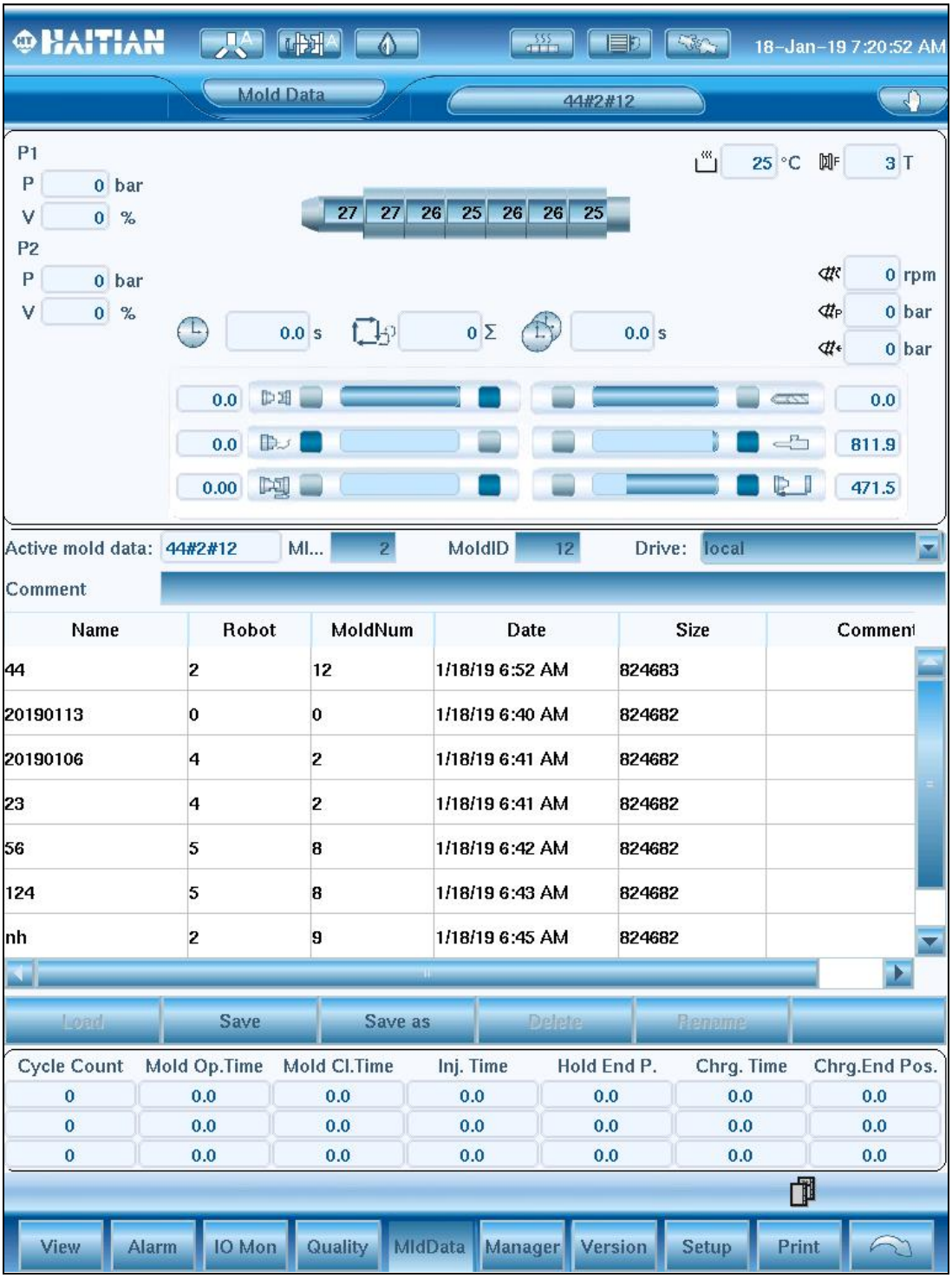
2.  （alarm menu shortcut key）



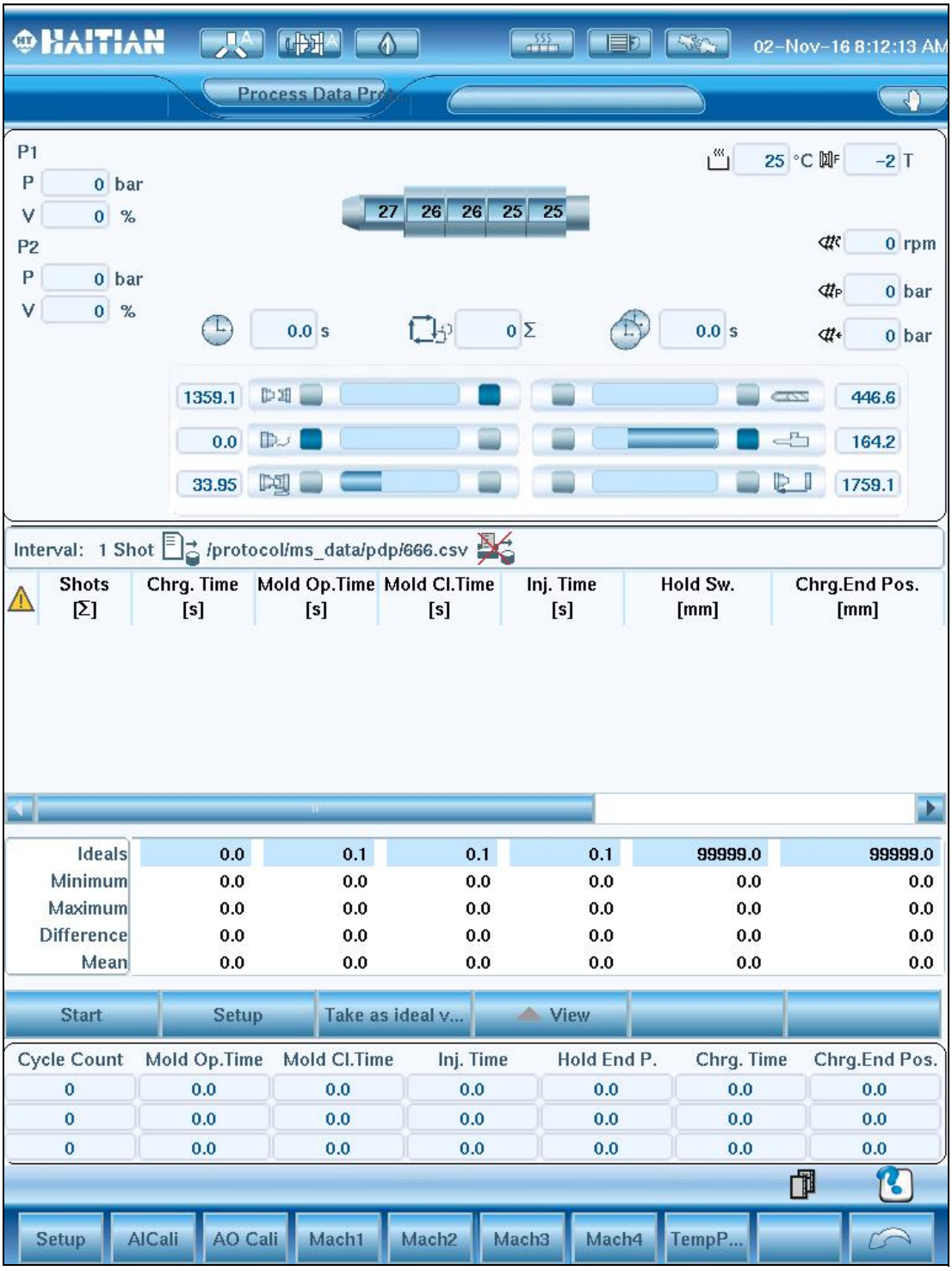
3.  （set menu shortcut key）



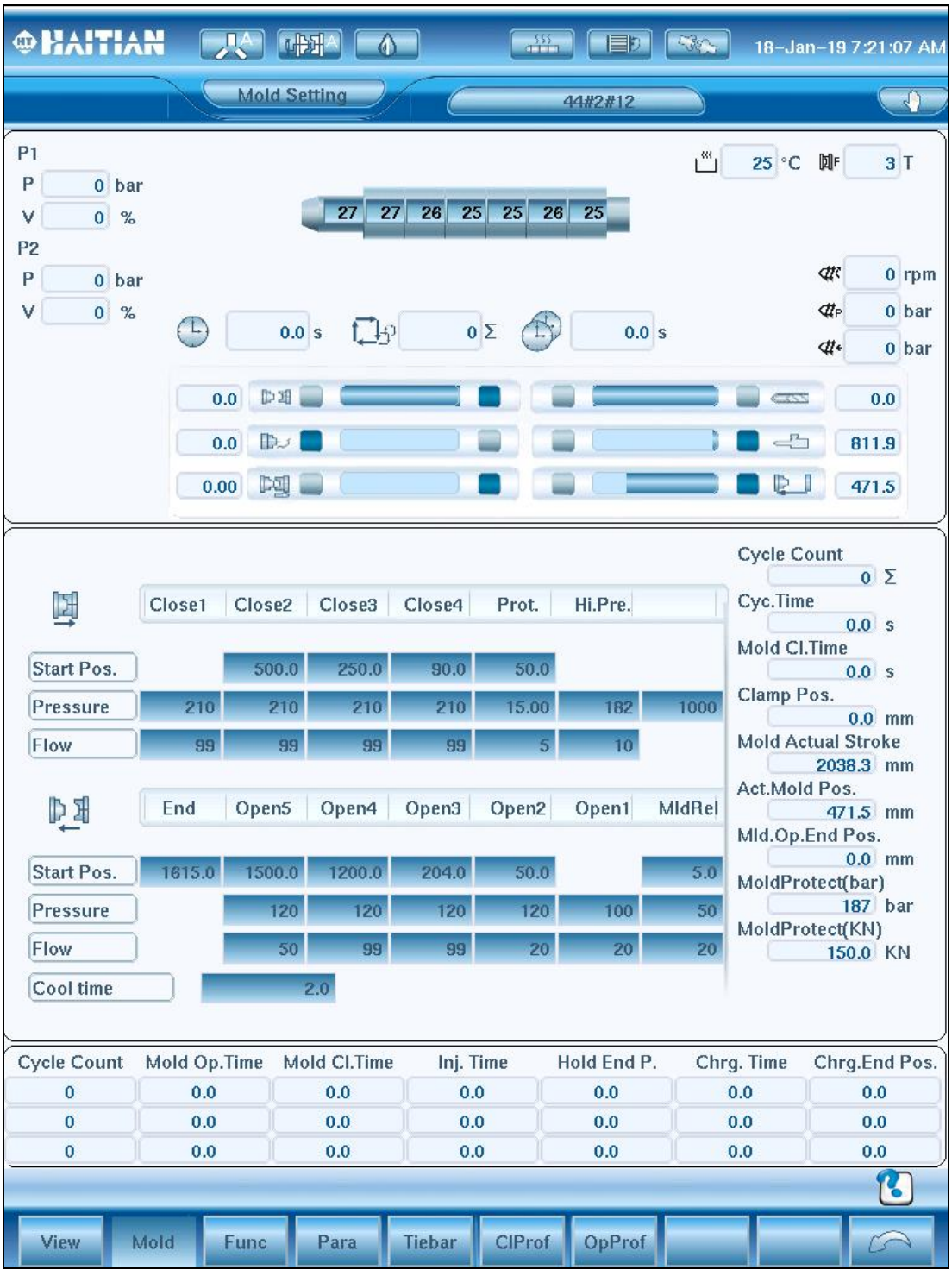
4.  （mould parameter menu shortcut key）



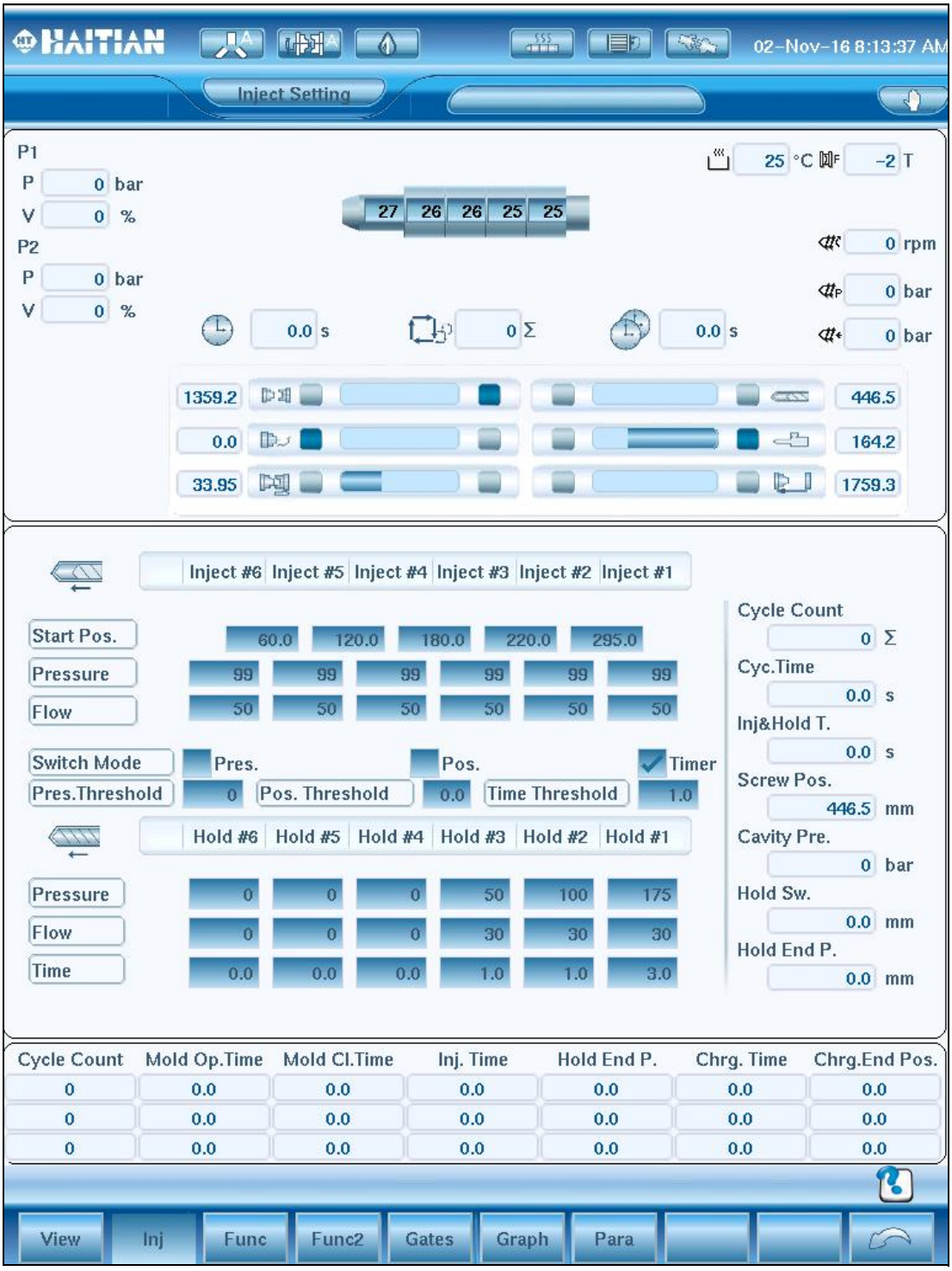
5.  （PDP menu shortcut key）



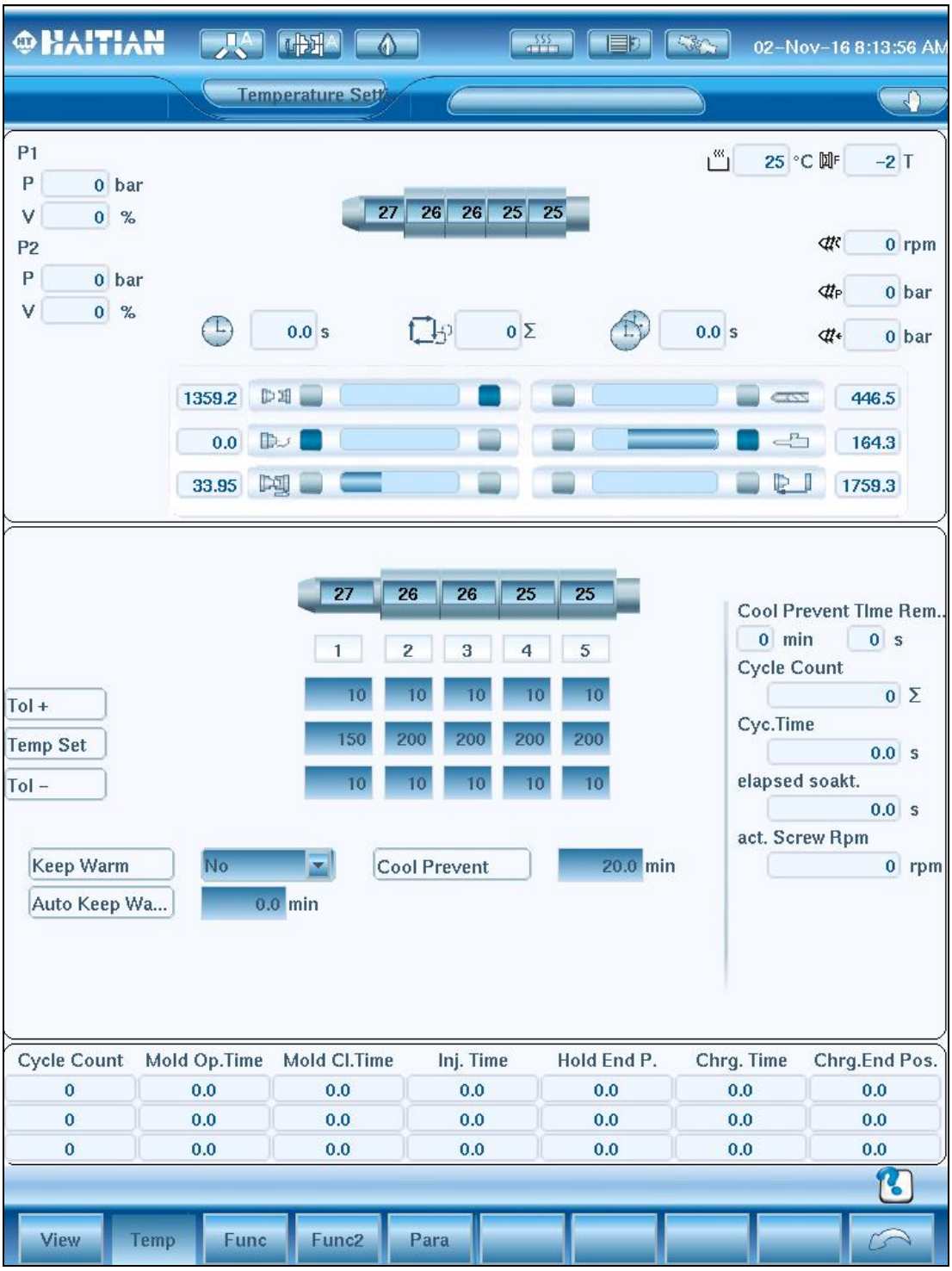
6.  （clamping menu shortcut key）



7.  （injection menu shortcut key）



8.  （heating menu shortcut key）



（3）**Manual button of clamping unit**

Mould opening button: Under the manual operation mode with all the conditions satisfied, press this button so that the injection molding machine will execute the mould opening action in compliance with the set values of the process menu. Once releasing this button or the mould is opened properly, the action stops. If the core, blowing or thimble is set, this button can be used to together to carry out the corresponding actions.

Under the adjusting mode with all the conditions satisfied, press this button, the mould opening action will execute with the independent speed and pressure.

Clamping button: Under the manual operation mode with all the conditions satisfied, press this button so that the injection molding machine will execute the clamping action in compliance with the set values of the process menu. Once releasing this button or the clamping is finished properly, it stops clamping.

Under the adjusting mode with all the conditions satisfied, press this button, the clamping action will execute with the independent speed and pressure.

Backward button: Under the manual operation mode with all the conditions satisfied, press this button so that the injection molding machine will execute the backward action in compliance with the set values of the process menu. Once releasing this button or the backward is completed properly, it will stop.

Under the adjusting mode with all the conditions satisfied, press this button, the backward action will execute with the independent speed and pressure.

Forward button: Under the manual operation mode with all the conditions satisfied, press this button so that the injection molding machine will execute the forward

action in compliance with the set values of the process menu. Once releasing this button or the forward is completed properly, it will stop.

Under the adjusting mode with all the conditions satisfied, press this button, the forward action will execute with the independent speed and pressure.

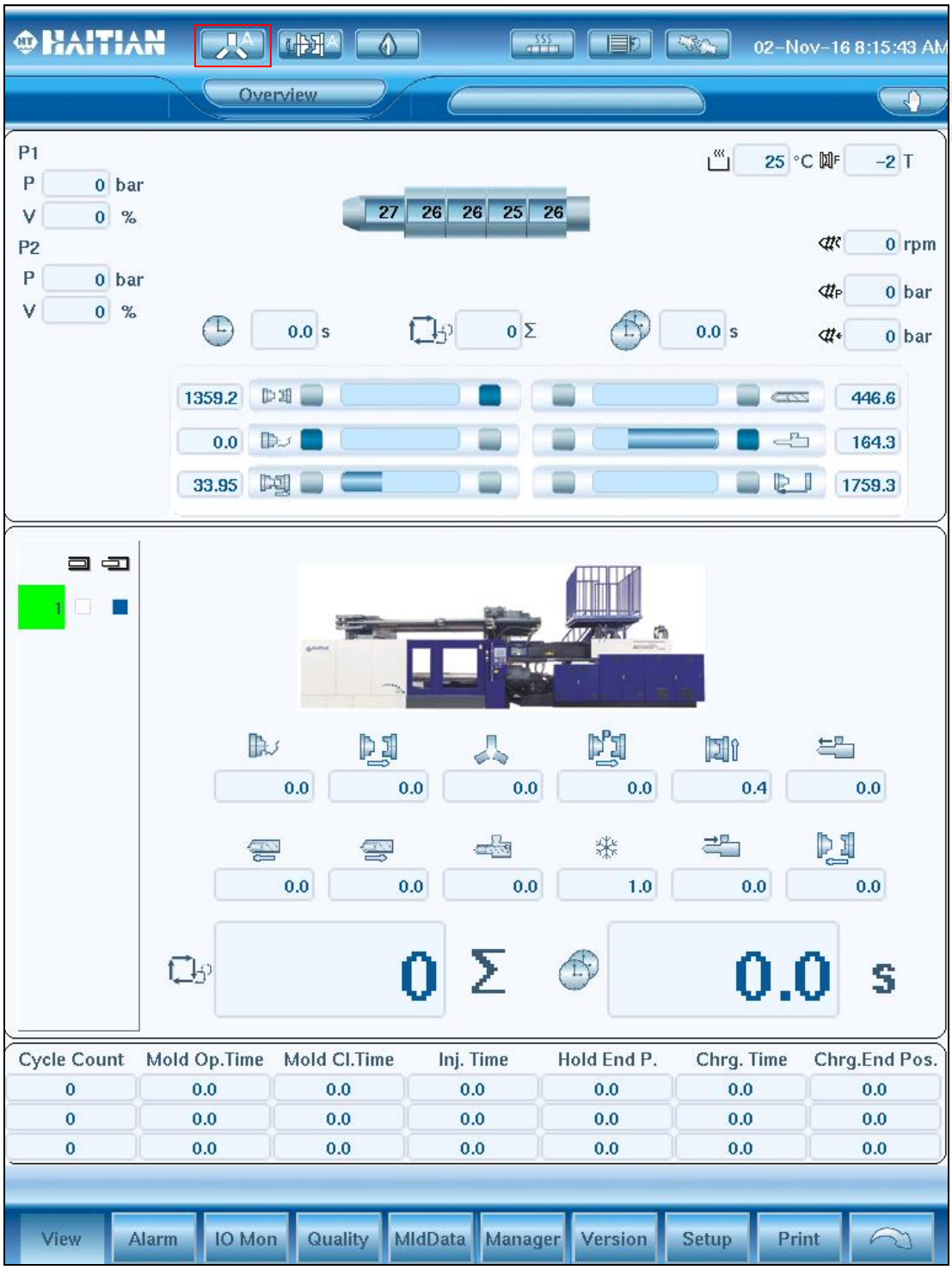
Core in button: Under the manual operation mode with all the conditions satisfied, press this button so that the injection molding machine will execute the core in action in compliance with the set values of the process menu. Once releasing this button or the core is in place properly, it will stop.

Under the adjusting mode with all the conditions satisfied, press this button, the core in action will execute with the independent speed and pressure.

Core back button: Under the manual operation mode with all the conditions satisfied, press this button so that the injection molding machine will execute the core back action in compliance with the set values of the process menu. Once releasing this button or the core is back in place properly, it will stop.

Under the adjusting mode with all the conditions satisfied, press this button, the core back action will execute with the independent speed and pressure.

Core add-subtract button: Press core add button to choose the previous core and press core subtract button to choose the next core. You can control the corresponding core function by choosing the core group numbers. Please be noted that if you are to press these buttons, the core plate places shall be matched with the core orders.

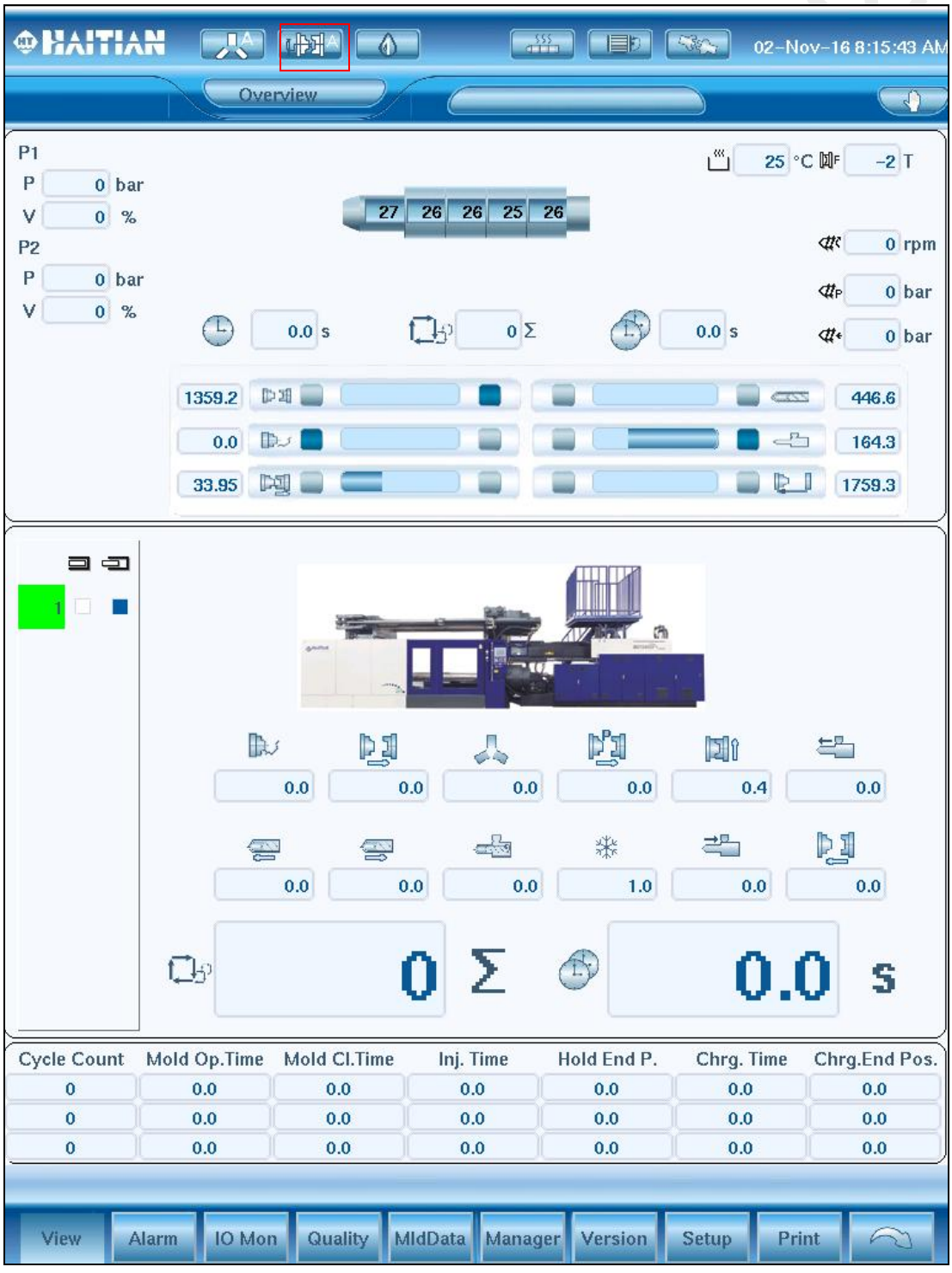


The core chosen will be marked in the red box as above.

Icons as follows:  、  、  、  （take 4 groups of cores as an example）.

Blowing button： Under the manual operation mode, press this button to blow in compliance with the current settings. Observe the settings at the thimble menu. Please be noted that you can use this button under the manual mode and manual adjusting mode.

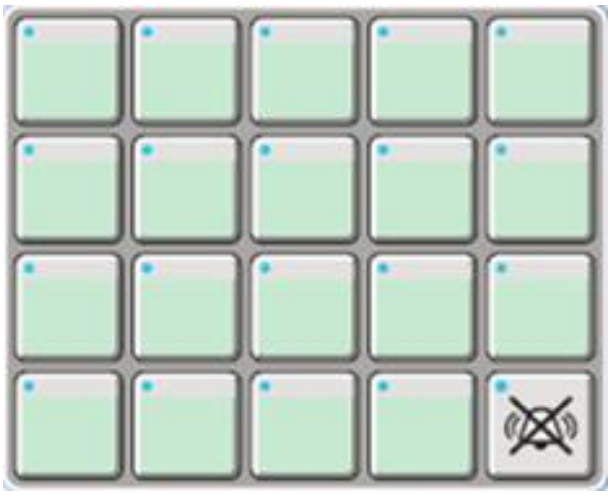
Blowing sequence button: Press the blowing subtract button to choose the previous group of blowing and blowing add button to choose the next group of blowing. You can control the corresponding blowing functions by choosing the blowing group numbers.



The core blowing chosen will be marked in the red box as above.

Icons as follows:  、  （take 2 groups of blowing as an example）。

（4）**Extending button area**

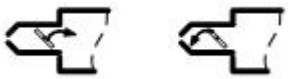


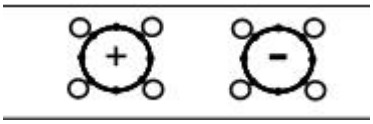
 **Alarm reset button:** Press this button so that the controller will cancel the alarm information.

 **Extending button:** When there are other special functions or new functions, these buttons will be used to realize the corresponding actions.

Extending button examples:

 **Flashboard switch key:** Under the adjusting mode with the conditions satisfied, press this button to execute the flashboard switch action and release to stop the action.

 **Nozzle switch key:** Under the manual or adjusting mode with the conditions satisfied, press this button to execute the nozzle opening or closing actions and release to stop the actions.

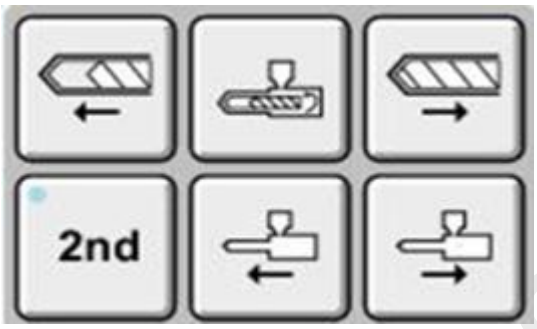
 **Adjusting mould forward or backward key:** Under the adjusting mode with the conditions satisfied, press this button to forward or backward the mould and release to stop the action.

Notice: This function is only equipped with the three-plate type crankshaft machines.

Loading and unloading keys of moving or fixed mould: Under adjusting mode with the conditions satisfied, press this button so that the injection molding machine will execute the loading or unloading actions and release to stop the actions.

Notice: This function is optional. Incorrect operations may damage the machine or the mould.

（5）**Manual key area of injection unit**



Injection key: Under the manual operation mode with the conditions satisfied, press this button to execute the injection action in compliance with the set values of the process menu and once released or the injection is done, this action stops. If sprue setting is used, this button can be used together with other keys to execute the corresponding sequence actions.

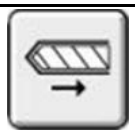
Under the adjusting mode with the conditions satisfied, press this button to execute the injection action with independent speed and pressure.

Storage key: Under the manual operation mode with the conditions satisfied, press this button to execute the action in compliance with the set values of the process menu and once pressed again or the storage is completed, the action stops.

Under the adjusting mode with the conditions satisfied, press this button to execute the injection action with independent speed and pressure.

This button is a compound function key that can be used to start the automatic purging procedure, please refer to "automatic purging" function for more details.

Notice: This button is for non-inching operation.



Injection back key: Under the manual operation mode with the conditions satisfied, press this button to execute the injection back action in compliance with the set values of the process menu. Once released or the action is done, it stops.

Under the adjusting mode with the conditions satisfied, press this button to execute the injection back action with independent speed and pressure.

Seat in key: Under the manual operation mode with the conditions satisfied, press this button to execute the seat in action in compliance with the set values of the process menu. Once released or the action is done, it stops.

Under the adjusting mode with the conditions satisfied, press this button to execute the seat in action with independent speed and pressure.

Seat back key: Under the manual operation mode with the conditions satisfied, press this button to execute the seat in action back action in compliance with the set values of the process menu. Once released or the action is done, it stops.

Under the adjusting mode with the conditions satisfied, press this button to execute the seat back action with independent speed and pressure.

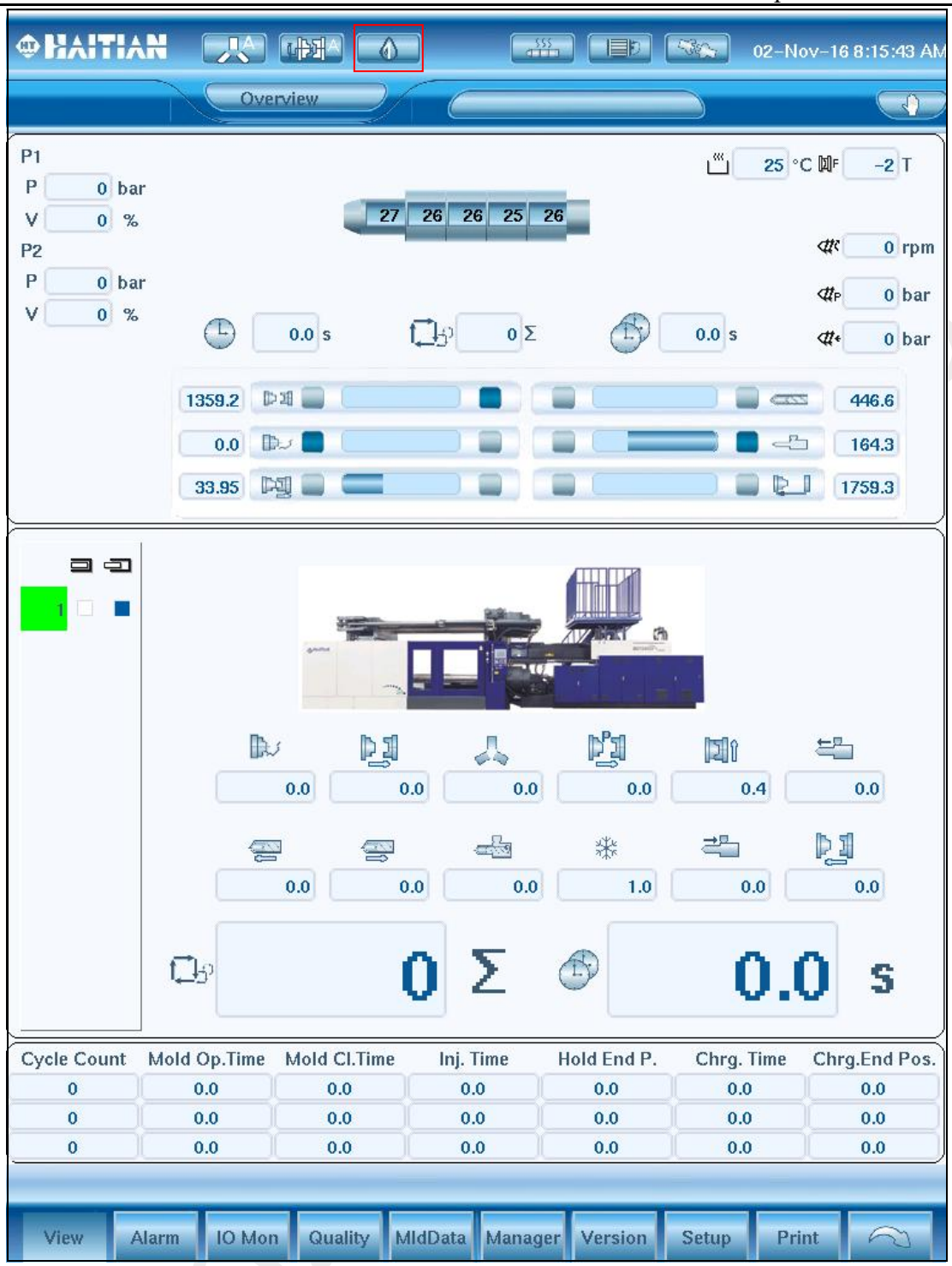
Injection unit 2 selection key: It is used for manual switching between various groups of constituents of the injection unit.

Notice: It can only be used for injection molding machines of various constituents.

（6）**Manual key area of injection unit**

Lubrication: Under non-auto mode, press this button to start the corresponding lubrication unit function. If the lubrication button lights up, it means the lubrication procedure is on. When it lights off, it means the lubrication procedure is not on.

Lubrication subtract key　Lubrication add key: Press the lubrication subtract key to choose the previous lubrication and press the lubrication add key to choose the next group of lubrication. You can control the corresponding lubrication function by choosing the lubrication group numbers. Please refer to the relative chapters for the detail function descriptions.


HAITIAN
02-Nov-16 8:15:43 AM
Overview
P1
P 0 bar
V 0 %
P2
P 0 bar
V 0 %
25 °C -2 T
27 26 26 25 26
0 rpm
0 bar
0 bar
0.0 s
0 Σ
0.0 s
1359.2
0.0
33.95
446.6
164.3
1759.3
1
0.0 0.0 0.0 0.0 0.4 0.0
0.0 0.0 0.0 1.0 0.0 0.0
0 Σ
0.0 s
Cycle Count | Mold Op.Time | Mold Cl.Time | Inj. Time | Hold End P. | Chrg. Time | Chrg.End Pos.
0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0
0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0
0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0
View
Alarm
IO Mon
Quality
MldData
Manager
Version
Setup
Print

The core blowing you have chosen will be marked in the dialog box as above.

Icons as follows:  、  、  （take 3 blowing groups as an example），when the icon turns green  , it means the lubrication is on.

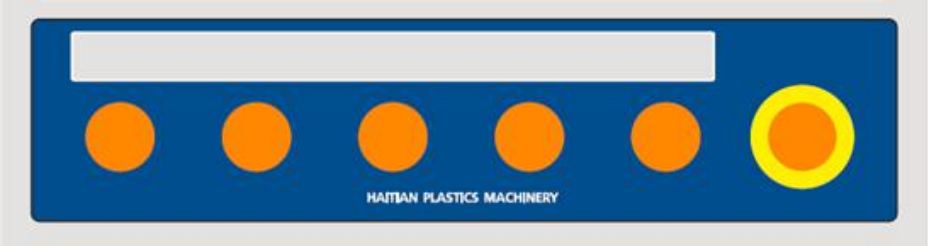
（7）**Power enabling unit button**

 **Hot runner switch key:** Under the manual operation mode with the conditions satisfied, press this button to start the heating mould runner and press it again to stop the runner. The current status can be estimated with the status light display.
Notice: This function is optional and this key is for non-inching operation.

 **Heater switch key:** Under the manual operation mode with the conditions satisfied, press this button to start heating the charging barrel and press it again to stop heating. The current status can be estimated with the status light display.
Notice: This key is for non-inching operation.

 **Motor switch key:** Under the manual operation mode with the conditions satisfied, press this button to start heating the motor and press it again to stop it. The current status can be estimated with the status light display.
Notice: This key is for non-inching operation.

（8）**External free assembly unit button**



Panel information lock: When the key directs to OFF, the information lock is invalid and when it directs to ON, the user's code degree switch to degree 1 automatically.

Cycle start / Cycle stop: In case of Full-Auto or Semi-Auto production is needed, the panel will instruct the user to press START button to start the Auto (Semi-Auto) production or STOP button to stop the Auto (Semi-Auto) production.

Emergency stop button: When it is needed to stop the operation of the machine or the motor during the production and maintenance for emergencies, the user can press this button or press it again to reset when the problem is eliminated.

Auto door switch button: If the machine is equipped with an Auto door, press the left button to open the door and the right button to close the door. Be aware of its difference between the electrically operated door, which requires you to press the button to the end to open.

3.1.2 Overview of controller menu

General rules

This section is mainly about the overview of the controller menu, including the basic icons and data setting. Through this section, you can get familiar with the menu and some basic setting methods of the controller.

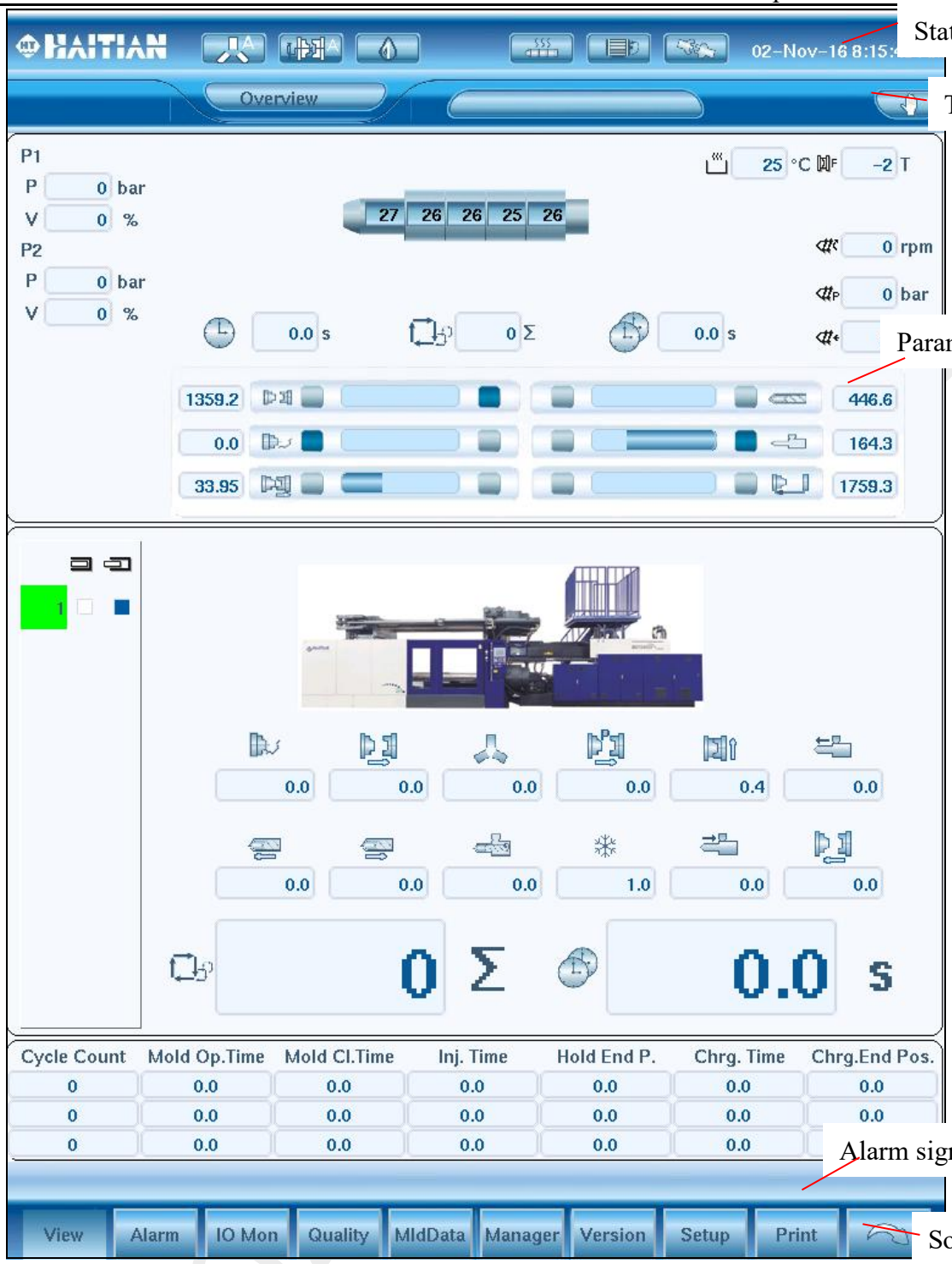
Section overview

- Introduction of main menu
- Introduction of user classification display
- Introduction of status bar
- Introduction of title bar
- Introduction of parameter area
- Introduction of alarm prompt area
- Introduction of soft keys
- Introduction of digital and character input
- Introduction of menu component functions

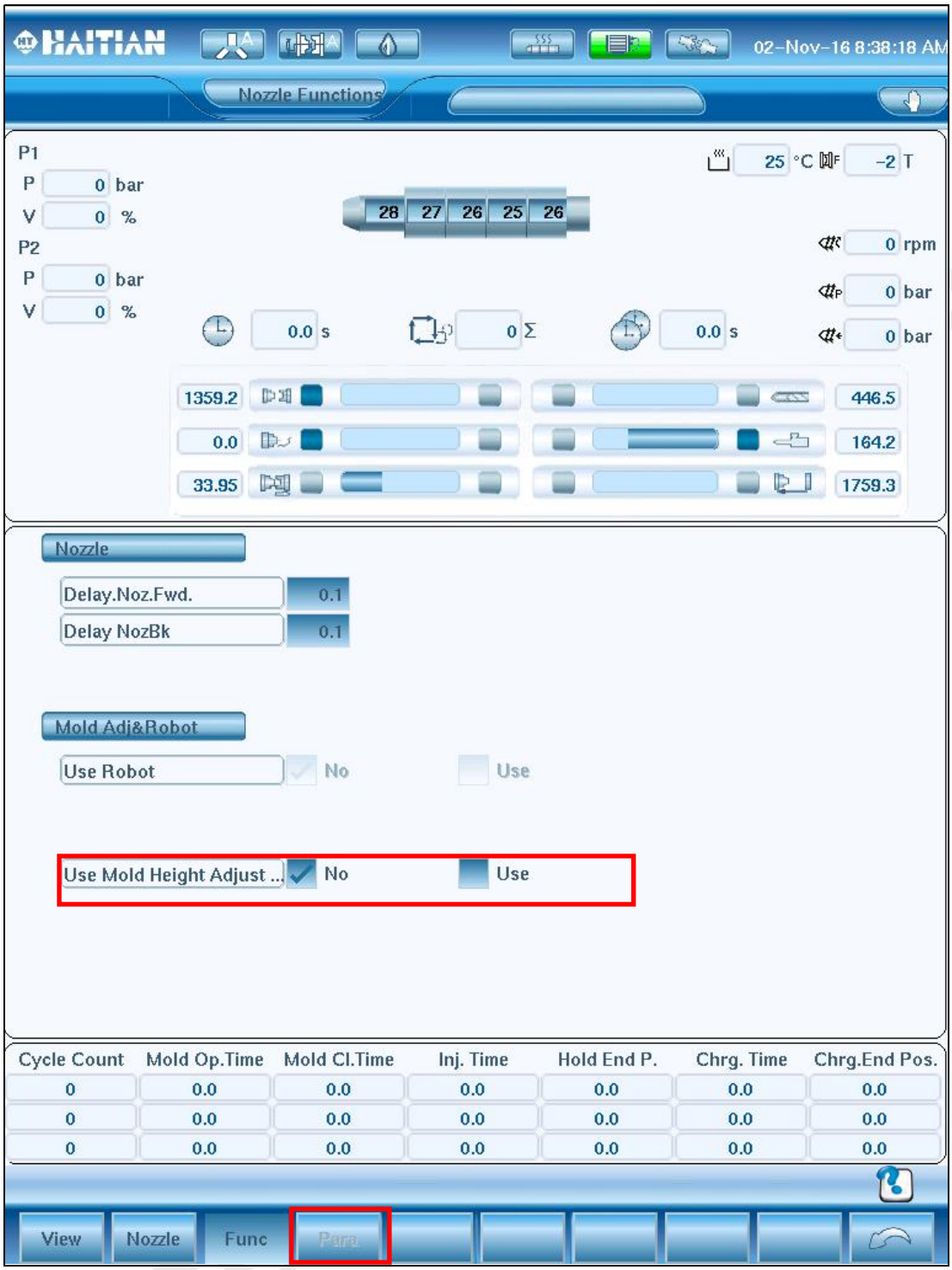
Screen layout functions

- for the convenience of operation of the user
- check action state of the machine
- set up the machine's parameters

I. Introduction of main menu


Status bar
Title bar
Parameter area
Alarm signal area
Soft key
HAITIAN
02-Nov-16 8:15:
Overview
P1
P 0 bar
V 0 %
P2
P 0 bar
V 0 %
25 °C
-2 T
27 26 26 25 26
0 rpm
0 bar
0.0 s
0 Σ
0.0 s
1359.2
0.0
33.95
446.6
164.3
1759.3
0.0 0.0 0.0 0.0 0.4 0.0
0.0 0.0 0.0 1.0 0.0 0.0
0
Σ
0.0
s
Cycle Count
Mold Op.Time
Mold Cl.Time
Inj. Time
Hold End P.
Chrg. Time
Chrg.End Pos.
0 0.0 0.0 0.0 0.0 0.0 0.0
0 0.0 0.0 0.0 0.0 0.0 0.0
0 0.0 0.0 0.0 0.0 0.0
View
Alarm
IO Mon
Quality
MldData
Manager
Version
Setup
Print

II. Introduction of user classification display



The screen displays in compliance with the user classification as the above red box. When the grade is not high enough, the user can only enter some pages with some parameters not changed; when the grade is not high enough, the user may not enter some pages.

User's classification: processing grade, functional grade, parameter grade, technician grade, engineer grade and manager grade. Please refer to 1.4 User's Grade Planning and User Authorization for detail description of the user's authorization.

Note: unauthorized using of the user's rights may cause changes to the machine's parameters and damage the machine. Please protect the authorized using of the user's rights.

III. Introduction of status bar

Haitian logo core blowing lubrication hot runner heating motor USB current time

Status

 core chosen at the moment

 blowing chosen at the moment

 opening status of lubrication 1

 closing status of lubrication 1

 opening status of hot runner

 closing status of hot runner

 opening status of heating

 closing status of heating

 opening status of motor

 closing status of motor

 USB connected

 USB disconnected

IV. III. Introduction of title bar

Action status Page name Current processing number Mode

（1） Mode:

 manual mode

press the manual button so that the machine enters the manual mode;

 adjusting mode

press the adjusting button so that the machine enters the adjusting mode;

 Semi-Auto mode

press the Semi-Auto button so that the machine enters the Semi-Auto mode;

 Full-Auto mode

press the Full-Auto mode button so that the machine enters the Full-Auto mode.

（2） Actual action logo of the screen:

 Clamping step

 Opening step

 Braking step

 Breaking step

 Boosting step

 Depressurizing step

 Seat in step

 Seat back step

 Injection step

 Storage step

 Mould breaking step

 Rod in step

 Rod back step

 Jacking step

 Ejecting step

 Heating step

 Cooling step

 Core in step

 Core back step

 Blowing step

 Nozzle opening step

 Nozzle closing step

V. Introduction of parameter area

It displays some working status and parameters of the machine: pressure-flow, rotation speed, mould locking pressure, injection pressure, clamping place, injection place, thimble place, seat place, rod place and template place.

Actual input display area:

They are the system 1 pressure, flow, system 2 pressure, flow and back pressure.

Actual feedback display area:

Including the current rotation speed, clamping force and injection pressure.

Actual place display area:

It displays the current clamping place, injection rod place, thimble place, seat place, rod place and template place.

Actual operation display area:

It displays the current time, module number and circulation time.

Charging barrel temperature display area:

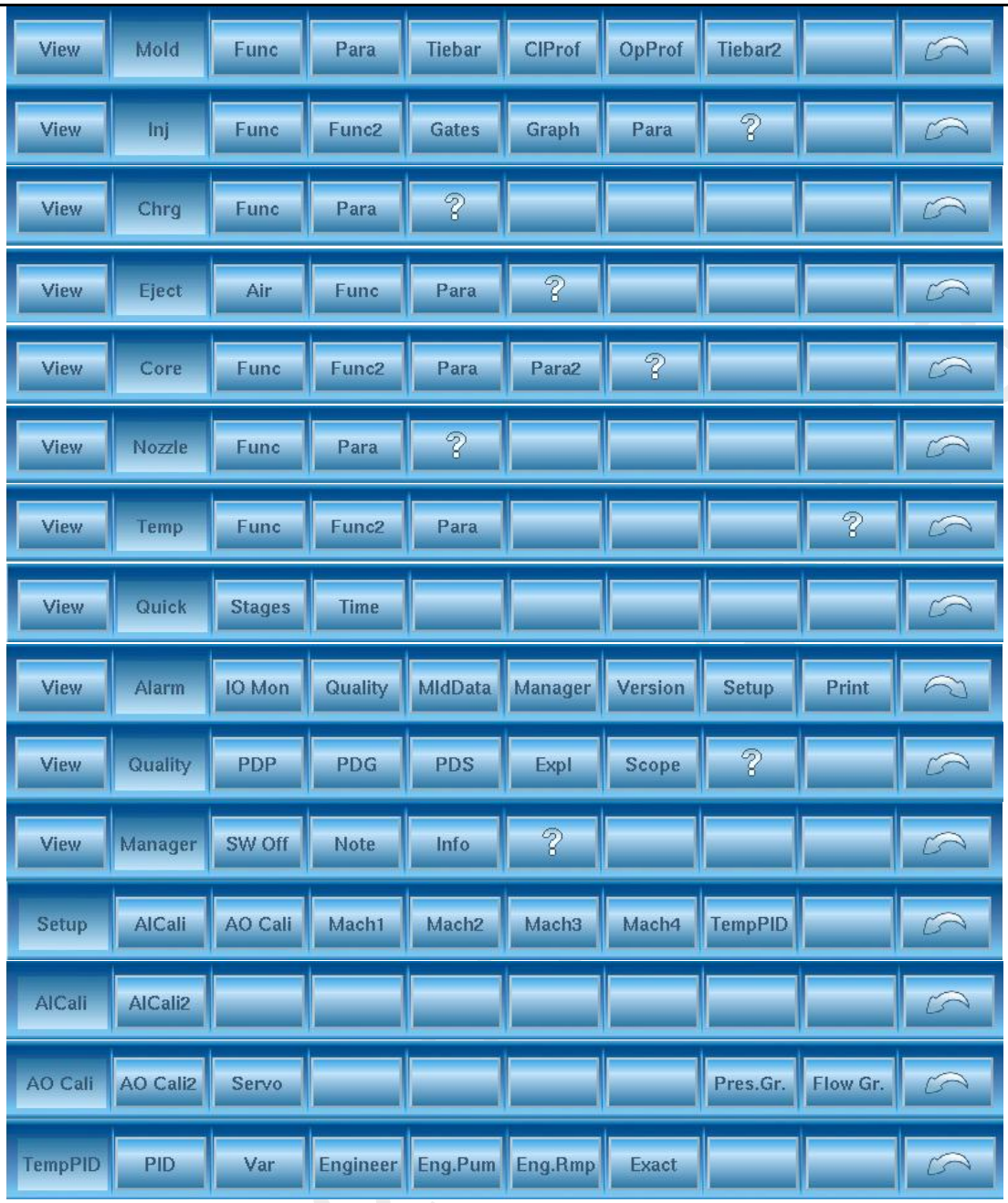
Oil temperature display area:

VI. Introduction of alarm prompt area

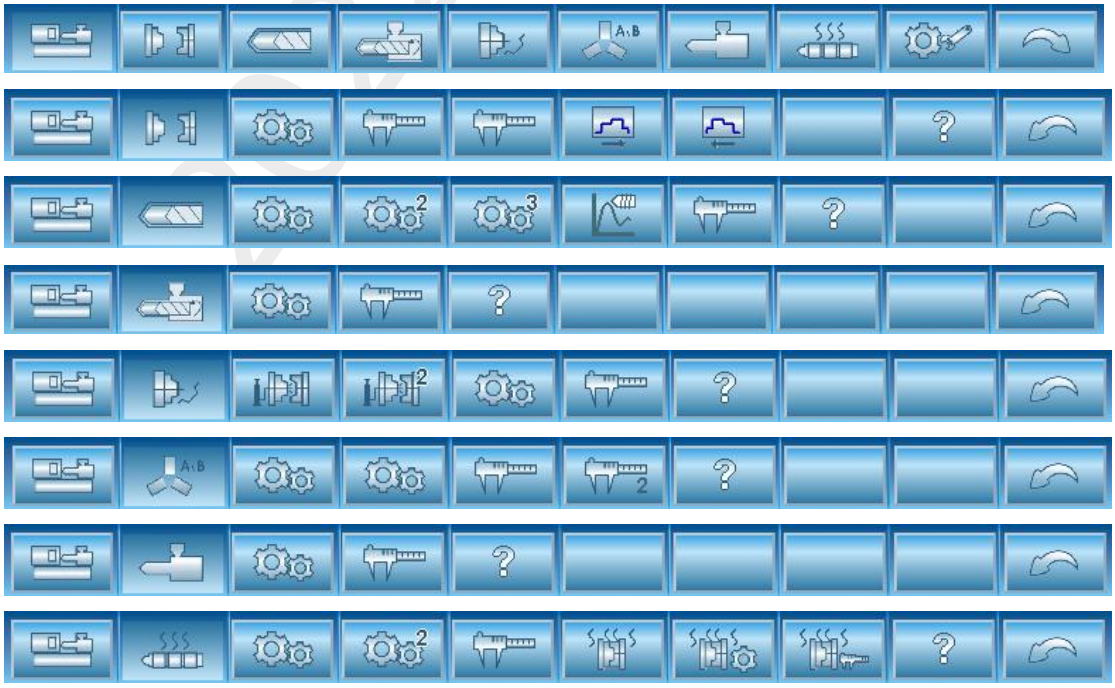
It displays the alarm and prompt information appeared at the machine at the moment. Click the red area to switch to the alarm page and check the specific alarm information.

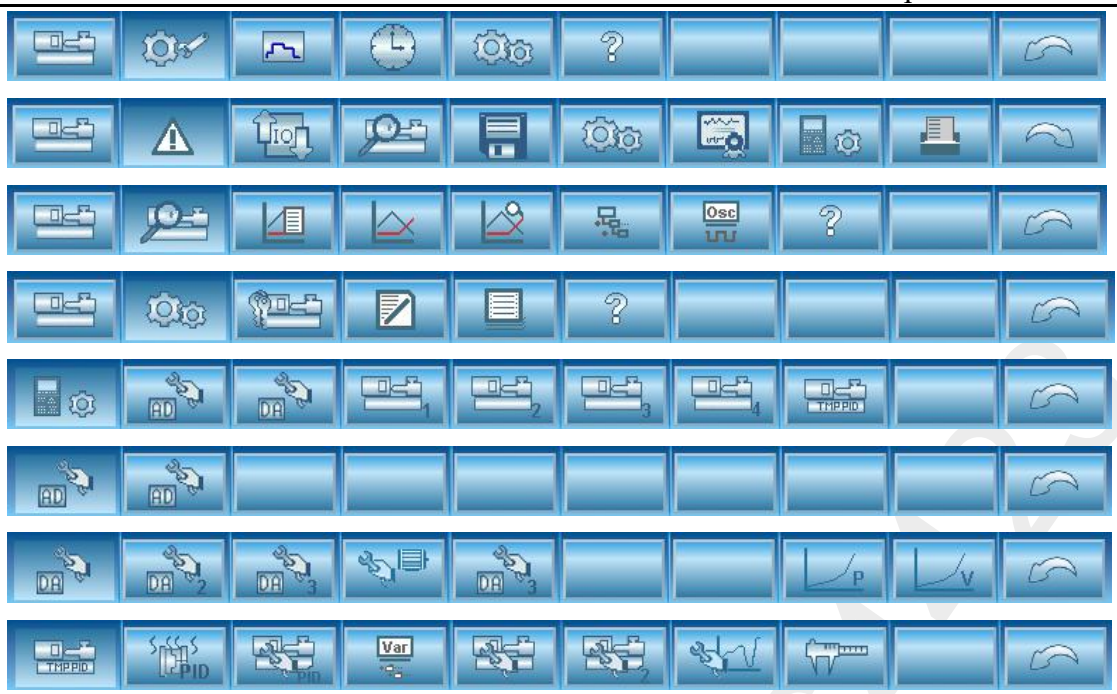
VII. VI. Introduction of soft keys

（1）Character key:


View Mold Func Para Tiebar ClProf OpProf Tiebar2
View Inj Func Func2 Gates Graph Para
View Chrg Func Para
View Eject Air Func Para
View Core Func Func2 Para Para2
View Nozzle Func Para
View Temp Func Func2 Para
View Quick Stages Time
View Alarm IO Mon Quality MldData Manager Version Setup Print
View Quality PDP PDG PDS Expl Scope
View Manager SW Off Note Info
Setup AlCali AO Cali Mach1 Mach2 Mach3 Mach4 TempPID
AlCali AlCali2
AO Cali AO Cali2 Servo Pres.Gr. Flow Gr.
TempPID PID Var Engineer Eng.Pum Eng.Rmp Exact

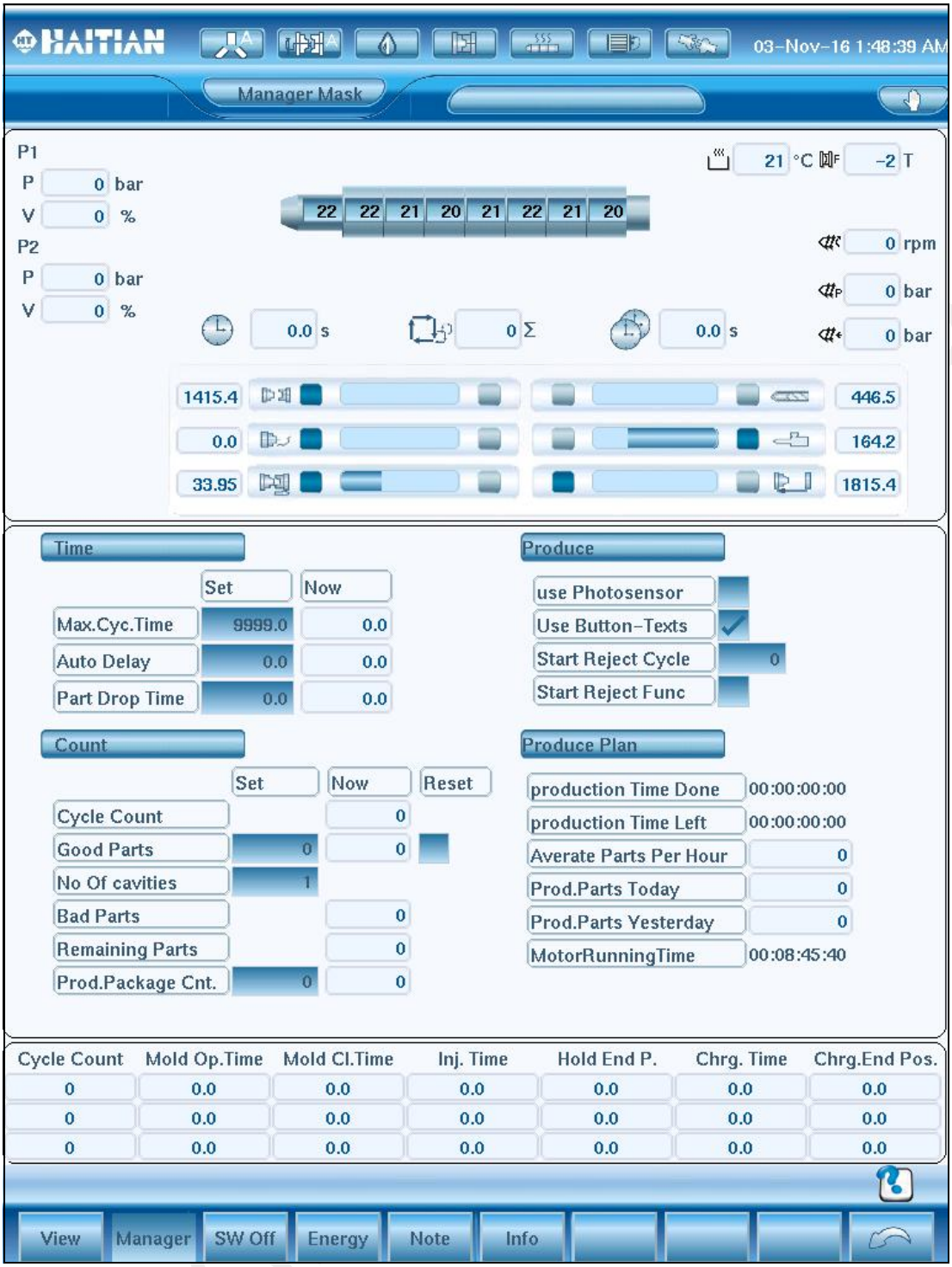
（2）Figure key:





Switch between character keys and figure keys:

Click next page, management to enter and set up the screen, where you can change the display way of the soft keys.

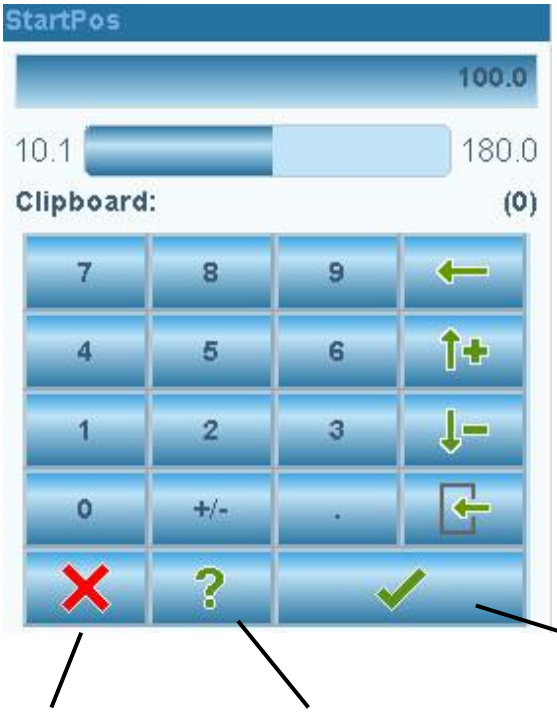


The user can choose the figure keys to operate by cancling the tick of "character key".

VIII. Introduction of digital and character input

Input keyboard

After inserting the permission card, you can select the corresponding parameters. When selecting a parameter, the following dialog box appears：



Input area (current value)

Interval range of input numeric values

The previous input value (in the clipboard)

Cancel the key (backspace)

Increase key (increase the value)

Decrease key (reduce the value)

Copy key, copy the previous input number to the current input location.

Input key

Close key

Select the help key of the parameter

If the value is in the range of possible maximum and minimum, the input value can be saved by pressing the input key in the input bar.

With the alphabetical keyboard, you can input letters and figures.

Keys introduction:

 **Enter:** The input value will be checked if within the limit scope. If it is valid, the controller will allow its input. If not, the controller will require for valid value.

 **Cancel:** Press this button to cancel your setting and close this dialog box. If this button is used during the figure input, the value will not be changed and the chosen parameters will resume to its original value.

 **Help:** Press this button, you will get the help information of the controller.

 **Delete:** Press this button to delete the incorrect figure input.

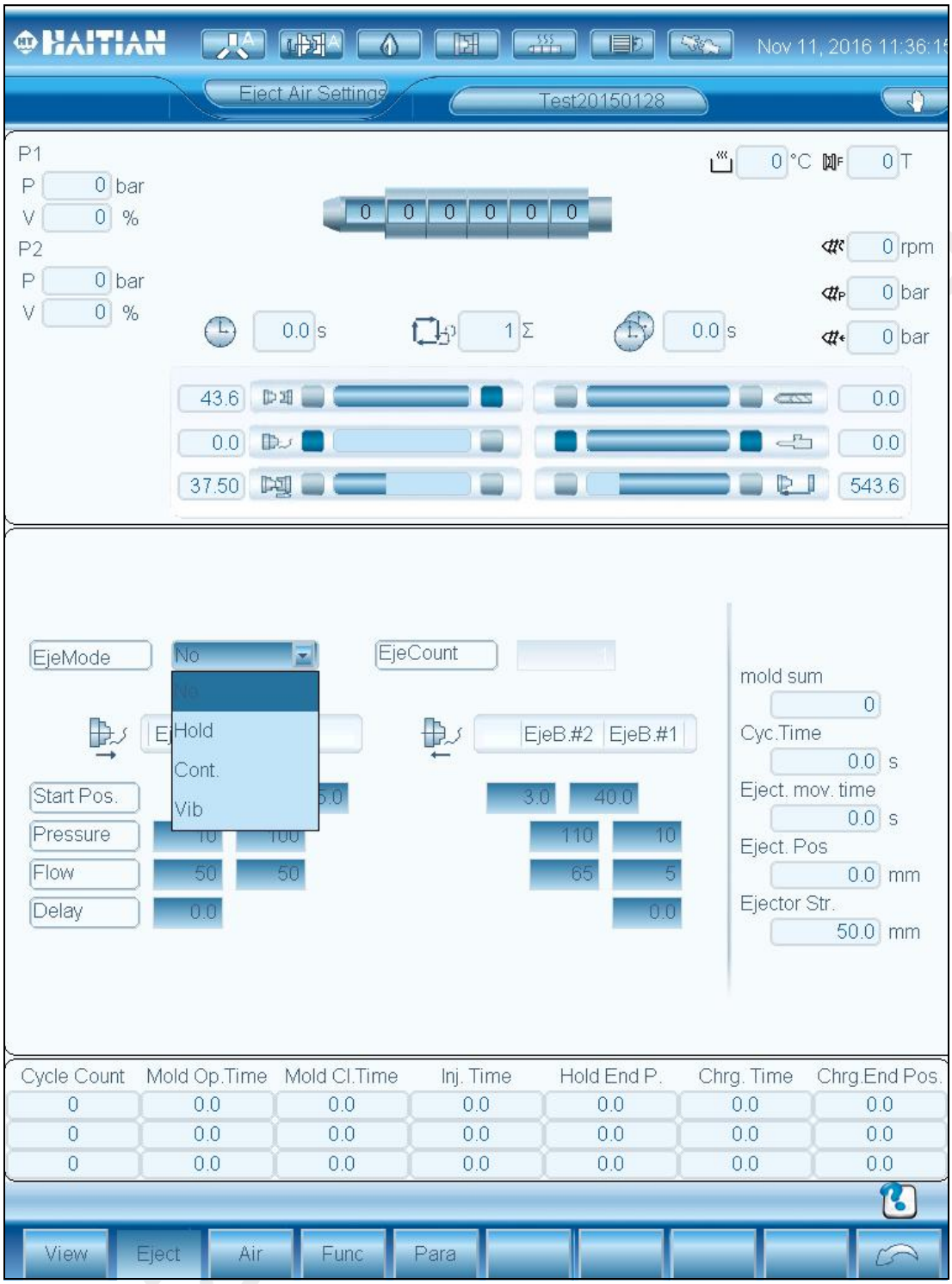
 **Increase:** Press this button to increase the input value.

 **Decrease:** Press this button to decrease the input value.

 **Revise:** Press this button so that the last value you input will be copied to this figure box.

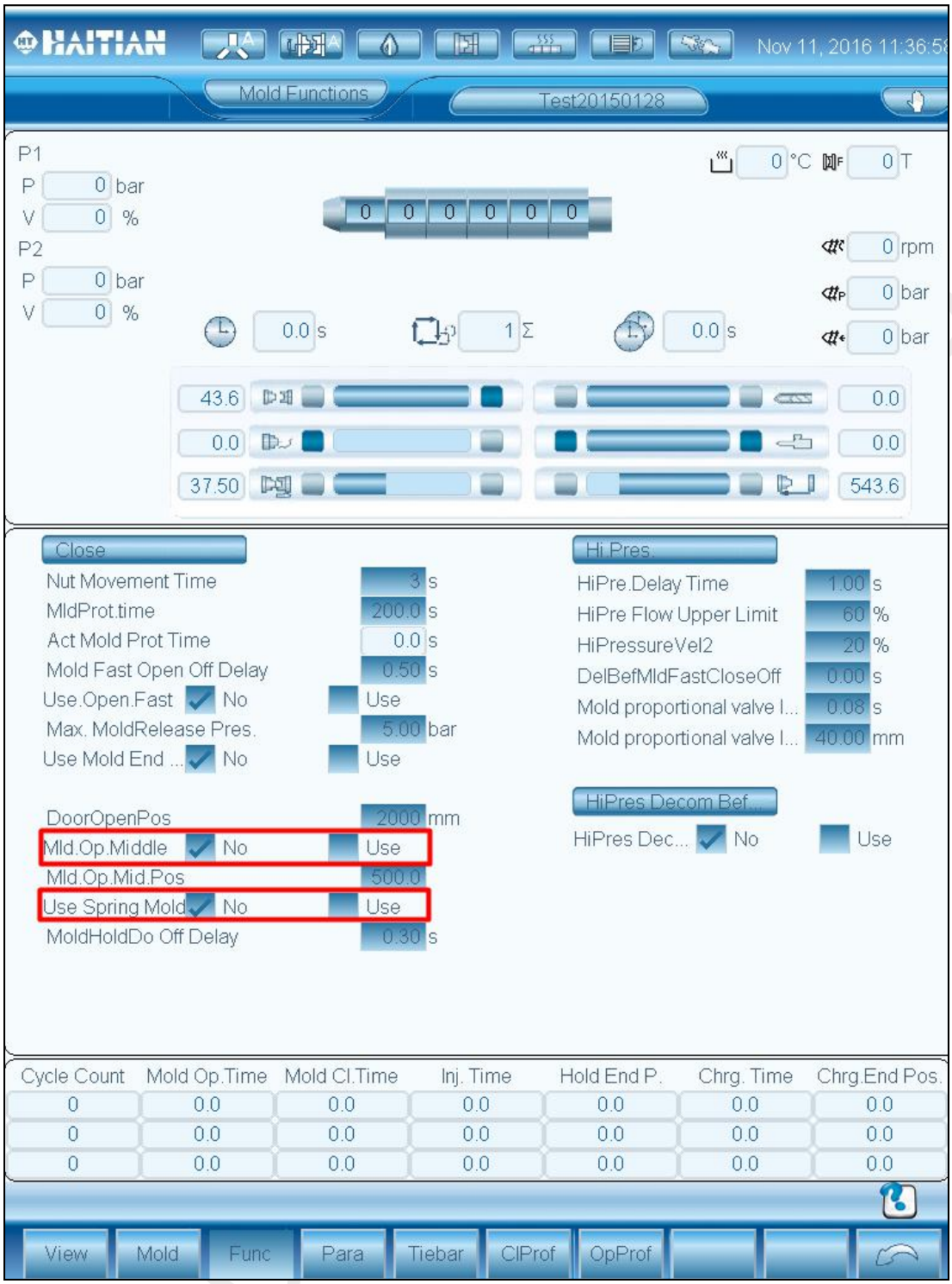
IX. Introduction of menu component functions

（1）Pull-down menu:



Click the pull-down menu to choose the items you need.

（2）Choose the functions:

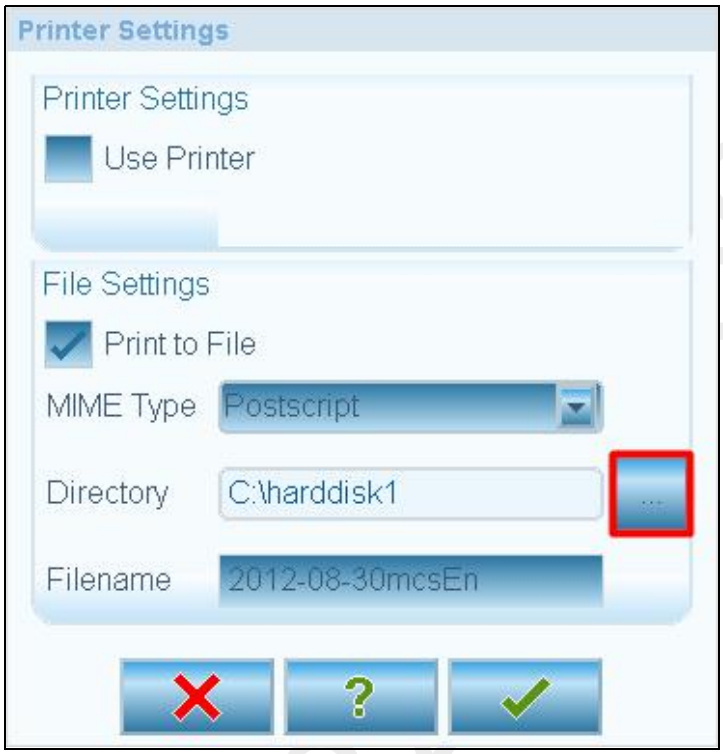


Tick at the item you need to apply this function.

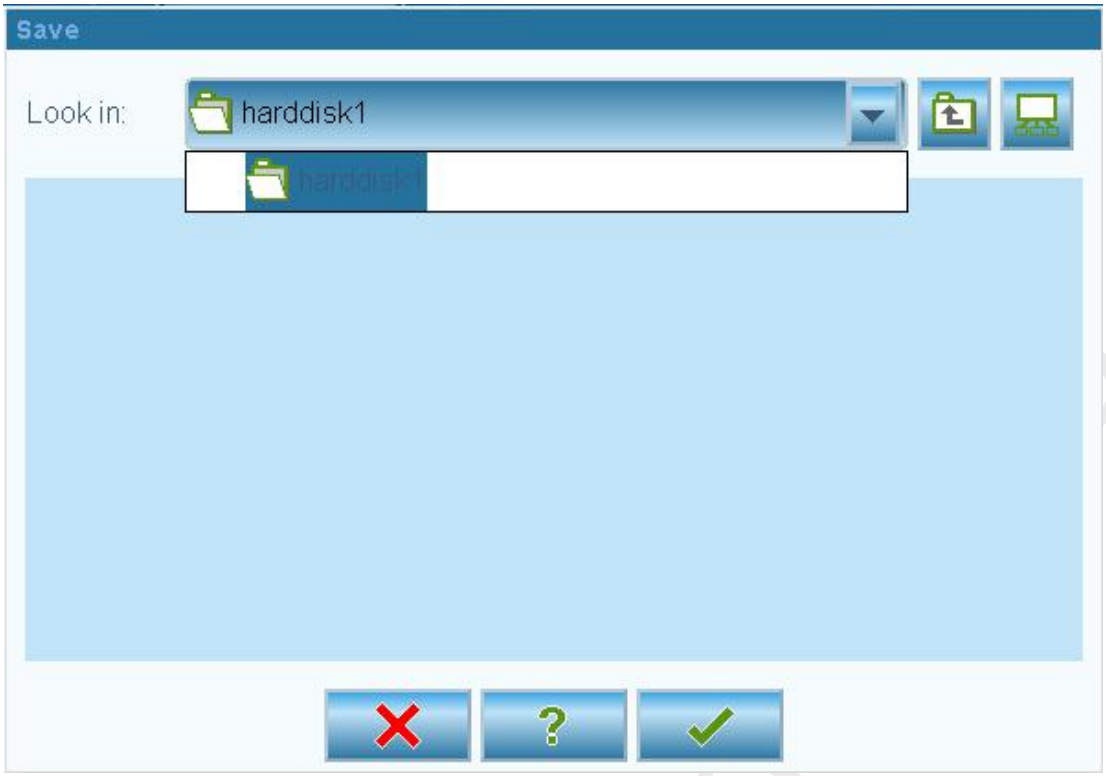
（3）Screenshot:

Click the red box range to choose this item and tick to enter.

（4）Choose file path:



Click the red box to popup the file path and choose.



After choosing the file path, tick to confirm.

（5）Enter and cancel buttons:

Tick to conform: press this button to confirm the current choice.

Cross to cancle the choice: press this button to cancel the current choice.

Doubt help: press this button to popup the help page so that the user can check the information for help.

3. 1. 3 User's grade planning and user authorization

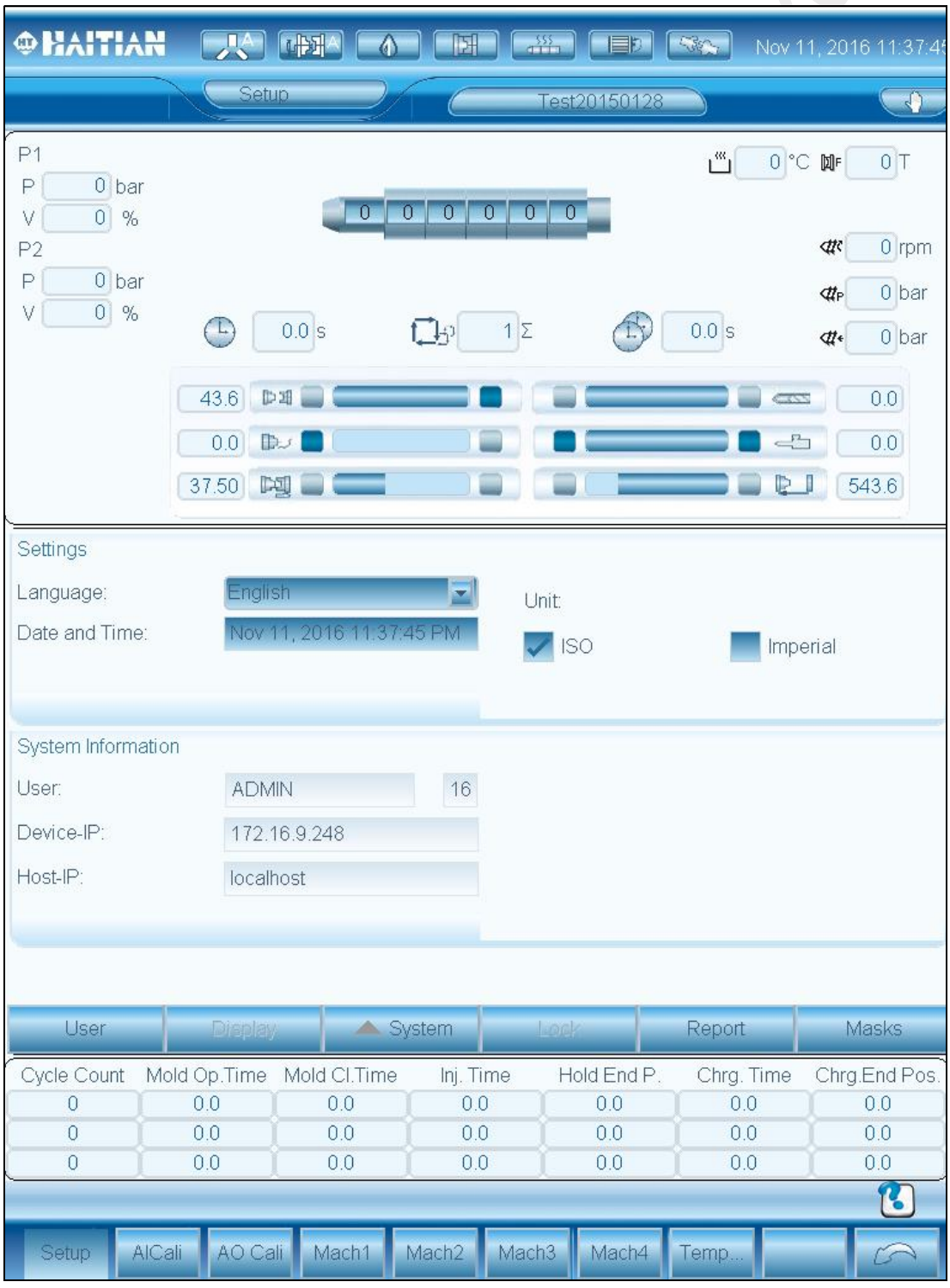
General rules

For the convenience of production management, Haitian has defined different user grades with different user authorizations. For example, the screen authorization, parameter setting authorization and language setting, which all require different grades of users. The specific user information includes: user's name, user's grade, language and unit type. Only those highest grades of users are authorized to operate on the other users, including setting up a new user, changing the user's information and deleting a user account.

I. User login

（1）Enter password on screen to login:

Login screen:



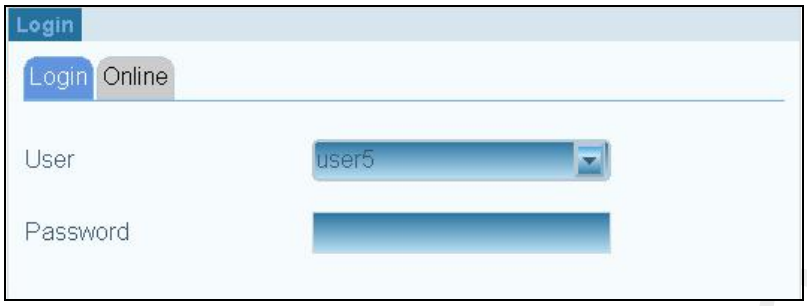
Enter the screen to path: main picture -〉 next page -〉 settings screen below

It displays the current user's name and grade.

Click 

to enter the login screen.

Enter the relative user's name and password in box.



Click the corresponding icon to logout.

If you have already purchased the identification function from Haitian, you can also login with the identification card or by inserting USB flash disk.

（2）Use identification card to login:(option)

Make sure the user's information has already been saved within the identification card that is to be used.

Put the card at the induction area to login.

Insert USB to login:

Make sure the user's information has already been saved within the USB that is to be used.

Insert the disk to the interface to login.

（3）User management

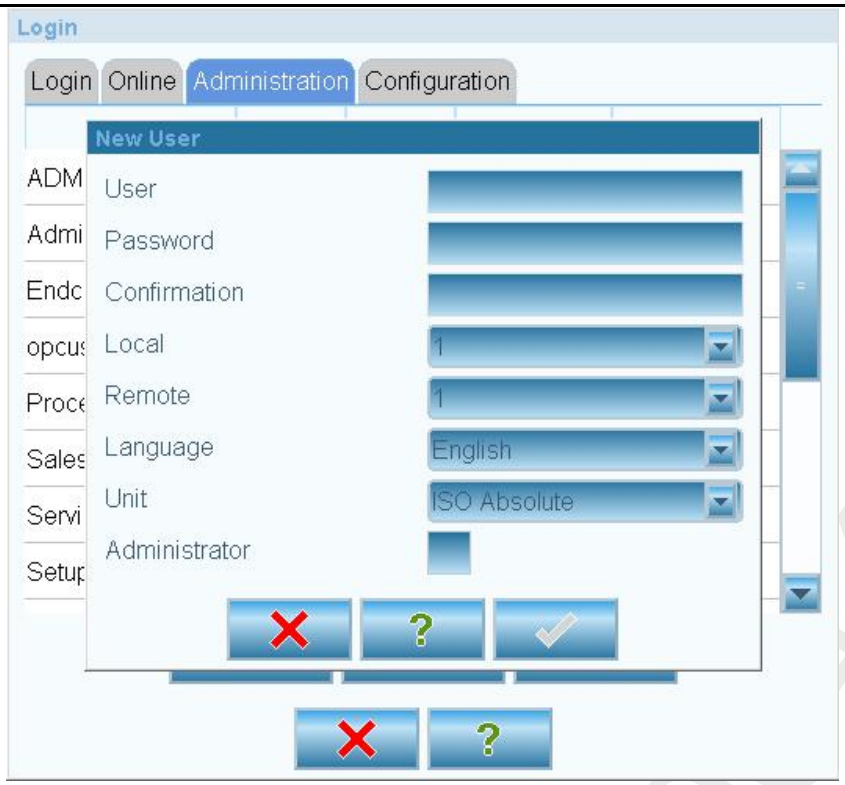
Haitian has provided different user's grades for the convenience of management. The user can add, change or delete the user through this user management. Before the management operation, the user shall require and get Administrator login password from the relative department.

【1】create a new user

Only the administrator can create a new user.

Steps as follows:

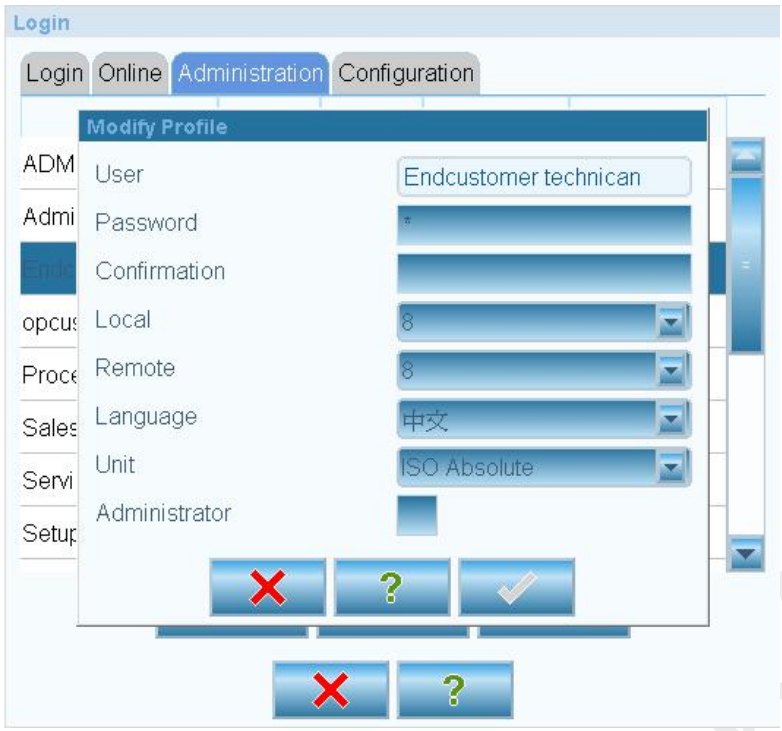
1. enter Administrator account
2. enter Administrator
3. click the new user



4. Input the relative information of the new user.
5. click 
6. Now the new user information has been saved in the computer.

【2】change user's information

1. enter Administrator account
2. enter Administrator
3. choose the user to be changed
4. click the user to be changed



user name

new password

affirm new password

grade of local

grade of remote

enter language

enter unit

is or isn't administrator

4. Input relative information of the user to be changed in the dialog box.

5. click 

6. Now the changed user information has been saved in the computer.

【3】delete the user

1. enter Administrator account
2. enter Administrator
3. enter Administrator
4. click the user to be deleted.

4.  click  at the popup dialog box to be deleted.
5. Now you will find the user you choose to delete has disappeared from the list.

（4）Specific user planning

User's grade and application operation

User's name	Grade	Screens allowed to enter
ADMIN	16	All the screens except for Administrator (user and password change)
Administrator	16	All the screens (including user and password change)

Engineer	12	Same as ADMIN, but not authorized to change the starting language and default unit of the system.
user	5	Only screens related to the mould parameter settings.
superuser	16	If equipped with Administrator authorization, same as Administrator; if not, same as ADMIN.
technican	10	Administrator screen, processing screen, temperature PID screen, variable monitor screen
User Admin	6	Same as User（grade 5）, without authorization to change users and the passwords of grade 6 and below
sales Dept	15	Same as ADMIN
production	1	Only limited to browse mould setting related screens without authorization to change any data.
process operator	5	Same as user
ftp user	16	Same as ADMIN, for ftp uploading and loading procedures.
opc user	16	Same as ADMIN, for opc data exchange.

3. 1. 4 User unit language setting

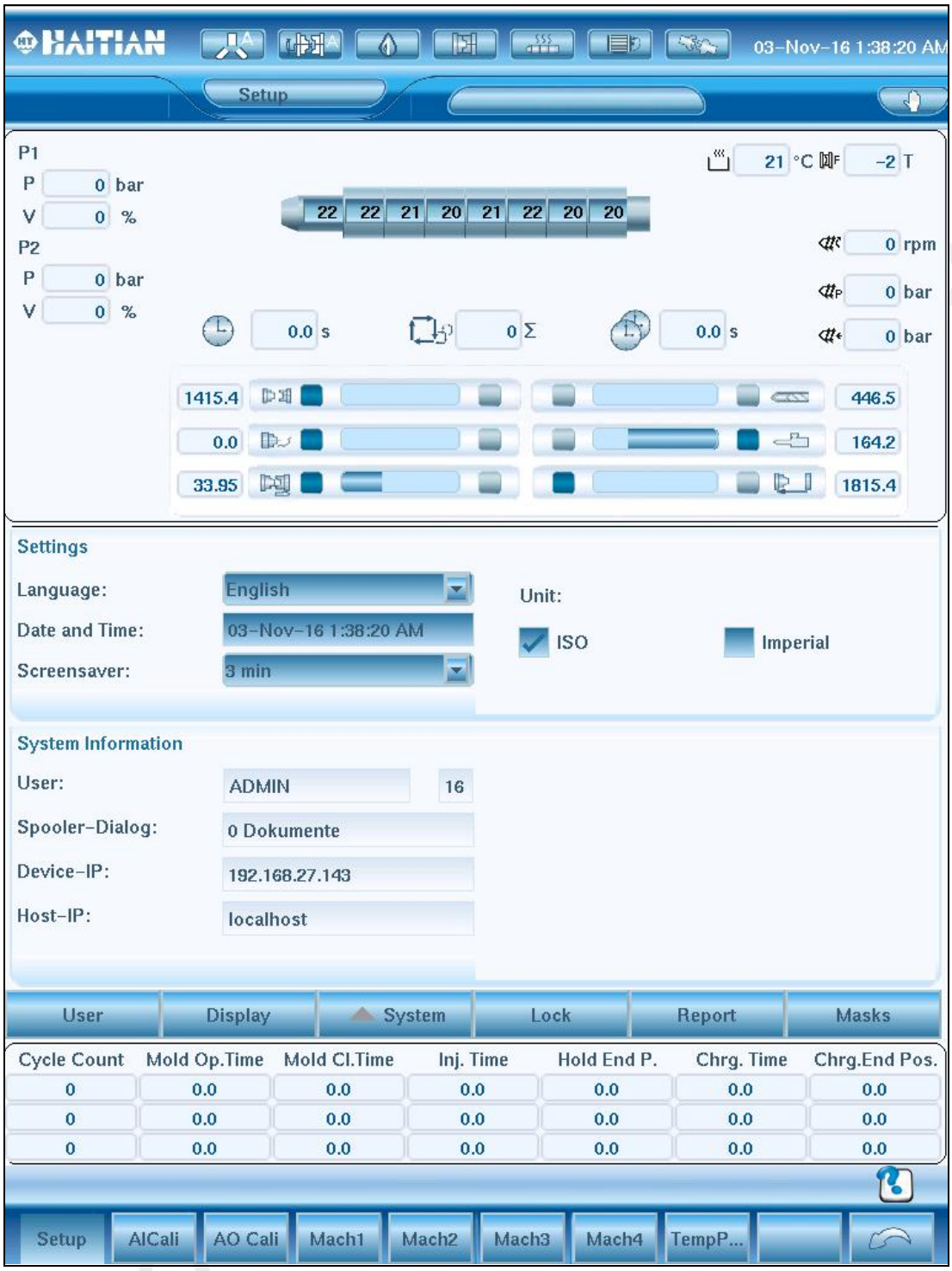
General rules

Haitian provides various language choices so that the users can choose their own languages, which avoids inconveniences may be caused by language differences. The starting language setting can save users from setting the languages everytime when starting.

Section overview

- Introduction of language selection function
- Overview of various languages
- Starting language and default unit setting

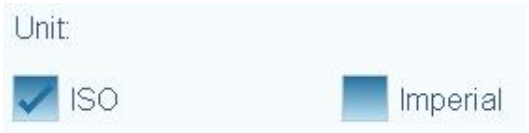
Introduction of language selection function



Click next page and then setting at the main menu to enter into the setting screen.

Language: setting of the screen language. Click the pull-down menu on the right of the language so that there will be a list of various languages for selection. Roll the list with the scrollbar and click the language required, which will be valid immediately and the systematic screen language will be switched to the language selected.

Date/time: set the date and time of the system. Click –10, –1, +1 or +10 to change the date or time of the system and tick to confirm.



Unit: set the system unit, which shall be the international standard or British system.

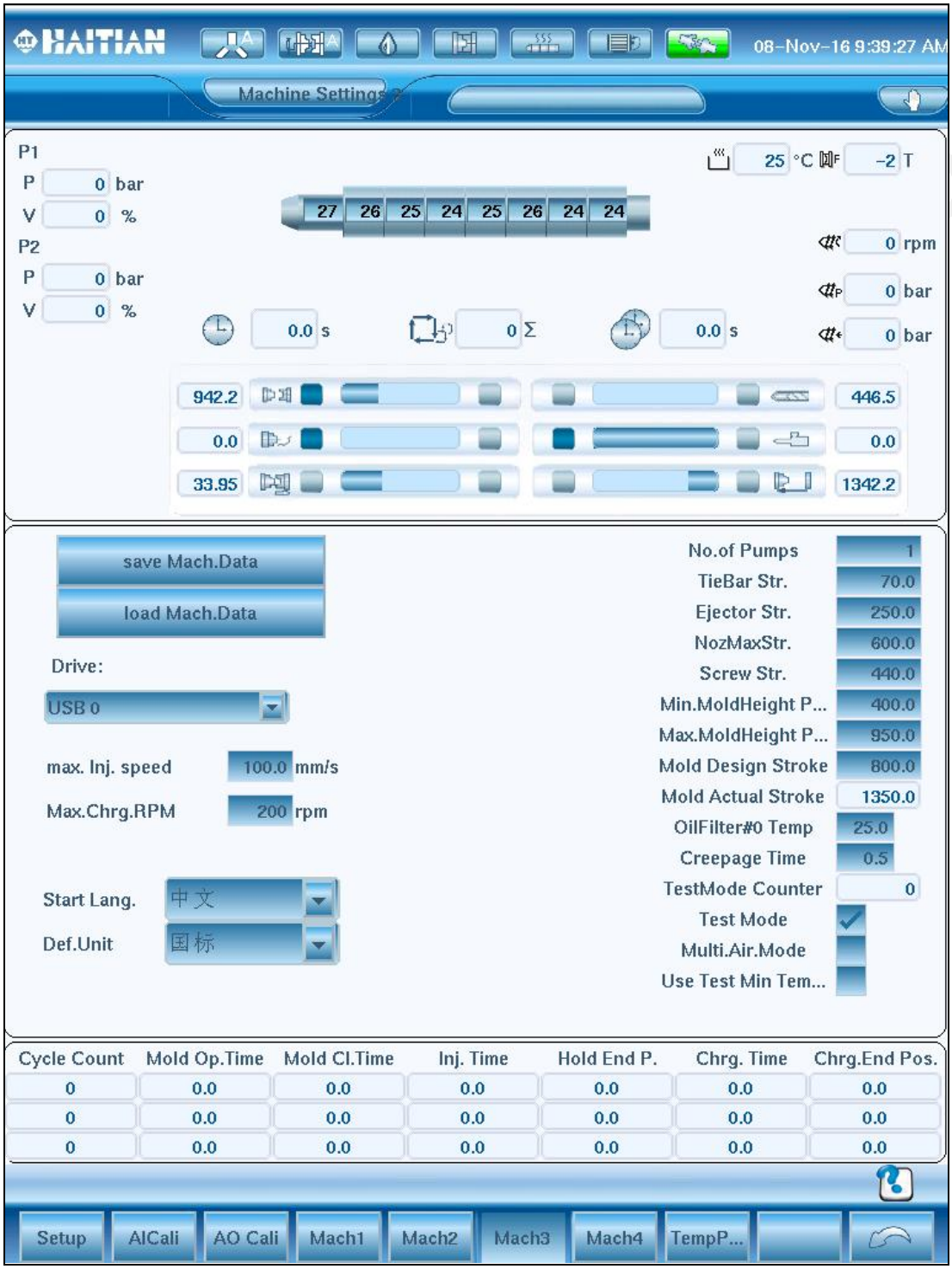
Overview of various languages

Chinese name	English name	Name in i2000 controller
英语	english	English
德语	german	Deutsch
中文	chinese	中文
西班牙语	spanish	español; castellano
法语	french	français; langue française
意大利语	italian	Italiano
荷兰语	dutch	Nederlands
葡萄牙语	portuguese	Português
瑞典语	swedish	Svenska
斯洛伐克	slovak	slovenčina

日语	japanese	にほんご / にっぽんご
韩语	korean	한국어
泰语	thai	
捷克	czech	česky; čeština
波兰	polish	polski
土耳其	turkish	Türkçe
希腊	greek	Ελληνικά
越南	vietnamese	Tiếng Việt
芬兰	finnish	suomen kieli
匈牙利	hungarian	Magyar
克罗地亚	serbo-croatian	Srpskohrvatski/Српскохрватски
斯洛文尼亚	slovenian	slovenščina
罗马尼亚	romanian	română
俄语	russian	русский язык
塞尔维亚	serbian	српски језик

Starting language and default unit setting

KEBA computer can set the default starting language so that the user does not need to change the language everytime when starting.



Click next page, setting and then setting 3 at the main menu to enter setting 3 screen.

Starting language: set the default language of the controller when starting.

Default unit: set the default unit of the controller when starting.

3. 1. 5 Basic operation of the machine

General rules

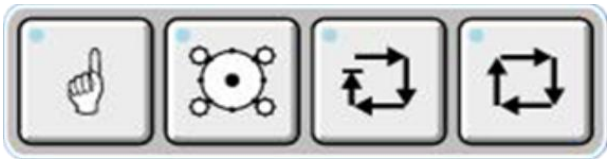
Only a correct operation can make sure the good production status and a safe production environment. Incorrect operation or setting may not only cause defect to the product but also incur potential safety hazard and damages to the machine and moulds.

Items of the file

- Switch of mode
- Starting and closing of heating of the motor, charging barrel and hot runner

I. Switch of mode

（1）Operation mode buttons of machine



Manual Adjust Semi-Auto Full-Auto

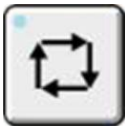
Manual button: This button has many functions. It can be used to switch from any operation mode to the manual operation mode or to delete any abnormal status. It can also be used to emergency stop actions of other modes. When it lights up, it means the machine is under the manual mode.

Adjust button: It is used to load and adjust the modules. Pressure and speed of actions under this mode are comparatively smaller.

Many functions can be matched with this mode, for example, pulling up, braking and automatic adjustment.

When the button lights up, it means the machine is under the adjustment mode.

Semi-Auto button: Press this button so that the machine is under the semi-auto mode. When it lights up, it means the machine is under the semi-auto mode.



Full-Auto button: Press this button, the machine will automatically execute every circle under the full-auto mode. Once the operation times achieve the set value or there is failure with the machine, the controller will stop the machine and the alarm will sound. When the button lights up, it means the machine is under the full-auto mode.

II. Starting and closing of heating of the motor, charging barrel and hot runner

Hot runner switch button: Press the mould temperature switch button to start heating the mould under the manual mode, press it again to stop heating.

Heater switch button: Press this heater switch button to start heating the charging barrel under the manual mode and press it again to stop heating. The heating process applies the current charging barrel heating setting. Press the temperature button at the main menu to observe the setting.

Motor switch button: Press this button start the hydraulic pressure pump motor under the manual mode and press it again to close.

3. 2 Introduction of the Clamping Unit Structure and Functions

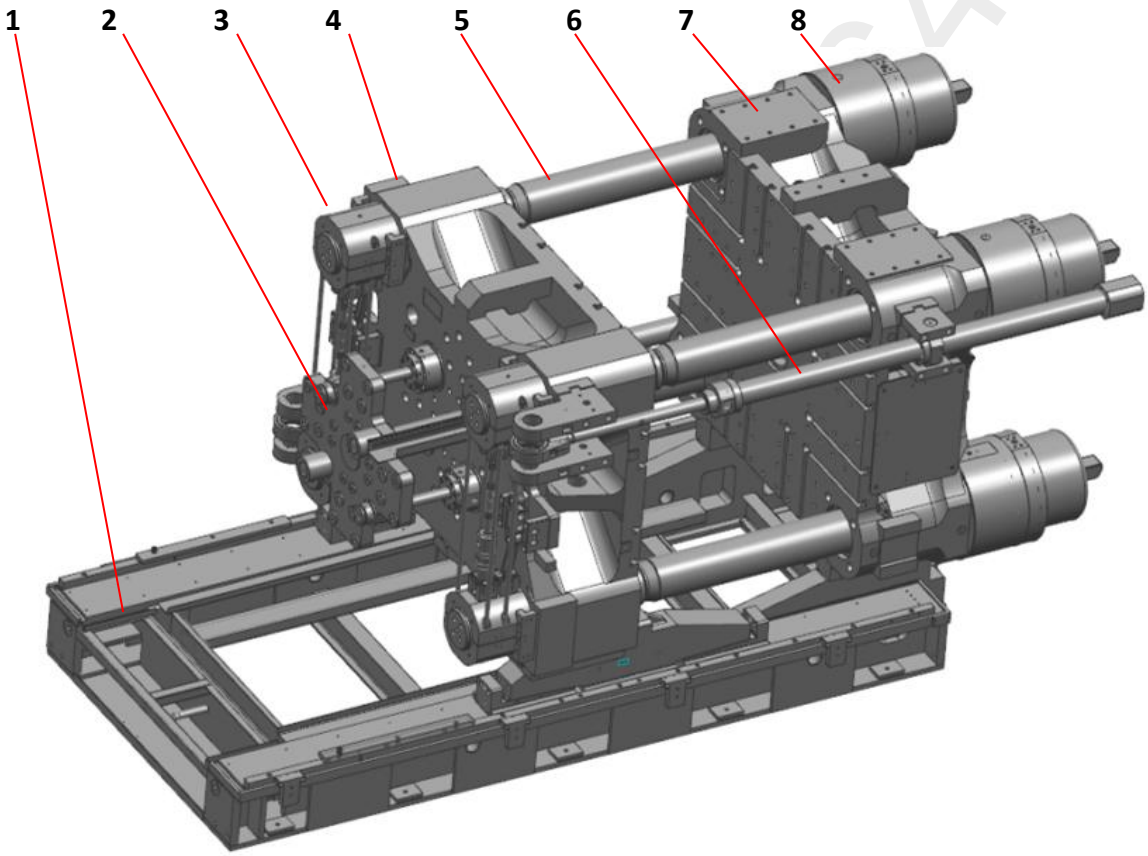
3. 2. 1 **Mould transferring and clamping system**

3. 2. 1. 1 Introduction of template structure arrangement

Functions of clamping unit

- Clamp the mould
- Maintain the clamping force in the injection
- Open the mould after forming
- Eject the product

Component of clamping unit



【1】Bottom box of clamping area
【2】Roof and ejector rob
【3】Connection mechanism between template and pull rod
【4】Moving plate
【5】Pull rod
【6】Mould opening and clamping oil cylinder
【7】Fixed plate
【8】Clamping oil cylinder

3.2.1.2 Introduction of clamping screen and action

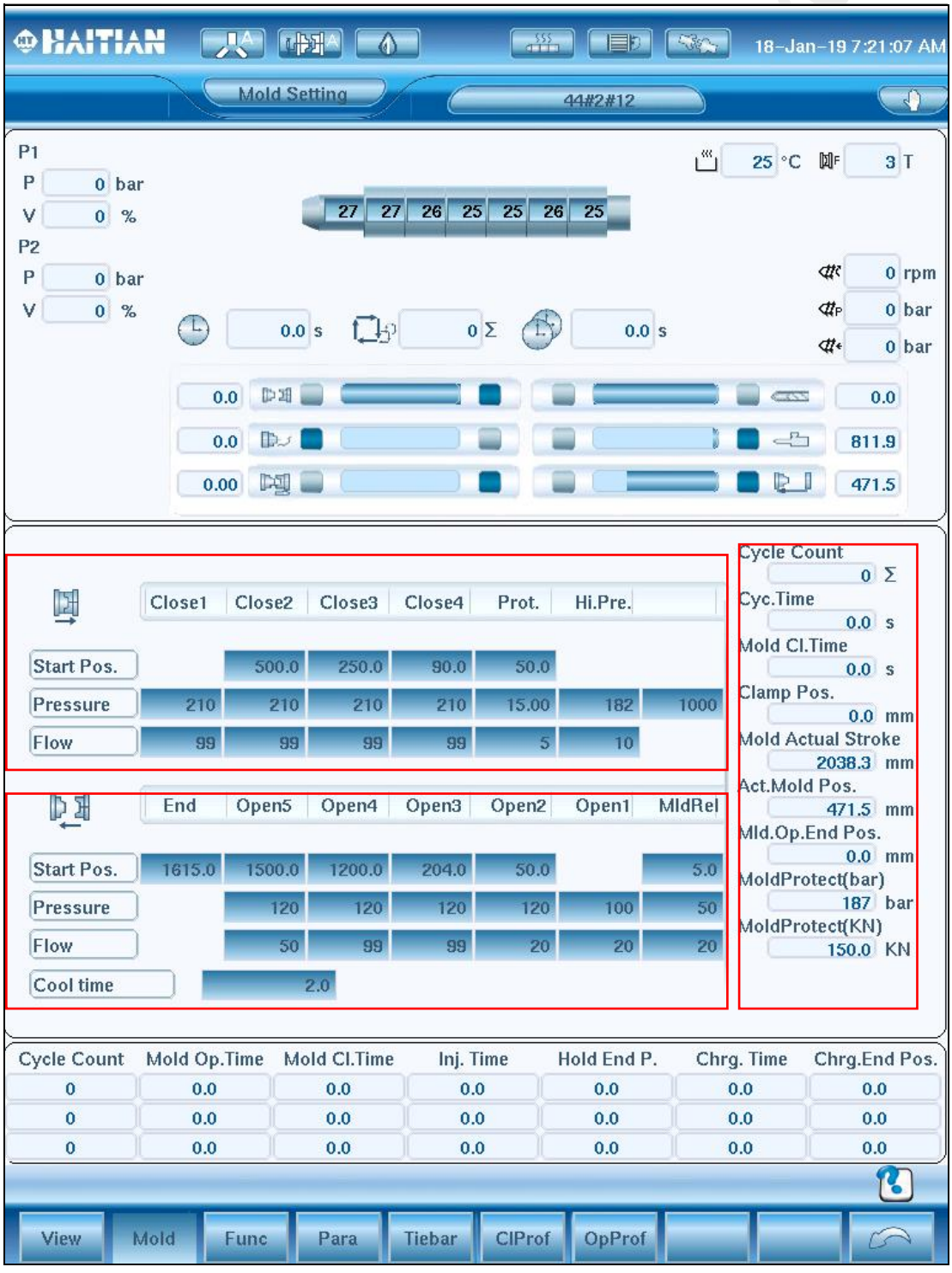
General rules

Clamping is an important procedure for the injection molding machine, which shall be fast and stable and not cause any damage to the moulds. It can be realized by adjusting the sectional pressure and flow.

Section overview

- Introduction of clamping screen
- Introduction of clamping action

Introduction of clamping screen



[1] Clamping action setting: In this part, the user can set the relevant pressure-flow in compliance with the starting position of every section so as to achieve the optimum clamping procedure.

[2] Opening action setting: In this part, the user can set the relevant pressure-flow in compliance with the starting position of every section so as to achieve the optimum mould opening procedure.

[3] Relevant data display area: In this area, the user can get a clear understanding of the modulus, time, position and the other actual values of relevant parameters.

Notes: The pressure-flow size shall comply with the protection requirements of the moulds and realize a fast and stable locking in accordance with the relevant slope.

Introduction of clamping action

Clamping action is mainly composed of: clamping -> fine adjustment of pull rod -> locking -> high pressure locking.

Clamping: Set the relevant flow-pressure parameter in compliance with the processing requirements and sectional positions of the moulds so that the moving plate can get to and stop at the locking position fast and stably.

Fine adjustment of tie bar: after the closing process of the movable platen, the tie bar is adjusted, to make four tie bars arrive at the target position before the full close.

Locking: Conduct the locking action once clamping and pull rod adjustment is in place by braking all the four braking plates.

High-pressure locking: the machine gets high pressure after the locking action until it achieves the set value.

Notes: Incorrect parameter setting may damage the machine or moulds.

3. 2. 1. 3 Introduction of clamping force

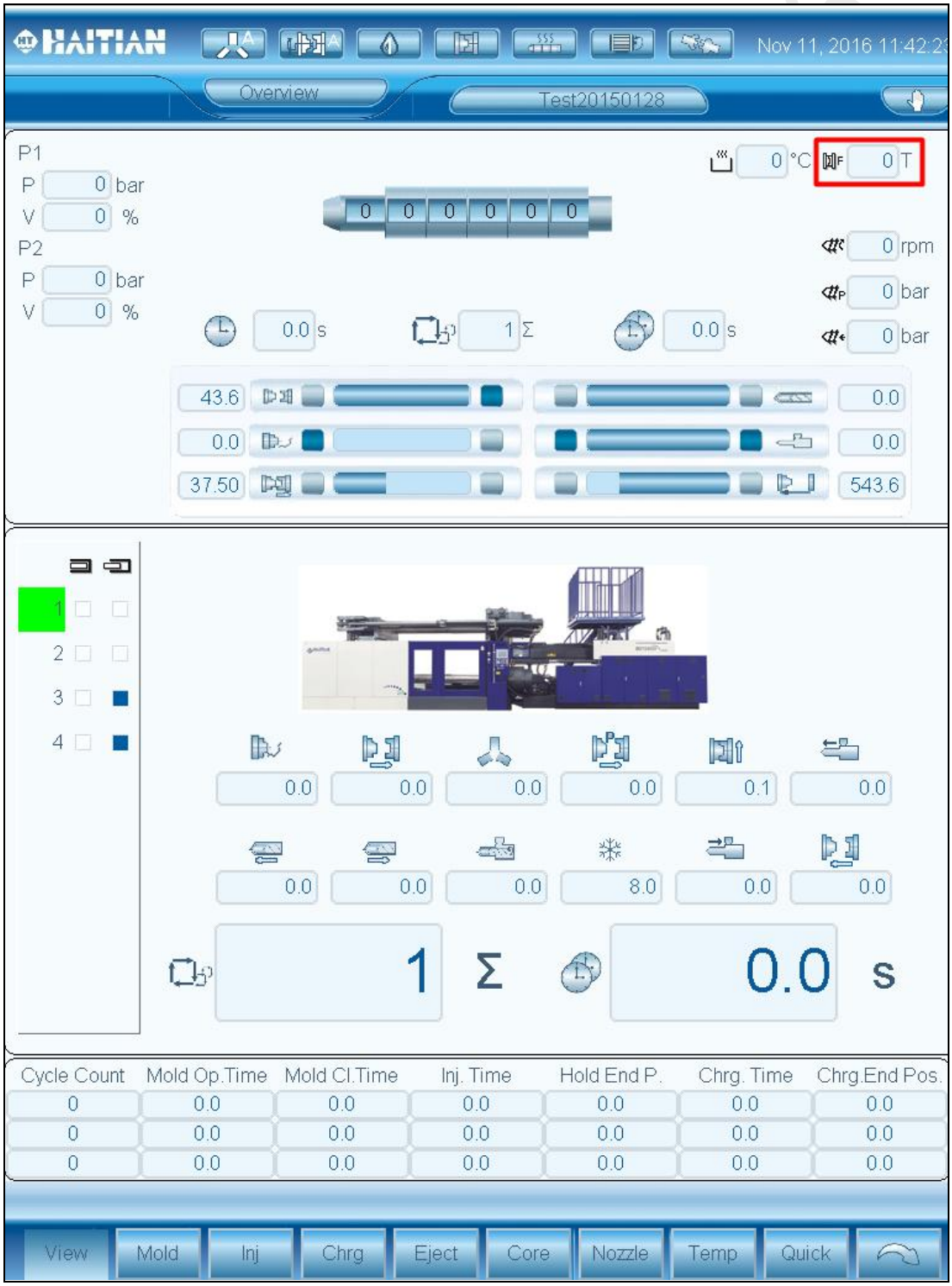
General rules

The clamping force is the force that is for the resistance of injection pressure and occlusion of the moulds. Appropriate clamping force can help close the moulds, but an over high clamping force may increase the unnecessary consumption and even cause damages to the equipment or moulds.

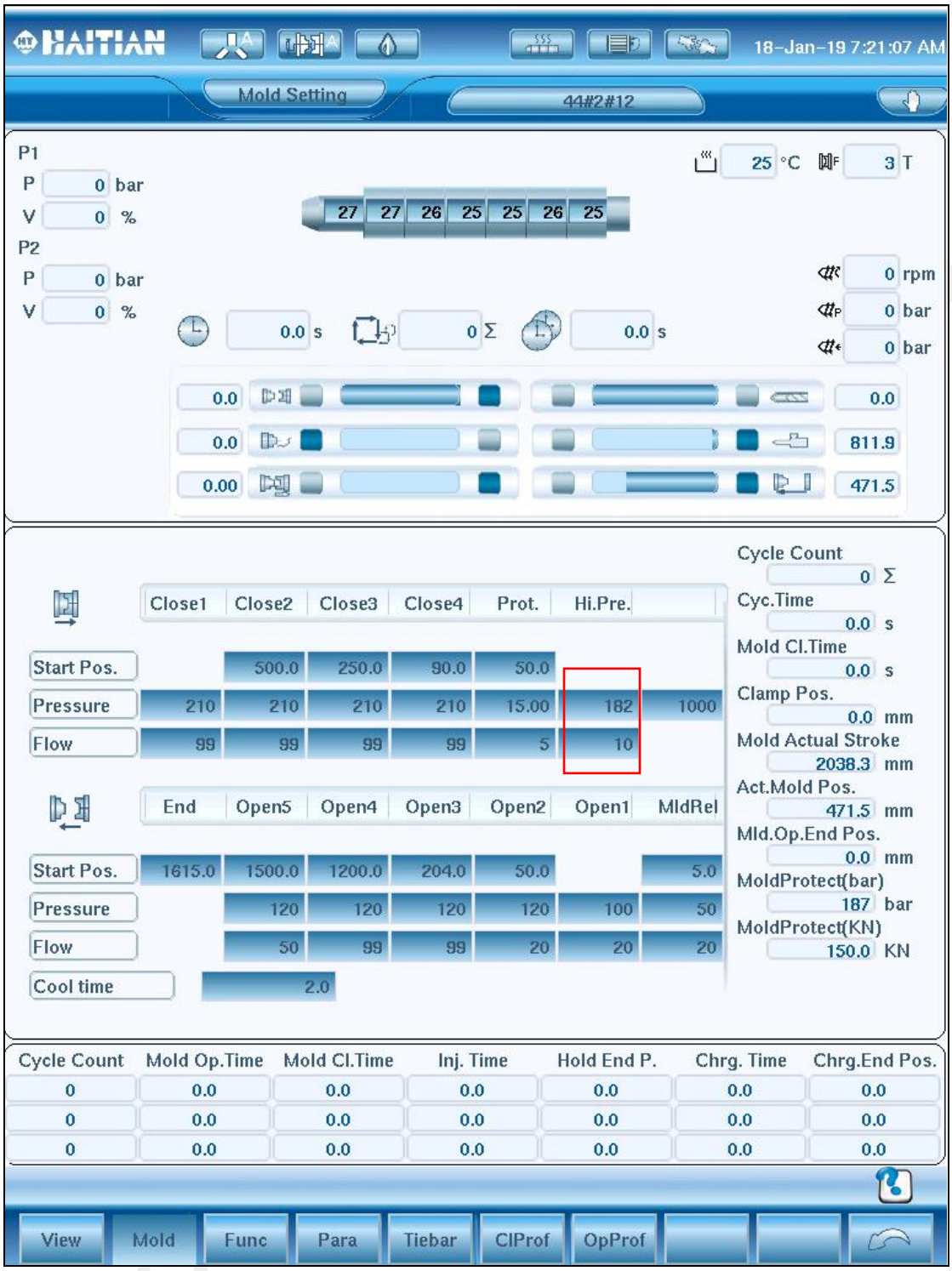
Section overview

- Introduction of clamping force screen setting
- Introduction of clamping force steps

Introduction of clamping force screen display setting



The red part as above is the real-time clamping force value. Please be noted that the unit is ton.



The red part above are the target clamping force and the relevant flow value set at the clamping screen. Please be noted that the unit of the clamping force is MPa.

Introduction of clamping force steps

For the clamping force establishment process, we provides 3 flow values for the users to set.

Step 1: setting -> 

in the setting screen, in this step, if the pressure is within the scope of 0-30, the flow output is 99. This step is the starting step of the establishment of the clamping force. As to accelerate the establishment, the flow set value of this step is comparatively high.

Step 2: as the flow value set at the clamping screen.

Step 3 (Note: only applied to some types): set the value HiPressureVel2 12 % at clamping -> functions screen, this is the step where the clamping force establishment is close to end, so the flow set value here is comparatively small to achieve the target stably.

3. 2. 1. 4 Introduction of low pressure mould protection function

General rules

The low pressure mould protection function can help avoid the moulds from being clamped and damaged during the clamping process.

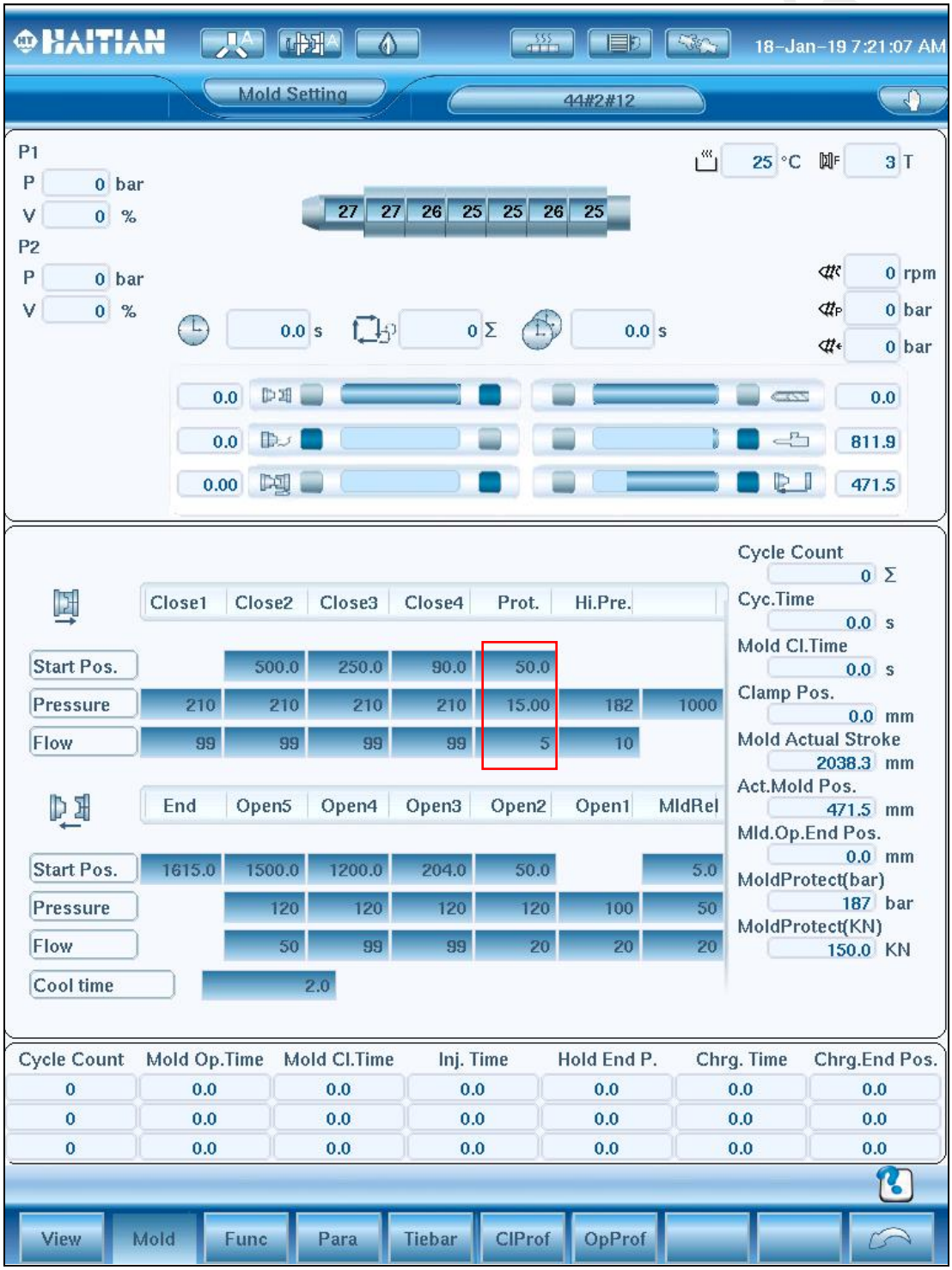
Options involved in this document

- Low pressure mould protection function screen
- Alarming information

Function of low pressure mould protection

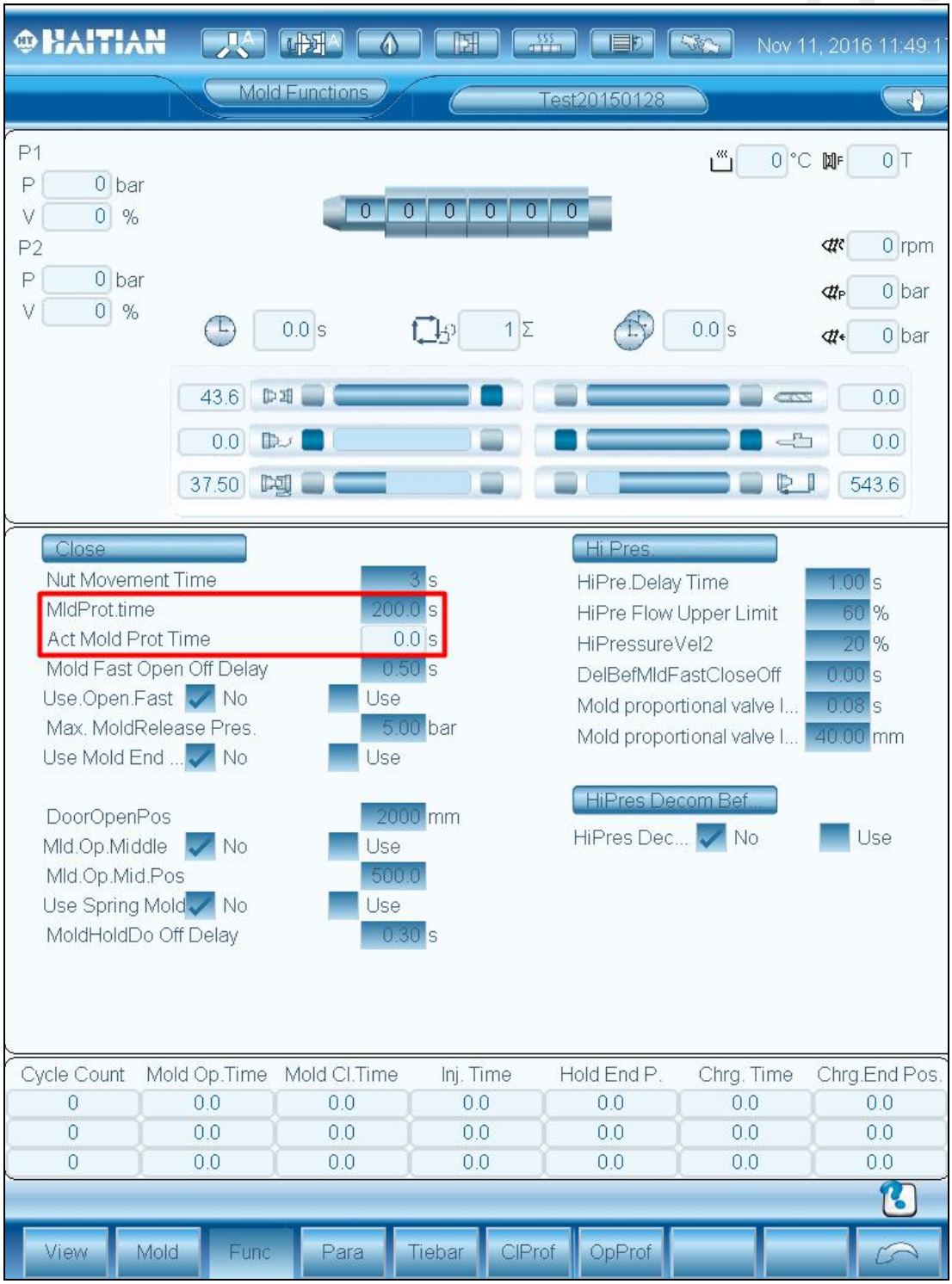
- Protect the moulds

I. Low pressure mould protection function screen



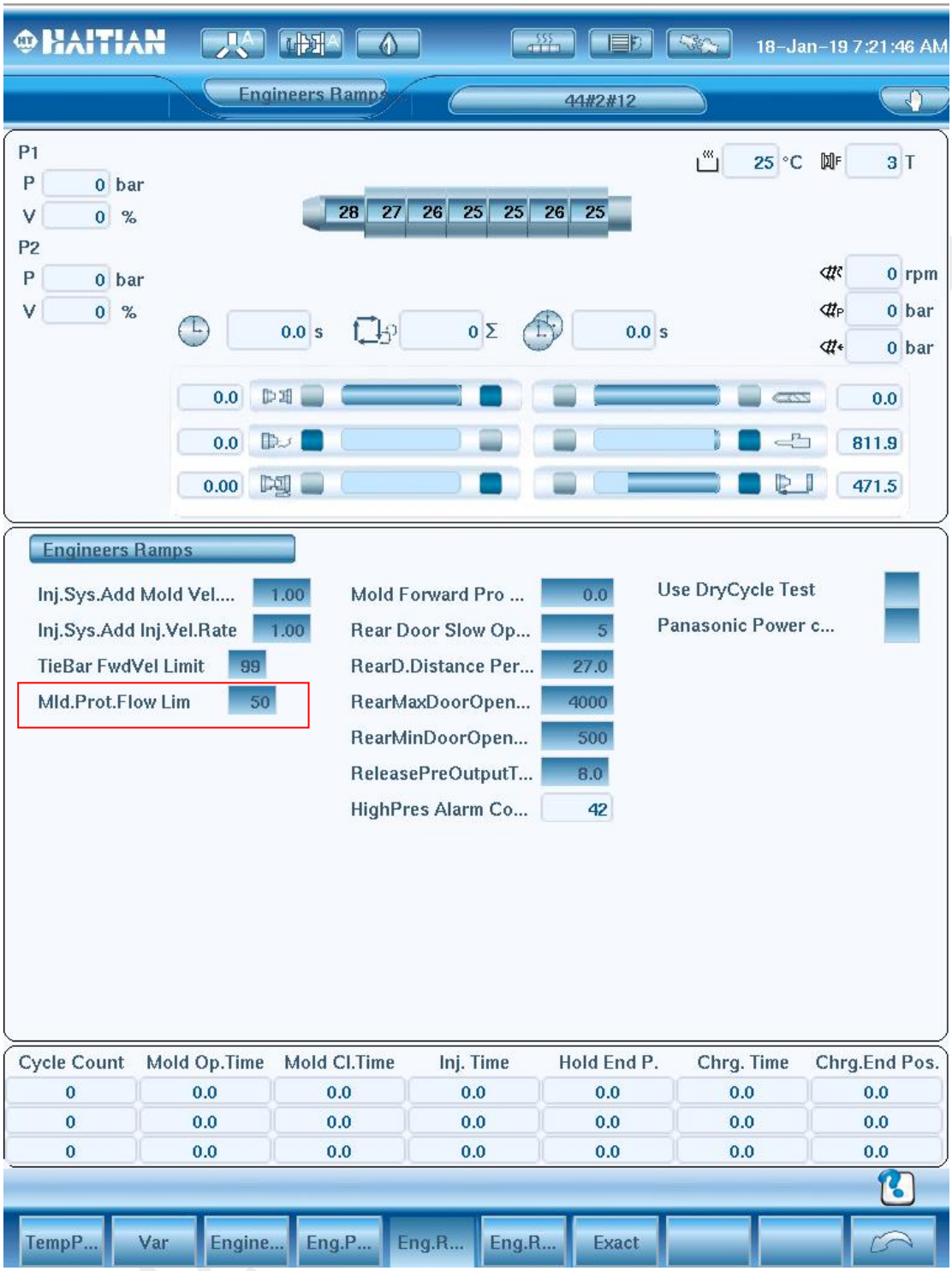
Mould protection step： During the clamping step, when the template moves to the start point of the mould protection set by the system, the mould protection action starts with the pressure-flow output as the above value.

Within the allowable range of the circle, set the pressure this is sufficient to fully close the template and the proper flow as slow as possible to protect the template.



Mould protection time: Set the mould protection time, if it is longer than this time, stop the circle immediately and send the alarm signal.

Actual mould protection time: It shows the actual mould protection time of the moment.



Maximum mould protection flow: to change the maximum mould protection flow value at the clamping function screen.

II. Alarm information

Low pressure mould protection alarm!

Cause: start of the mould protection function, may be clamped in the moulds as for the products;

Consequence: stop the circle immediately and stop the action;

Elimination: set the comparatively large opening stroke and long recycle time in compliance with the internal status of the moulds, or set the comparatively large ejection stroke or more ejection vibration frequencies.

3. 2. 1. 5 Introduction of automatic mould adjustment function

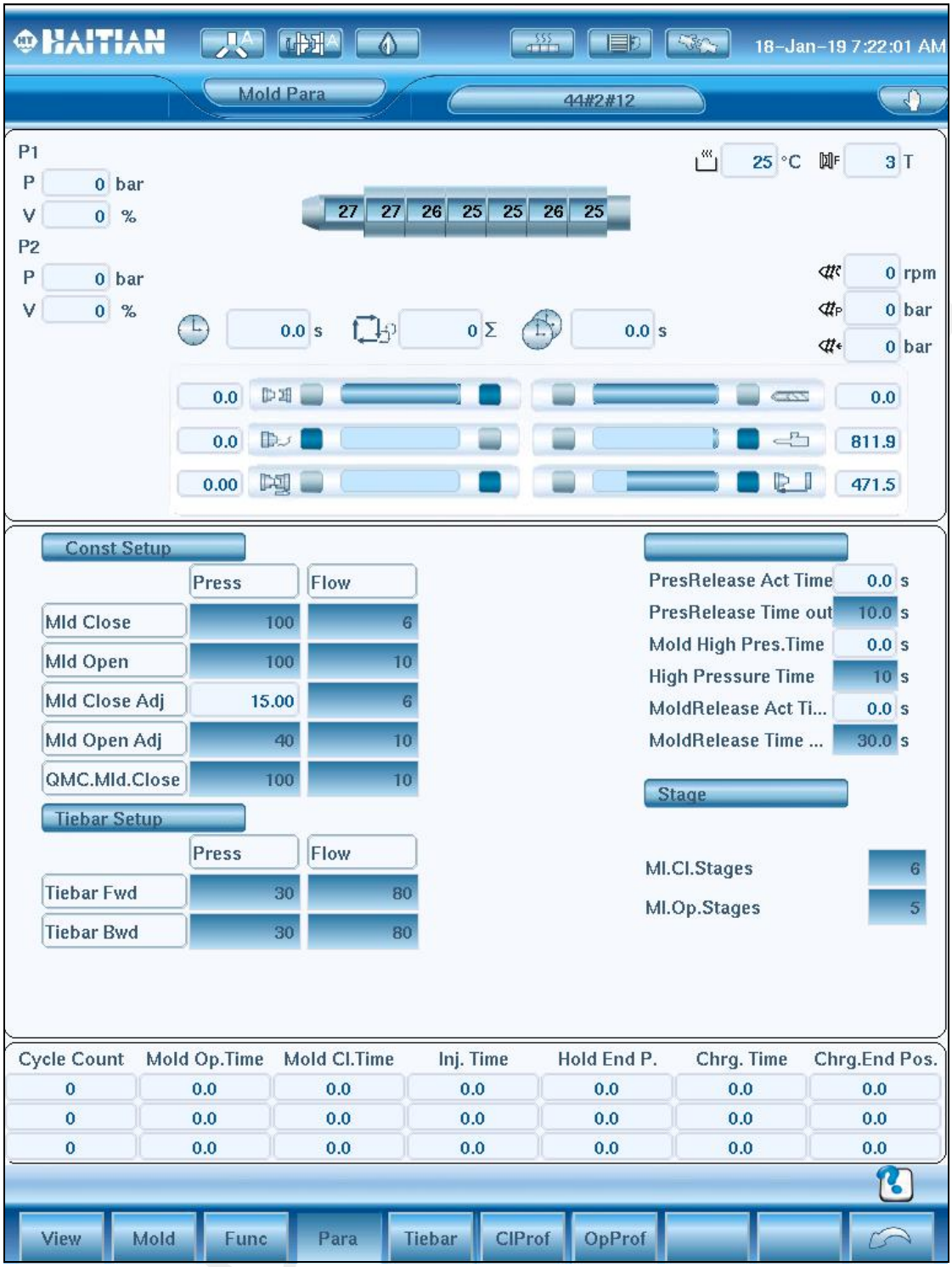
General rules

The automatic adjustment function is applied in mould changing. After installing the new mould to the machine, it requires the automatic mould adjustment procedure to get the mould thickness so that the machine can conduct the normal clamping action.

Options involved in this document

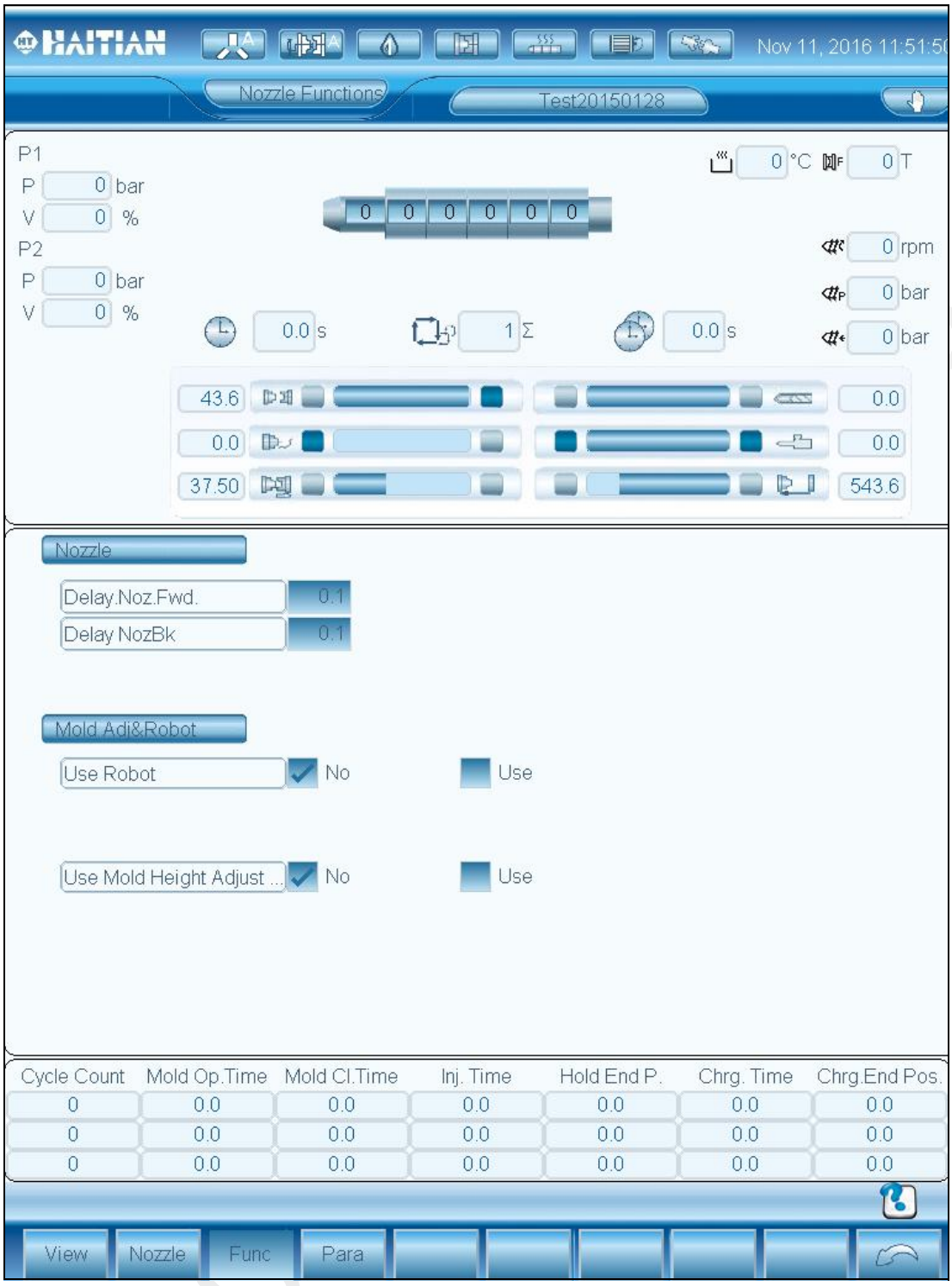
- Automatic adjustment function screen
- Automatic adjustment operation
- Manual adjustment function screen
- Manual adjustment operation

I. Automatic adjustment function screen



Automatic adjustment forward: for the clamping flow setting in the automatic mould adjustment.and the clamping pressure is the same as the pressure of mould protection, the unit isTon.

Automatic adjustment backward: Automatic adjustment forward: for the opening pressure-flow setting in the automatic mould adjustment.



For the opening action option after the completion of automatic mould adjustment.

For the opening stroke setting after choosing automatic opening adjustment.

II. Automatic adjustment operation

Step 1: press the adjustment button twice quickly, once "please press the clamping button to start the automatic adjustment" popup at the computer screen, press the clamping button again; the machine enters the automatic mould adjustment procedure.

Step 2: the machine enters the clamping action until the fixed plate clamps the mould and the moving plate can not continue to move forward.

Step 3: after maintaining this state for some time, record the position of the template at the computer and calculate the position in compliance with the current mould thickness.

Step 4: conduct the pull rod adjustment action until it is in place.

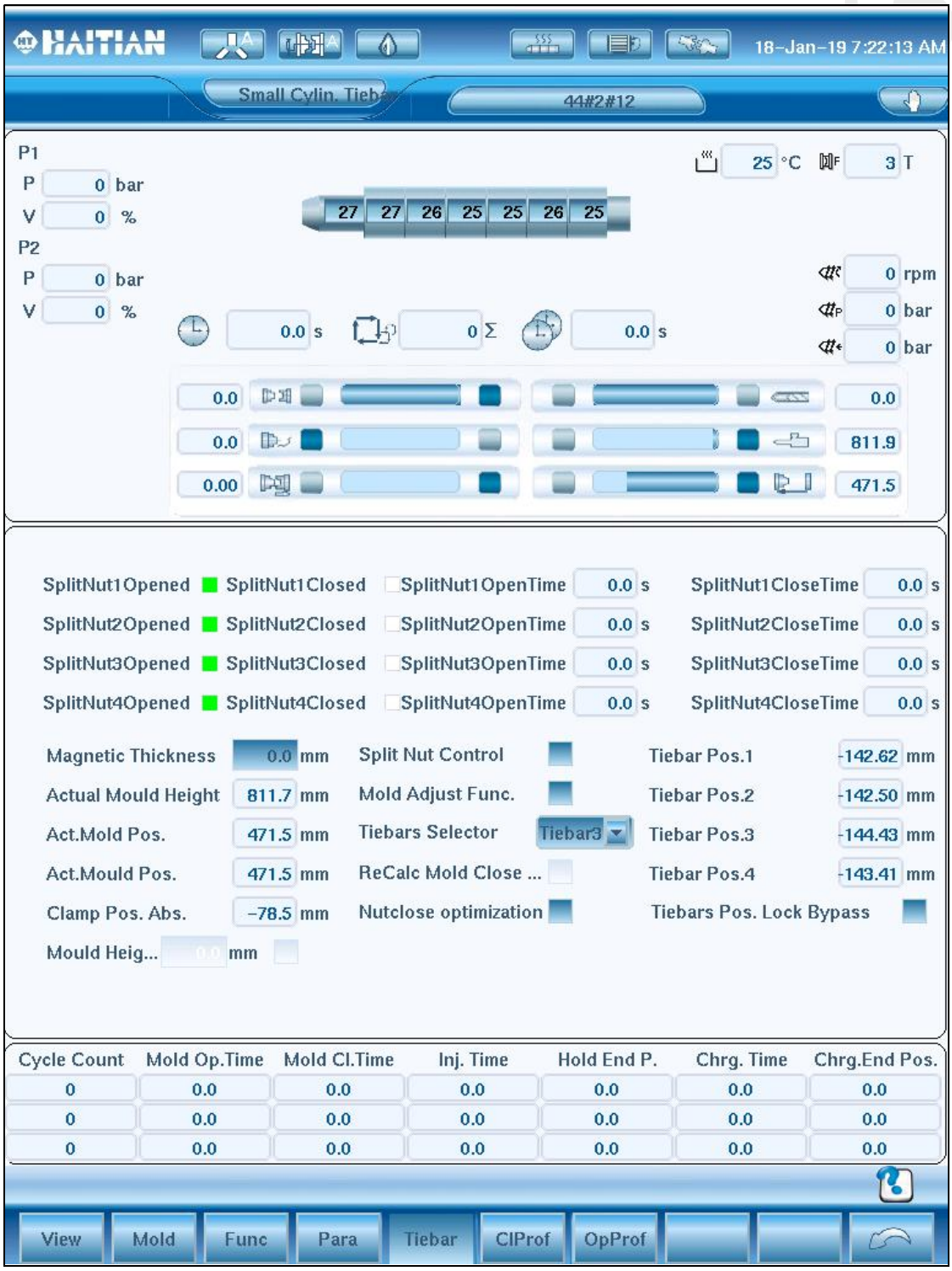
Step 5: braking action.

Step 6: breaking action.

Step 7: opening action (if choose opening after automatic opening).

Step 8: automatic adjustment completes.

III. Manual adjustment function screen



Conduct the clamping action under adjustment mode and neglect the option of clamping zero point in saved in the computer.

Manual mould adjustment activation option.

IV. Manual adjustment operation

Step 1: choose the original mould adjustment function.

Step 2: under the adjustment mode, press the clamping button to conduct the clamping action until the fixed plate clamps the mould and the moving plate can not continue to move forward.

Step 3: click to calculate the braking position option.

Step 4: manual adjustment completes.

V. Alarm information

Name: automatic adjustment is longer than the monitoring time.

Cause: the automatic adjustment time is longer than the monitoring time set.

Consequence: the automatic adjustment action is paused.

Elimination: increase the automatic adjustment time at the setting screen.

Name: motor off.

Cause: the motor is not started or is closed in the automatic adjustment process.

Consequence: unable to get into the automatic adjustment action or the automatic adjustment action is terminated.

Elimination: start the motor.

Name: do not use core in automatic adjustment.

Cause: choose the core at core screen.

Consequence: unable to get into the automatic adjustment action or the automatic adjustment action is terminated.

Elimination: close the core function at the core screen.

3.2.1.6 Introduction of spring mould function (Option)

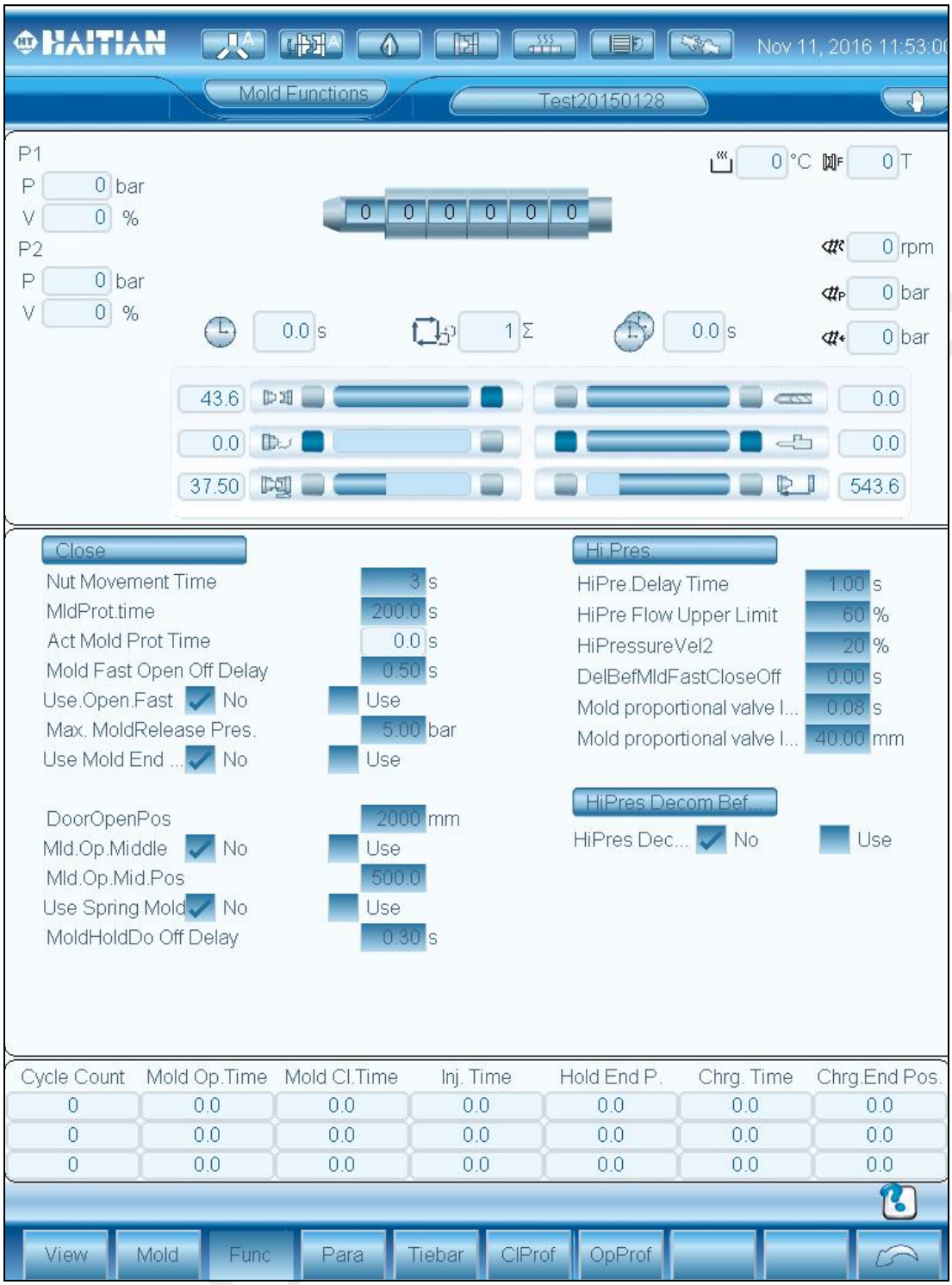
General rules

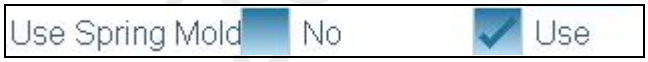
The spring mould function is applied onto the mould installed in the injection molding machine to produce spring force when the die joint is closed.

Options involved in the document

- Screen of spring mould function
- Operation of spring mould function

I. Screen of spring mould function





Choose whether to use the spring mould function.

Delay time for closing the spring mould valve.

II. Operation of spring mould function

Step 1: choose to use the spring mould function.

Step 2: set the proper automatic adjustment inlet pressure for automatic mould adjustment action (refer to automatic adjustment instructions).

Step 3: automatic mould adjustment completes.

Step 4: set the proper mould protection pressure for normal opening and clamping actions.

Step 5: set the proper delay time.

Step 6: all the above pressure shall be subject to the minimum pressure required for not flicking after closing of the moulds.

3. 2. 1. 7 Introduction of opening screen and action

General rules: This chapter is mainly about the combined actions related to the template after the completion of the cooling to before the ejection of the finished products, including decompression, mould breaking, braking and template backward.

I. Manual opening action button

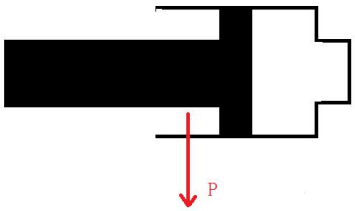
II. Introduction of specific action

（1）decompression:

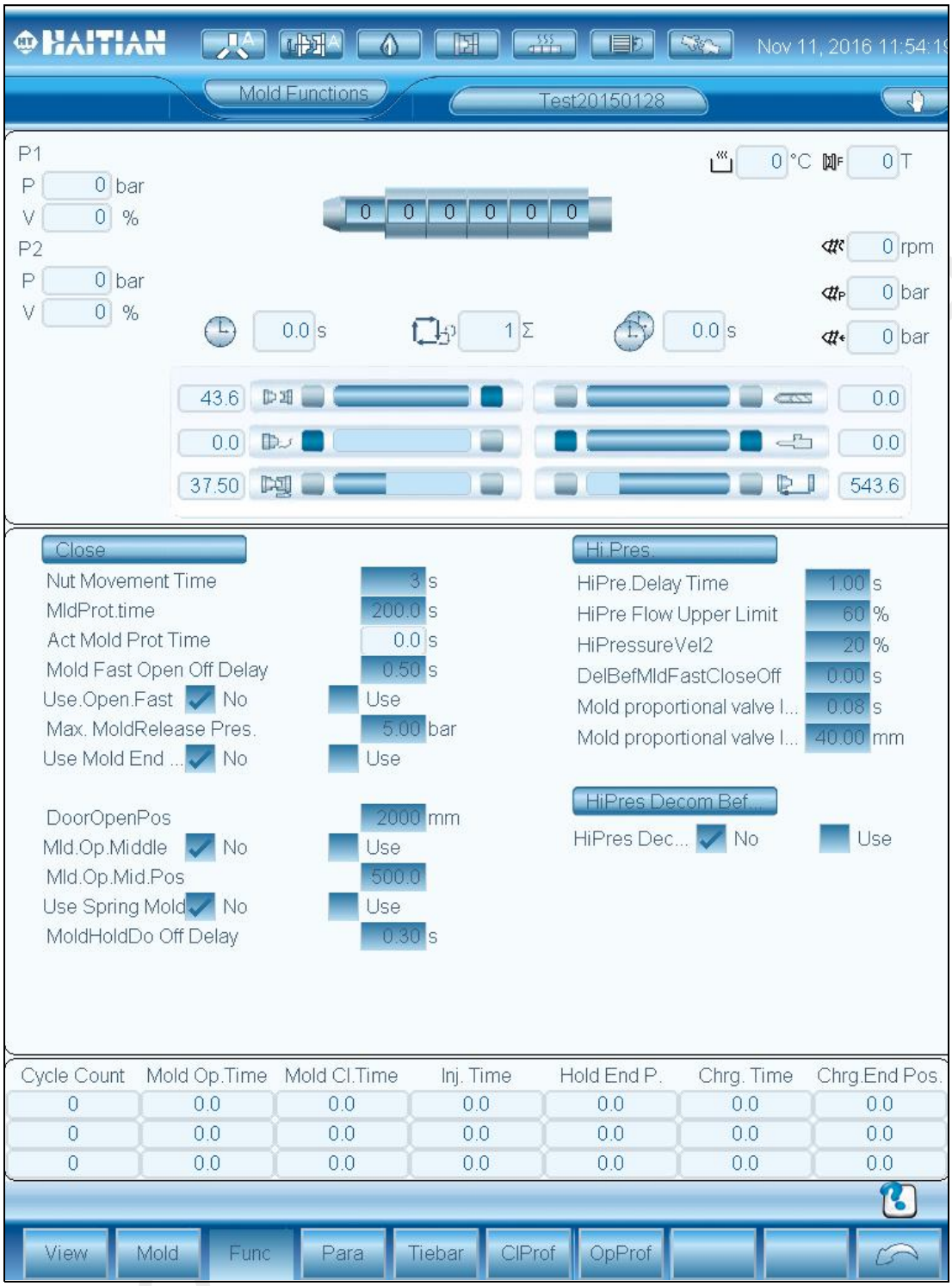
The first action after cooling. It is mainly to discharge the oil pressure through locking oil cylinder force so as to reduce the actual locking force, being prepared for the mould breaking action.

Action icon: 

Decompression as above:



Parameter setting:



Pressure for transferring decompression to mould breaking:

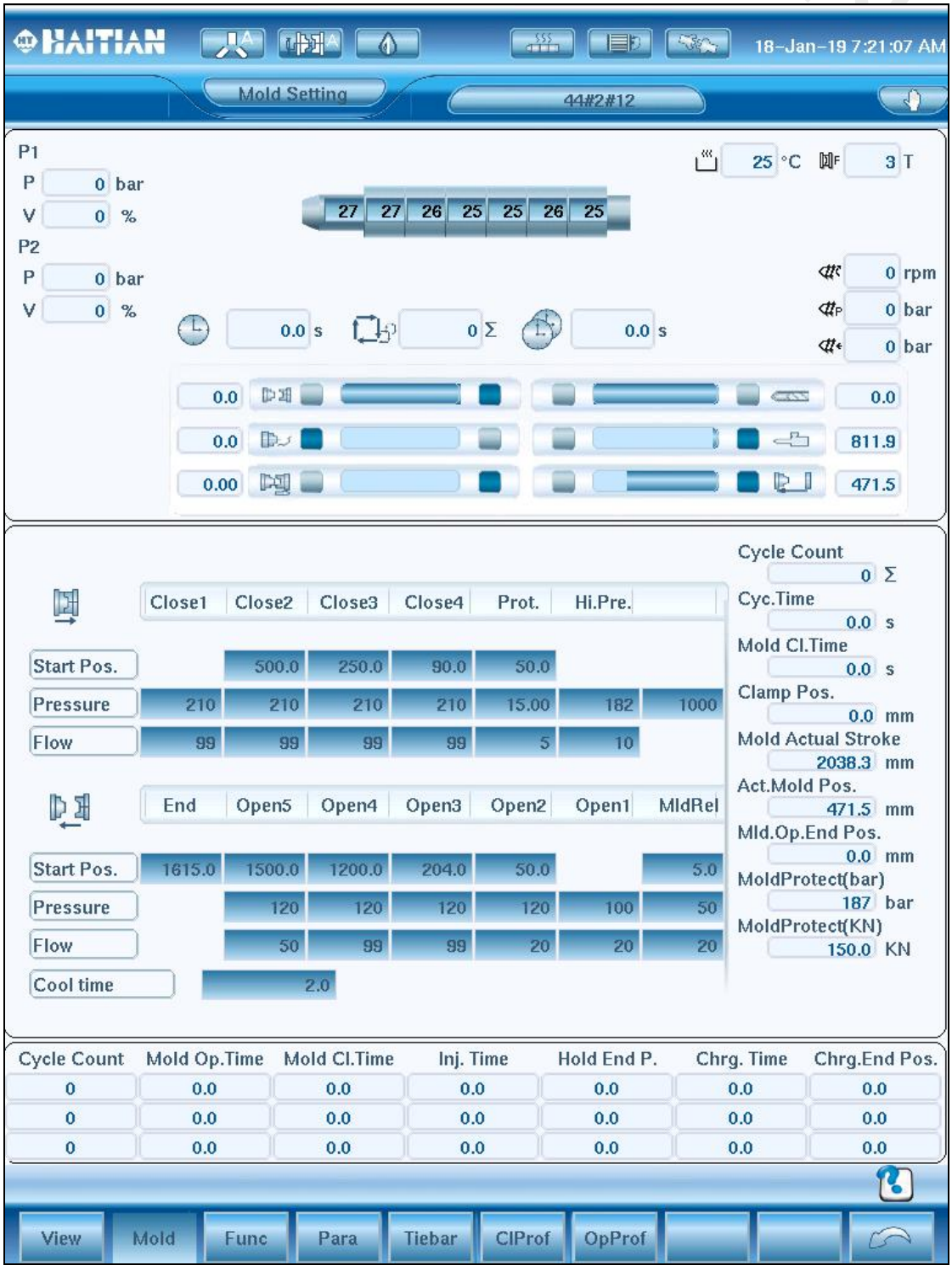
If the actual pressure detected is lower than the set value, the decompression action ends and the mould breaking starts.

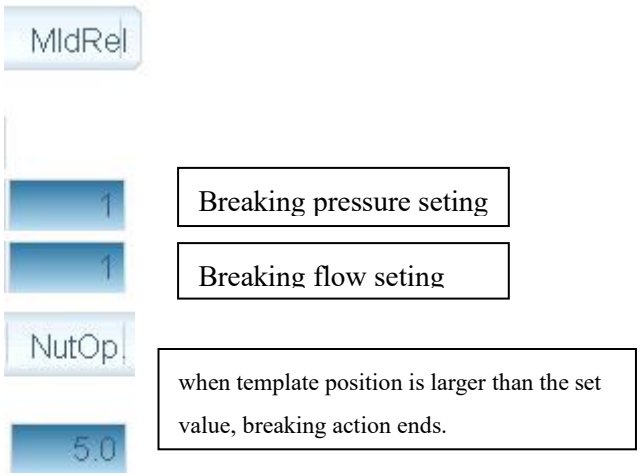
（2）Mould breaking:

The next action after decompression. By pulling back the pull rod to pull back the template, being prepared for breaking so that the template can be more easily opened.

Action icon: 

Parameter setting:



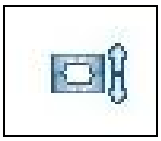


Notes:

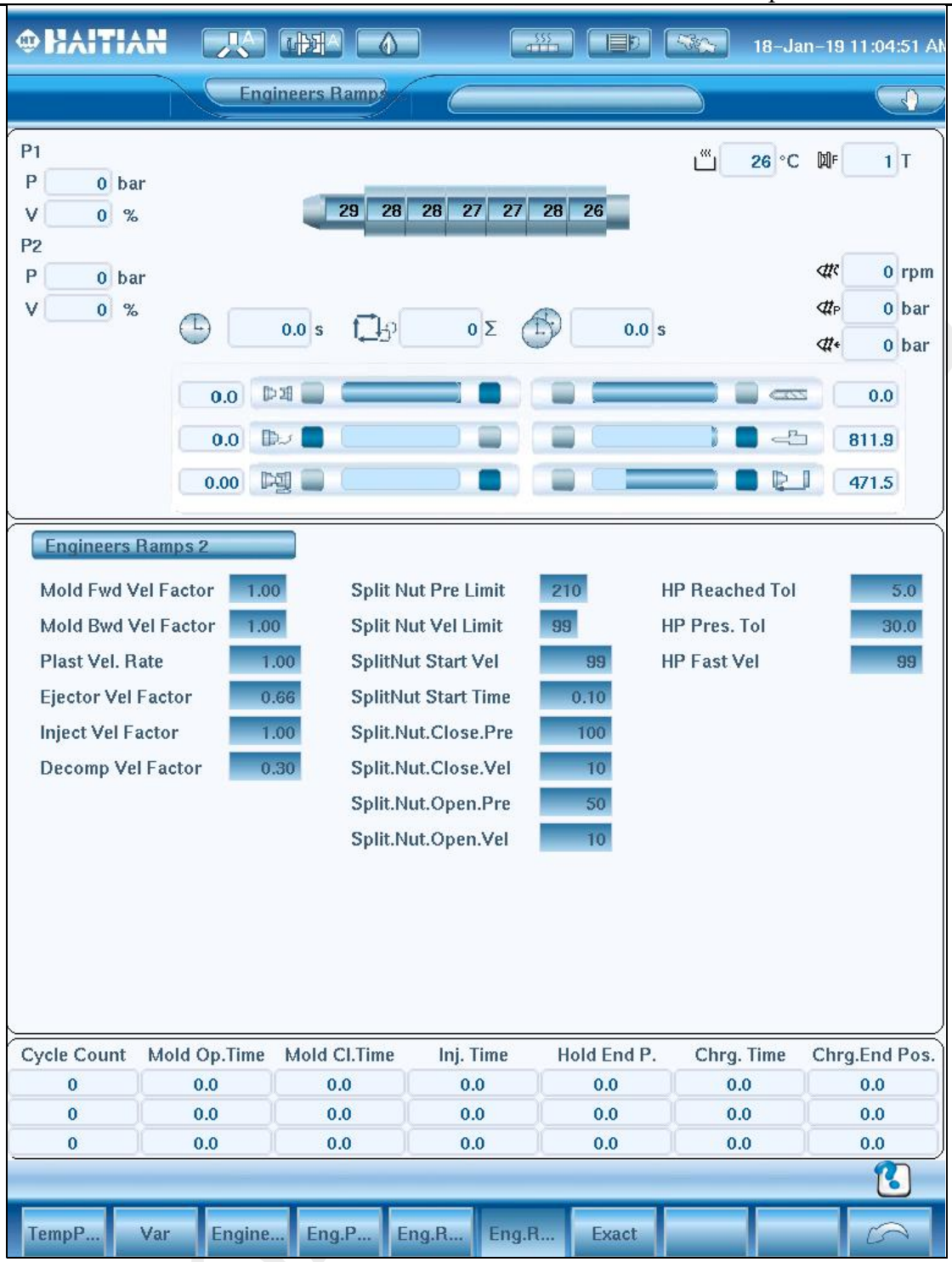
The breaking stroke and pressure-flow requires different processing adjustment. If the breaking stroke is too long, it may effect the product cycle.

（3）Braking:

The next action after breaking ends is braking, being prepared for the pulling back.

Action icon: 

Parameter setting:



Outlet pressure of braking system

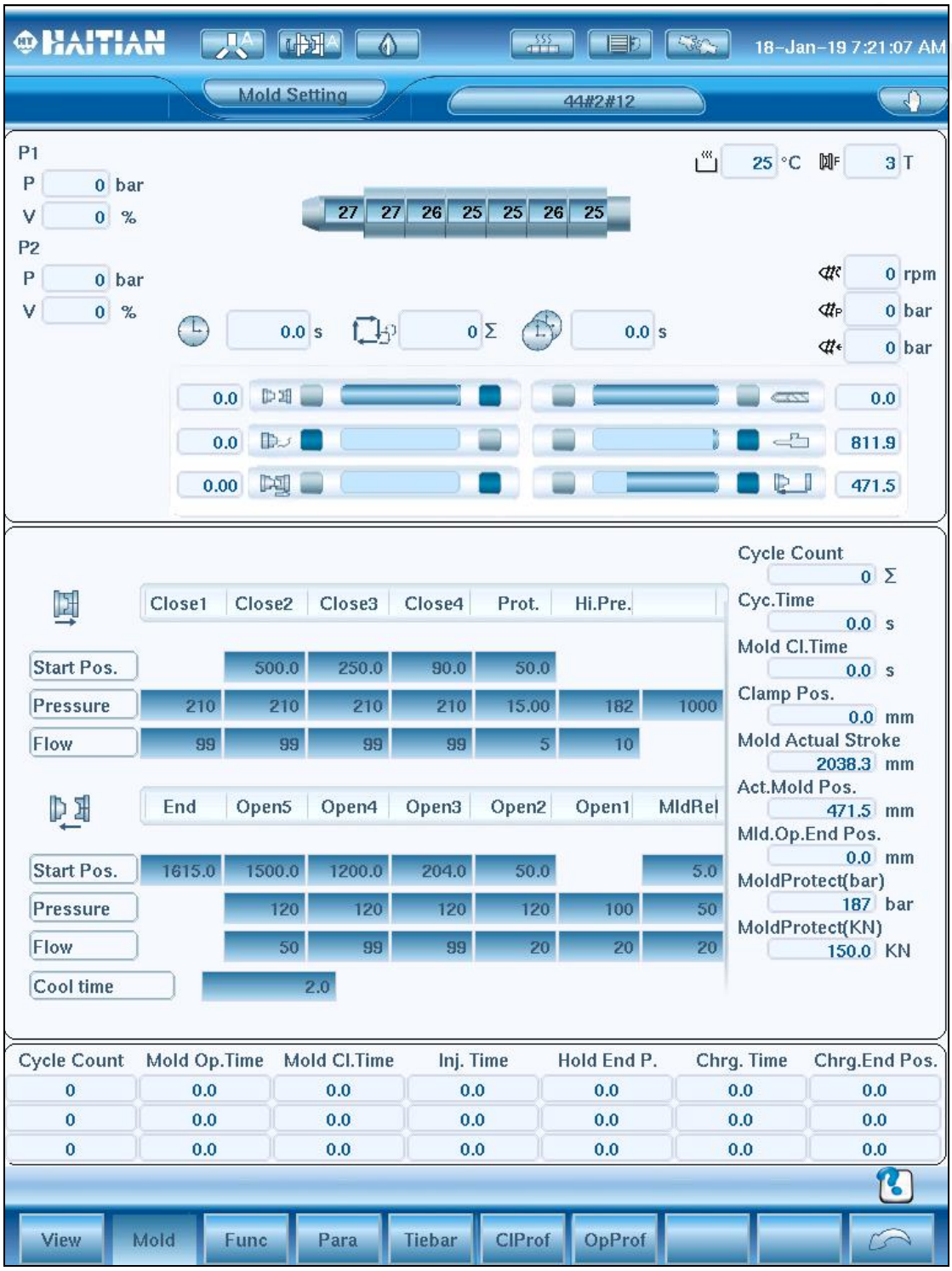
Outlet flow of braking system

（4）Mould opening:

The next action after braking is to open the moving plate fast and stably to the product receiving place through the fast oil cylinders at the two sides of the template.

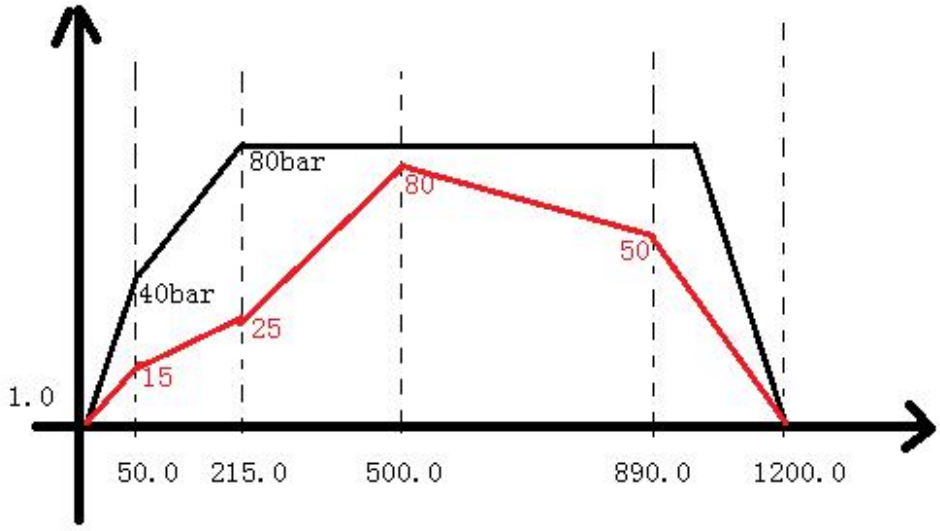
Action icon: 

Parameter setting:



Through settings of different place parameters, the user can conduct multiple level control for the opening action and realize the fast and stable opening action.

Multi-level output graph:



of which, the black line is the pressure curve and red is the flow curve.

3. 2. 1. 8 Introduction of early decompression

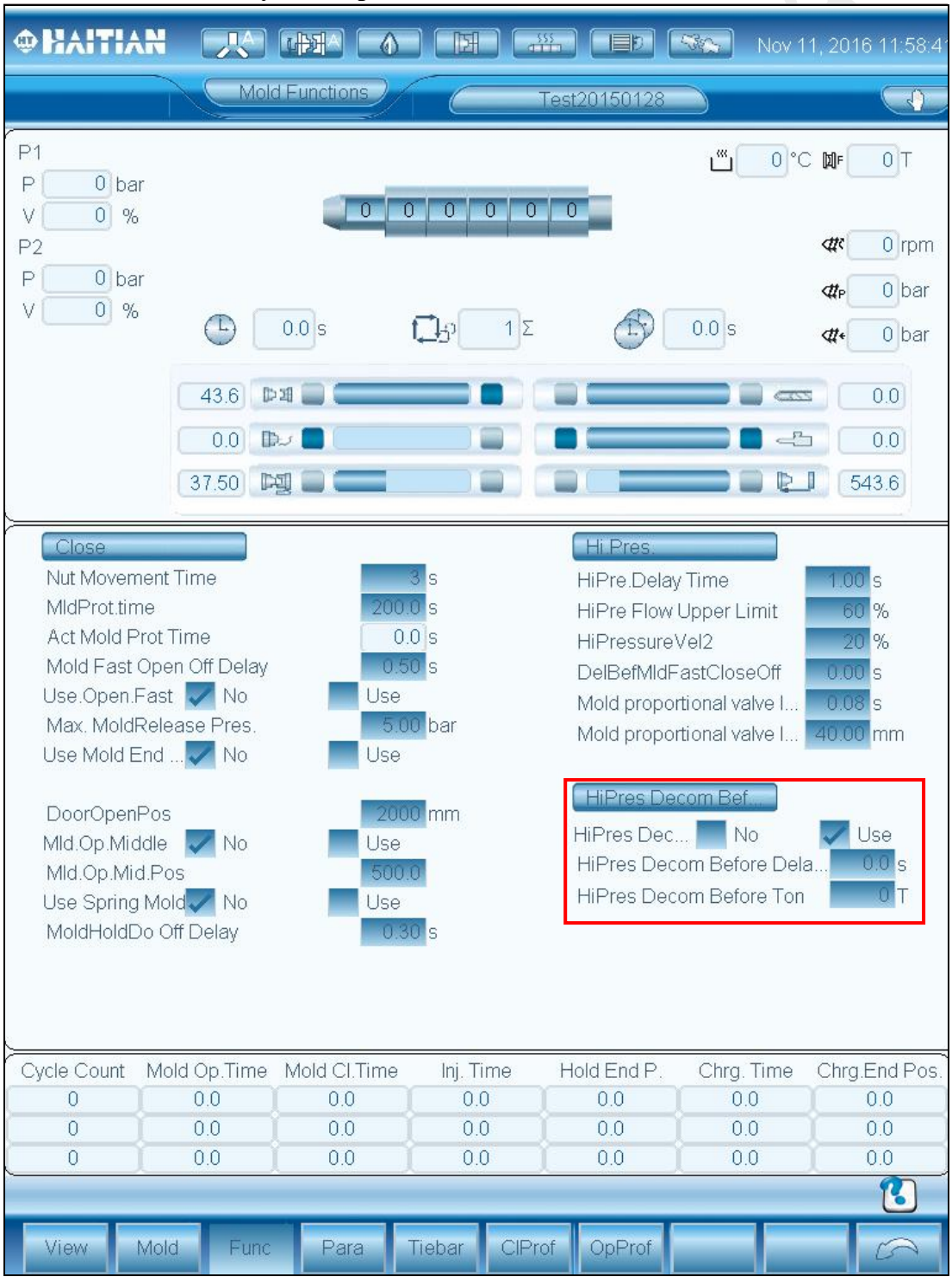
General rules

Early decompression means before decompressing the normal locking high pressure, under the allowing condition of the products and moulds, decompress some pressure early after cooling so as to accelerate the operation cycle and reduce noise from decompression.

Options involved in the document

- Introduction of early decompression screen and function

I. Introduction of early decompression screen and function



This function is applicable in the semi-auto or full-auto mode and is invalid under manual or adjustment mode. (under the manual or adjustment status, the early decompression valve outputs under some specific conditions, but this function will not be realized)

Early decompression: Tick "yes" to use this function or "no" not to use this function.

Delay the start time: If the early decompression function is used, this time means the delay time from start of the cooling to the start of the early decompression.

Target locking tonnage: If the early decompression function is used, this target tonnage means the tonnage achieved after completion of the early decompression, which means once the locking tonnage achieves this value, the early decompression ends.

Notes:

1. This function can be used together with the products you produced and the moulds you used.
2. The early decompression function can not be used together with the zero point core function.

3.2.1.9 Setting of mould thickness function and related protection

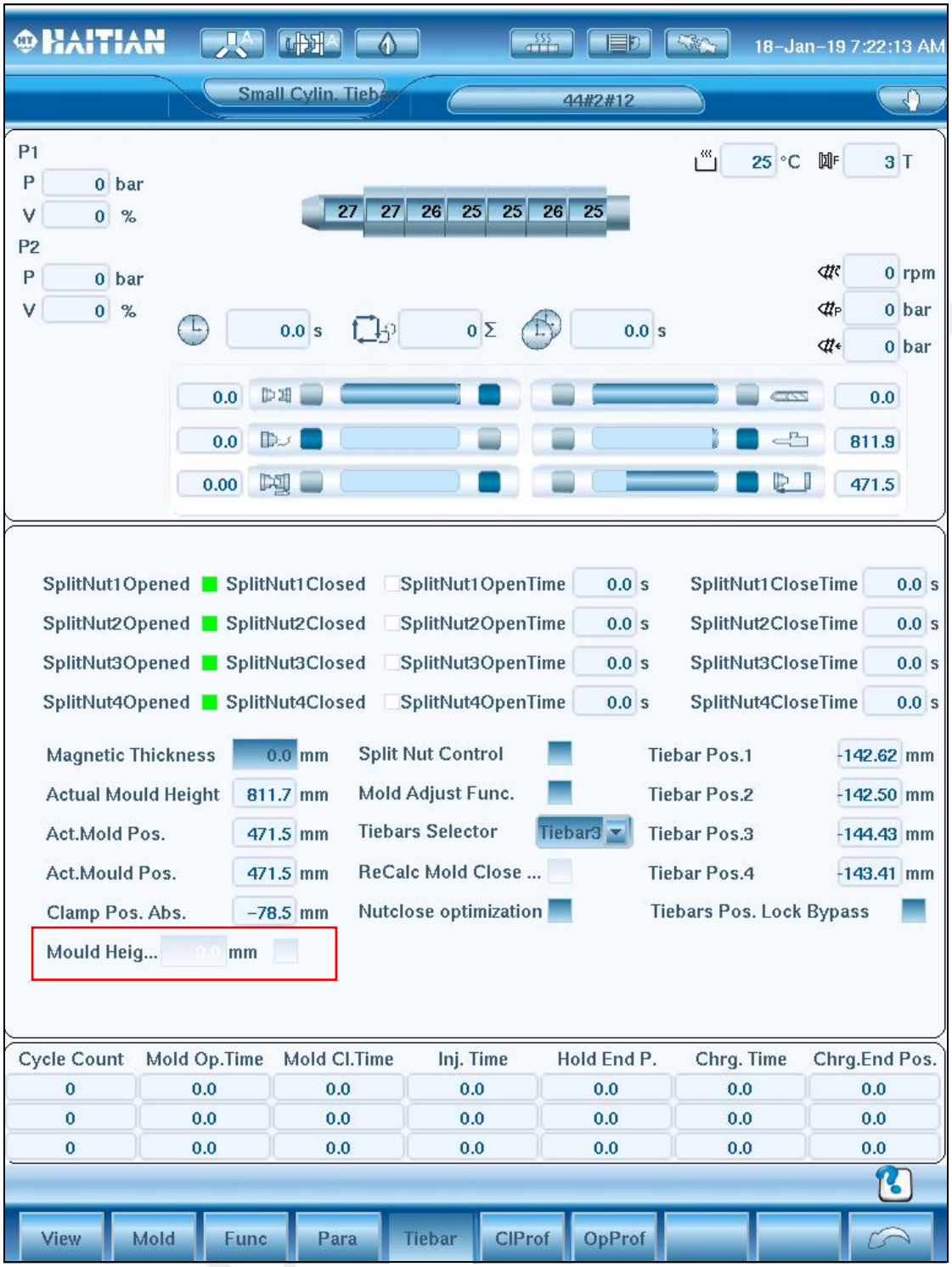
General rules

Mould thickness function is optional for the user so as to check whether the difference value between the actual input mould thickness and the mould thickness after completion of mould adjustment is beyond the allowable range.

Options involved in the document

- Setting of mould thickness function and related protection

I. Setting of mould thickness function and related protection



"clamping-pull rod" screen as the above red box, under the adjustment mode, set the values at the red box (it can not be operated under other modes).

Mould thickness test: Input the thickness of the mould used.

If the user ticks the latter option, the machine will calculate and compare the mould thickness value with the input value. If the difference is beyond certain range, it will alarm "mould thickness not normal".

If the latter option is not ticked, it will not compare and calculate the thickness value.

Notes:

1. the mould thickness will effect the selection of the relative zero point of the machine so as to effect the series of actions including clamping and braking.
2. correctness of the mould thickness relates to the qualification of the products.

3. 2. 1. 10 Introduction of manual braking plate

General rules

Manually control the braking action.

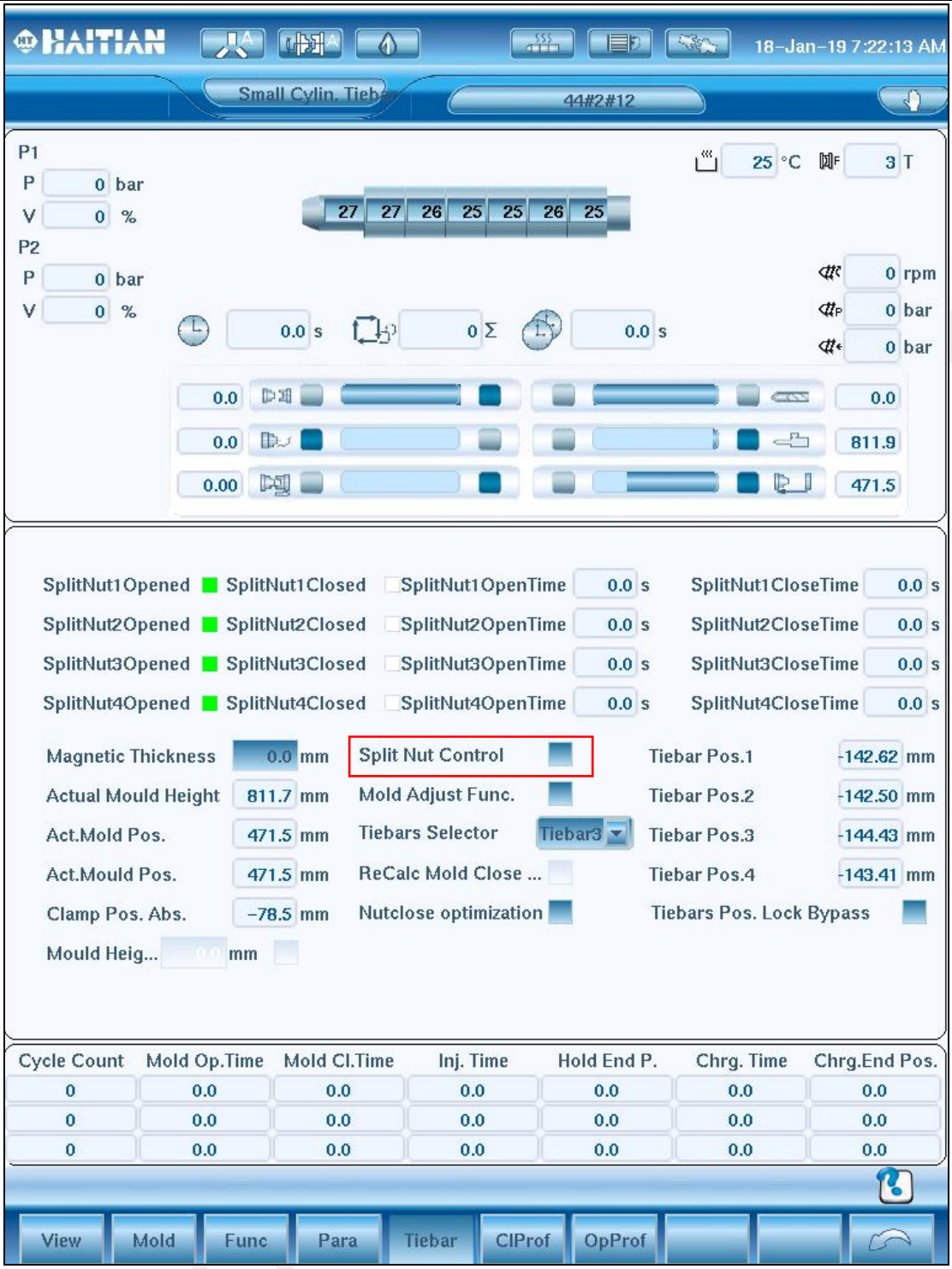
Options involved in the document

- Manual braking action setting screen
- Function introduction
- Alarm information

Function of manual braking action

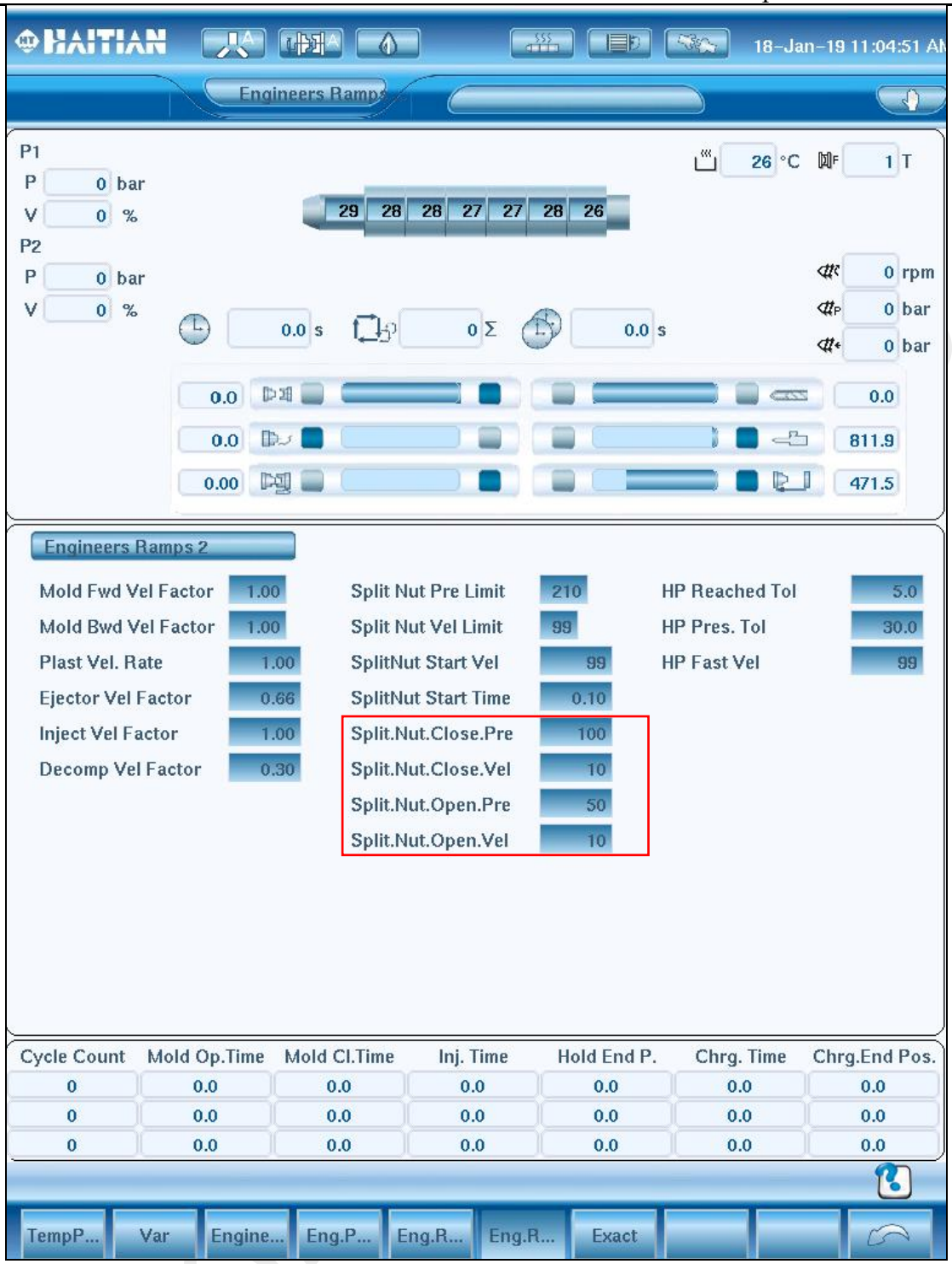
- it can separately control the switching on and off of the braking plate.

I. Manual braking action setting screen



click clamping, then pull rod to enter into small oil cylinder setting screen.

Tick manual braking action option to start the manual braking action function.



Set the pressure and flow of braking switch at the clamping screen.

II. Function

When the machine is under the mould adjustment mode without automatic adjustment, after ticking manual braking action option,

press **braking plate off** button to close the braking plate;

press **braking plate on** button to open the braking plate.

III. Alarm information

Braking plate off failure

Cause: Braking plate overtime, safety door not closed, emergency stop button pressured, enforcement point output, injection protection cover not closed, hydraulic safety, clamping limit, pull rod end, etc.

Consequence: Action stops and alarms.

Elimination: Find the reason and manually press the button to eliminate the alarm.

Nut overtime

Cause: Braking switch action over the monitoring time.

Consequence: Action stops and alarms.

Consequence: Check if the braking switch pressure-flow setting is appropriate.

3. 2. 1. 11 Introduction of manual pull rod action

General rules

Manually pull in or back the rod for the fine adjustment.

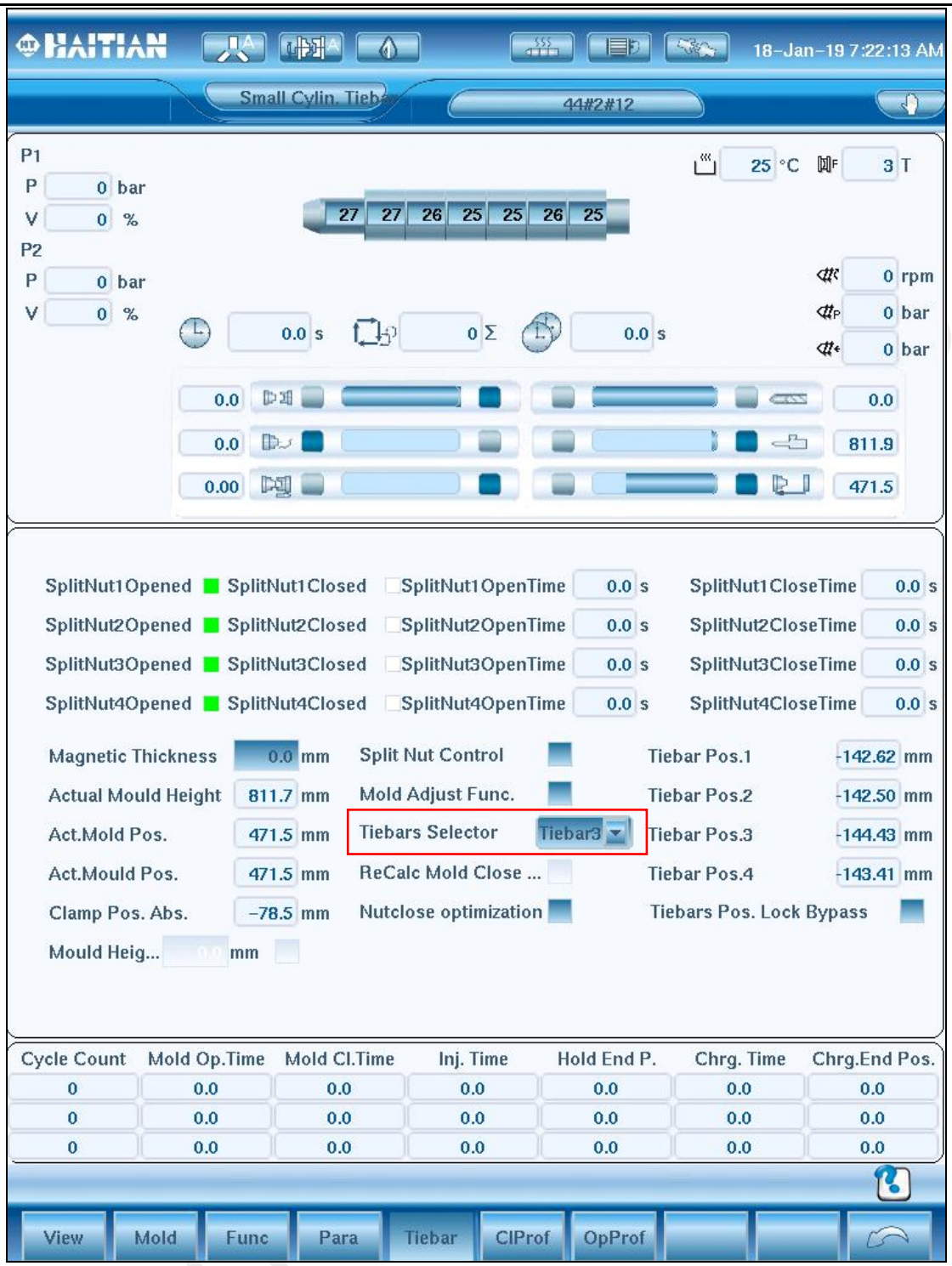
Options involved in the document

- Manual pull rod action setting screen
- Function introduction
- Alarm information

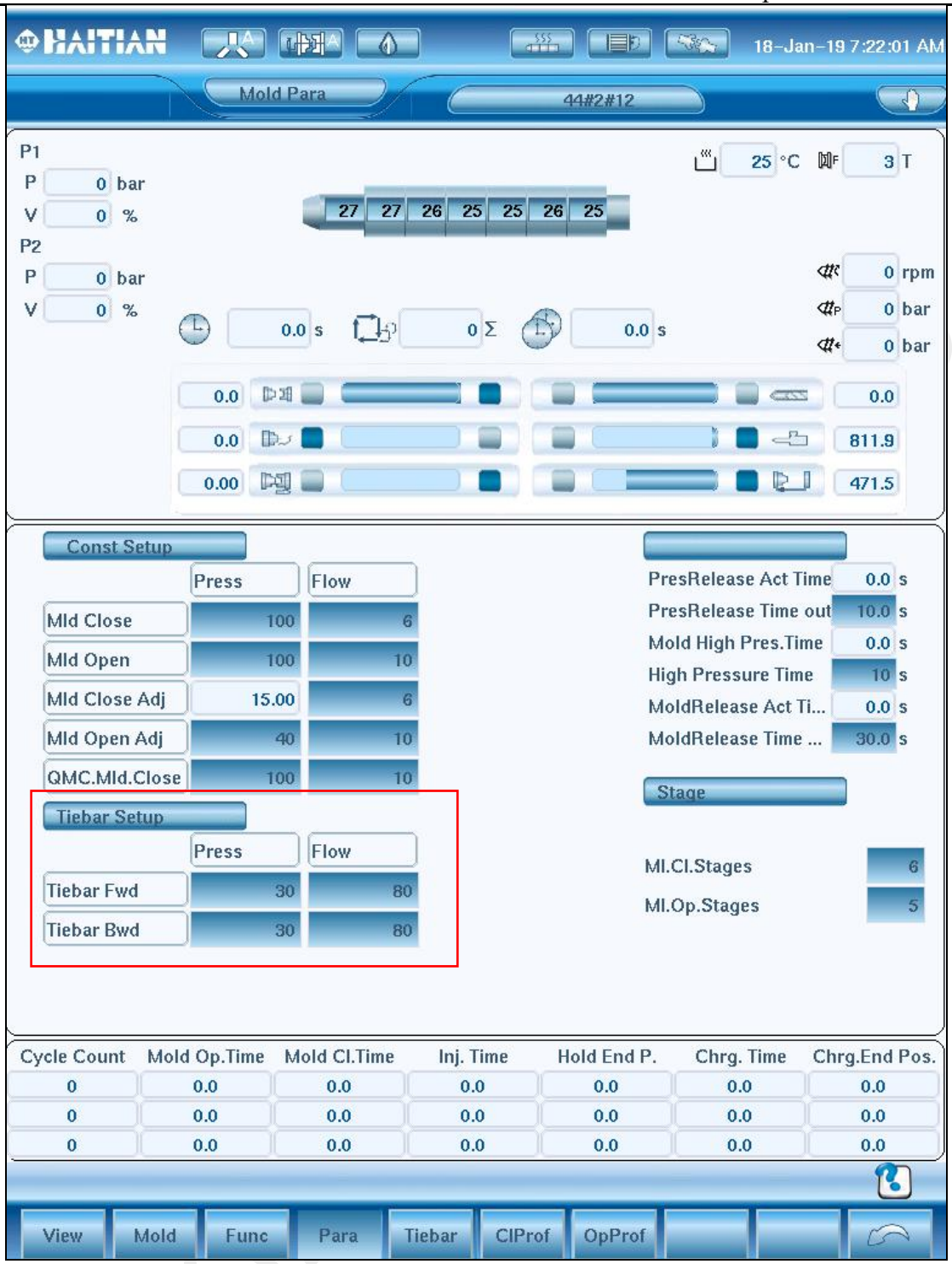
Function of manual pull rod action

- Separately control pull rod action
- Eliminate braking failure problem

I. Manual pull rod action setting screen



Click clamping, pull rod to enter into small oil cylinder setting screen:



Click clamping, parameters to enter opening and clamping setting screen:

Set the pull rod in and back pressure-flow through small oil cylinder setting.

II. Function

When the machine is under adjustment mode without automatic adjustment,

click pull rod button and choose certain pull rod,

press **adjustment advance** button, the corresponding pull rod advances with the pressure-flow executed in compliance with the small oil cylinder settings;

press **adjustment retreat** button, the corresponding pull rod retreats with the pressure-flow

executed in compliance with the small oil cylinder settings.

III. Alarm information

erCylinderBack

Breaking failure

Cause: Pull rod retreats failure, it is possible that the pull rod retreat time is over the monitoring time.

Consequence: Action stops and alarms.

Elimination: Check if the pull rod advance and retreat flow settings are proper.

erCylinderFwd

Pull rod advance failure!

Cause: Pull rod retreats failure, it is possible that the pull rod retreat time is over the monitoring time.

Consequence: Action stops and alarms.

Elimination: Check if the pull rod advance and retreat flow settings are proper.

erTiebarFwdReachLS

Pull rod advance limit sensor in place!

Cause: Pull rod advances in place and the pull rod advance limit signal disappears.

Consequence: Action stops and alarms.

Consequence: Check if pull rod advance place and sensor are normal.

3. 2. 2 Introduction of thimble structure arrangement

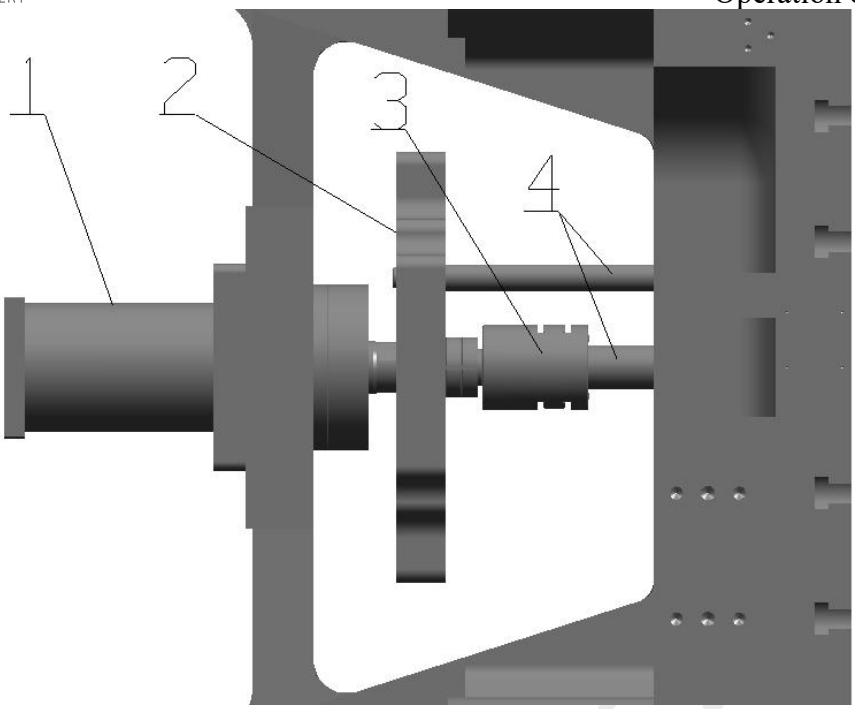
General rules

The thimble is used to take out the injection mould from the injection workpiece.

Options involved in the document

- Thimble structure arrangement

I. Thimble structure arrangement



[1] Thimble driver
[2] Thimble junction plate
[3] Thimble connector
[4] Thimble

3. 2. 2. 1 Introduction of thimble screen and function

General rules

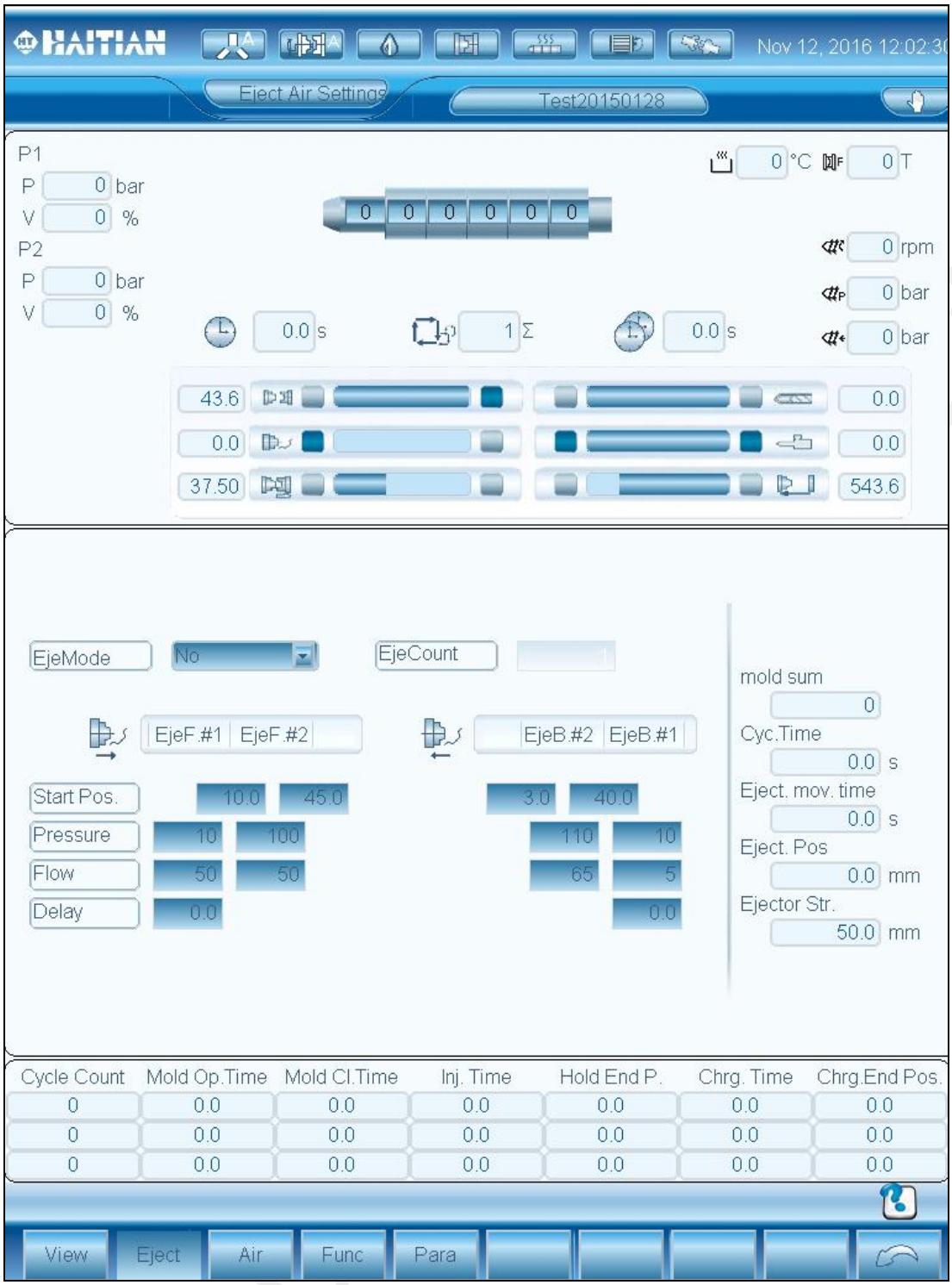
At the thimble screen, the user can set the pressure-flow of the ejection action and the related functions.

Options involved in the document

- Thimble screen
- Thimble function screen
- Thimble parameter screen

Thimble screen

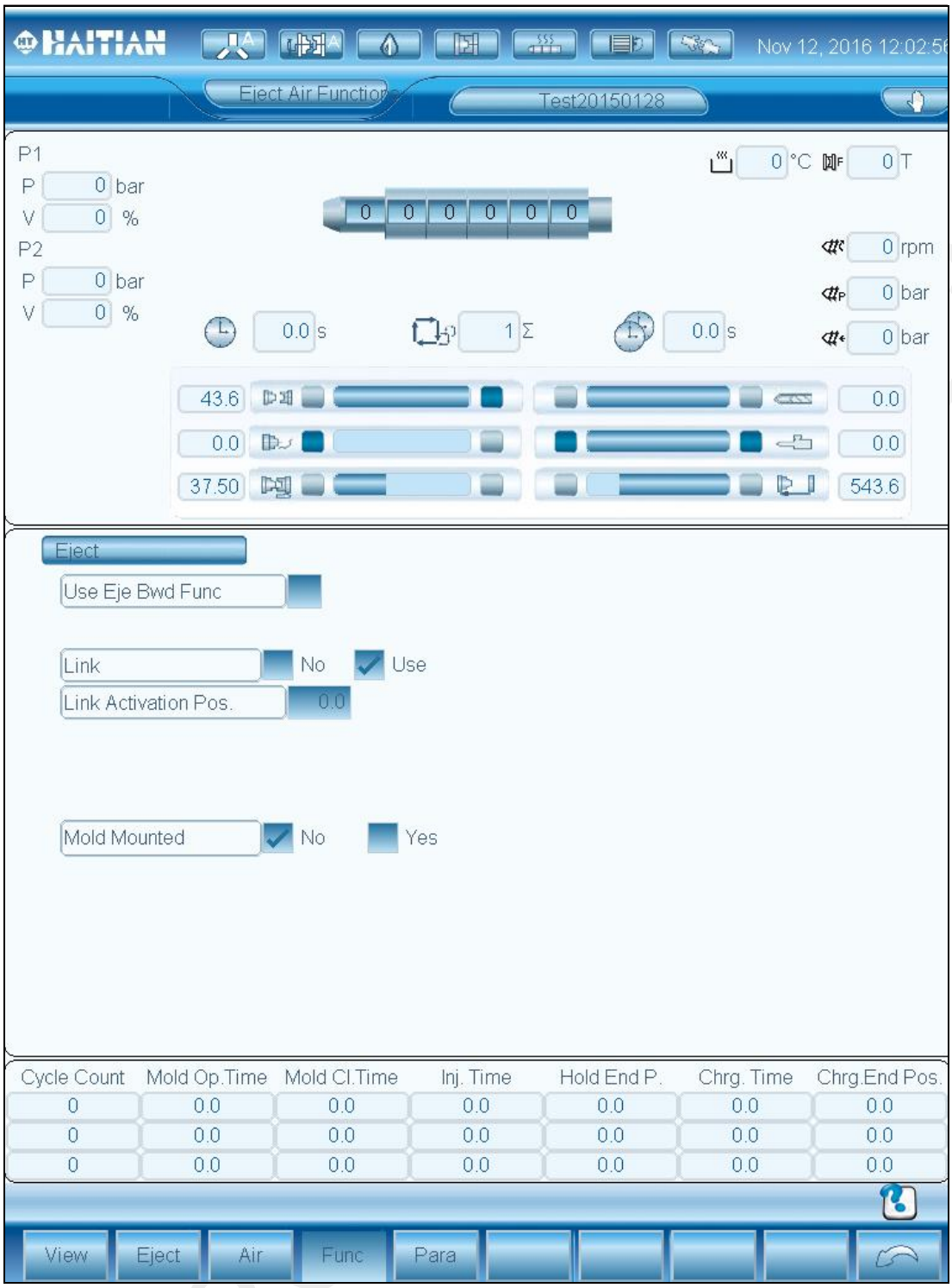
Enter the thimble screen as follows:



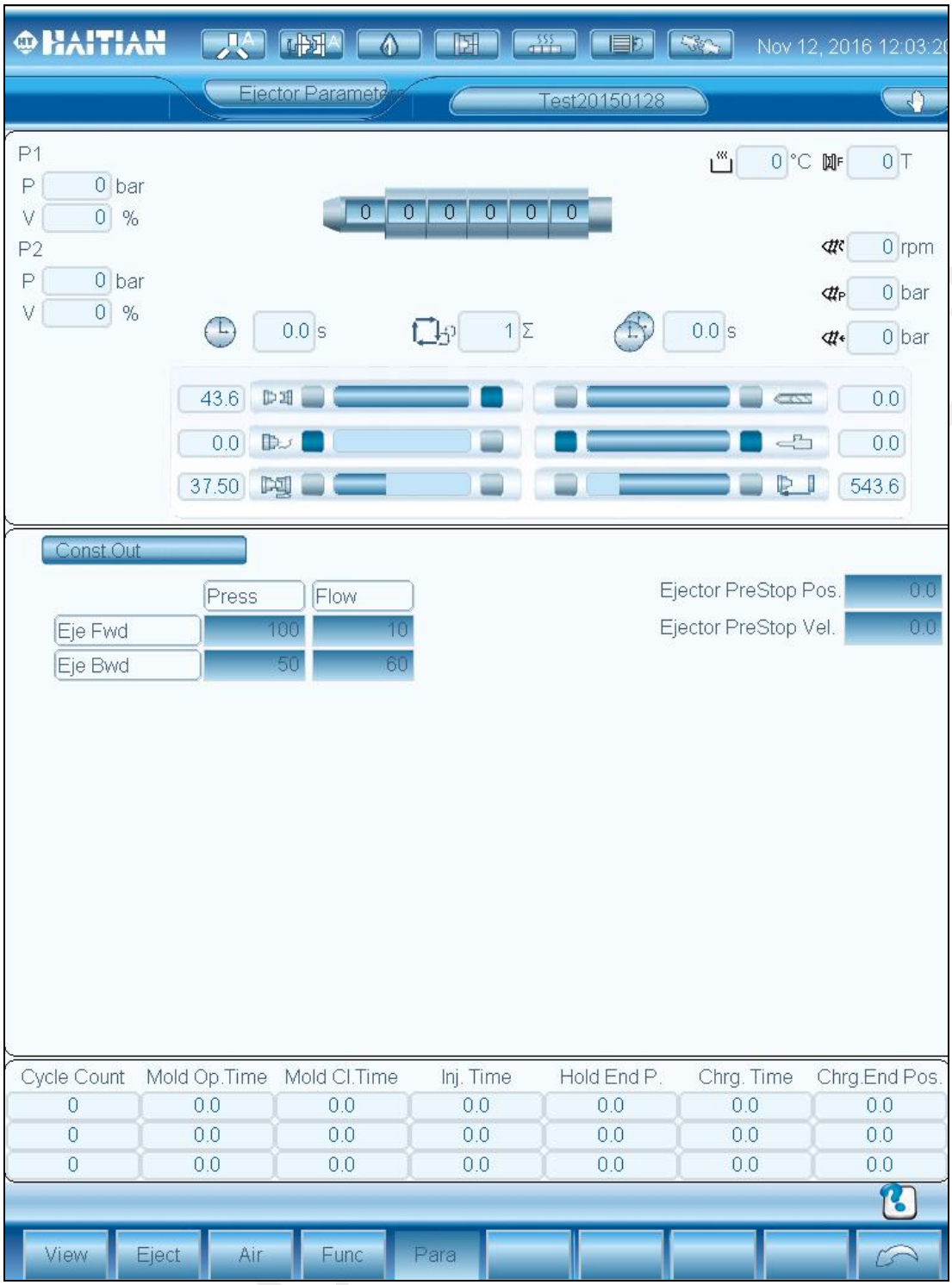
Thimble mode: The user can choose the thimble modes including maintain, counting and vibration, of which the counting and vibration are available in times with a range from 1 to 99.

We can see the place, pressure, flow and delay time settings of the ejection action as above so as to eject the products better.

Thimble function screen



Thimble parameter screen



Set the pressure and flow of the thimble action under adjustment mode.

Set the ejection advance place and flow (in case the flow is over high as to impact when the ejection is to the end).

3.2.2.2 Introduction of thimble opening linkage function

General rules

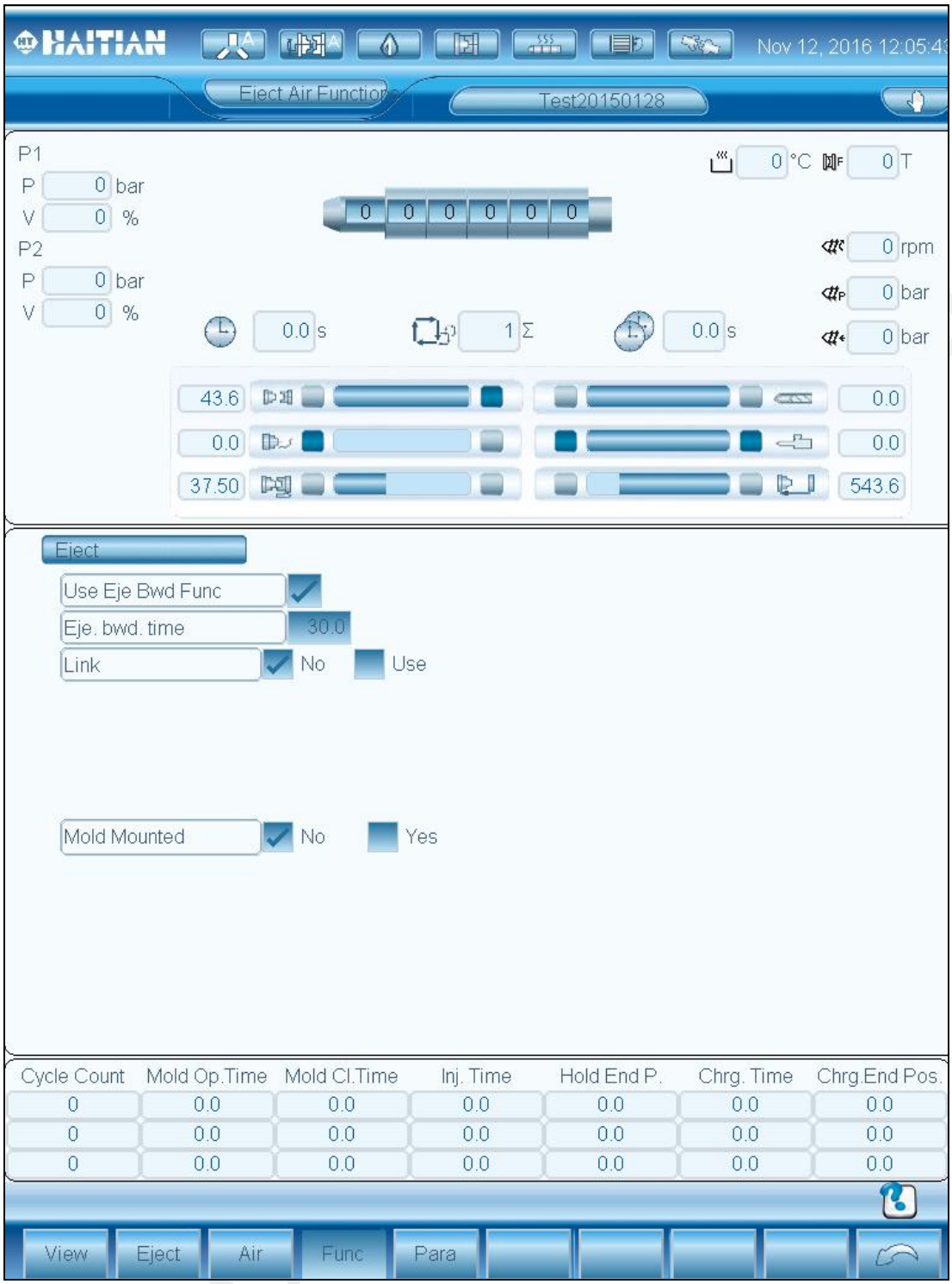
The thimble actions at the same time with the opening process so as to significantly reduce the production cycle of the products.

Options involved in the document

- Ejection opening linkage screen
- Ejection opening linkage parameter screen

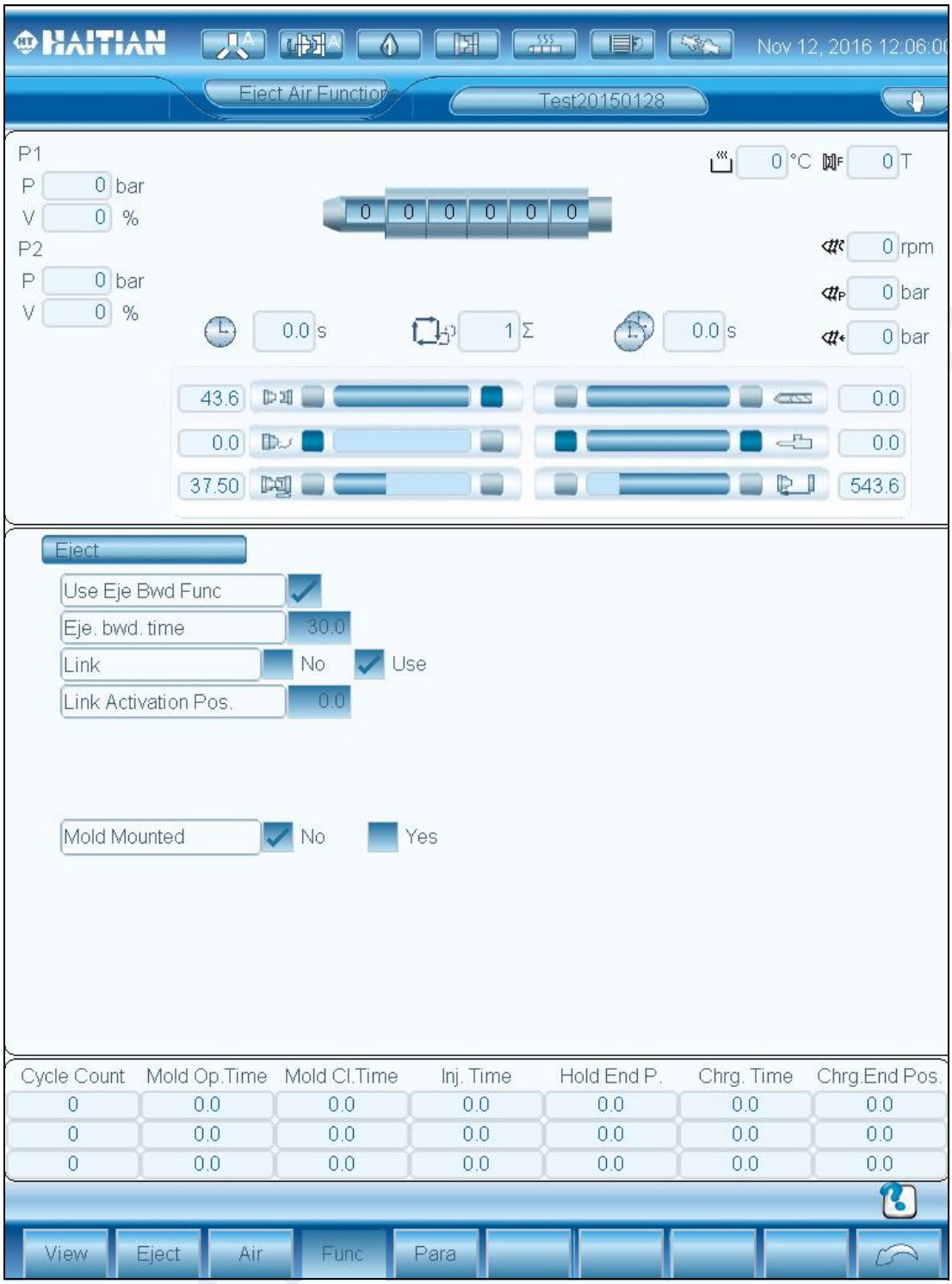
I. Ejection opening linkage screen

Choose and set parameters at the thimble function screen as follows:



II. Ejection maintain parameter setting

After choosing thimble opening linkage function, the screen is as follows:



Function selection: choose whether to use linkage function.

Linkage place setting: set the linkage start place from opening to ejection.

Notes: this function is optional.

3. 2. 2. 3 Introduction of ejection maintain function

General rules

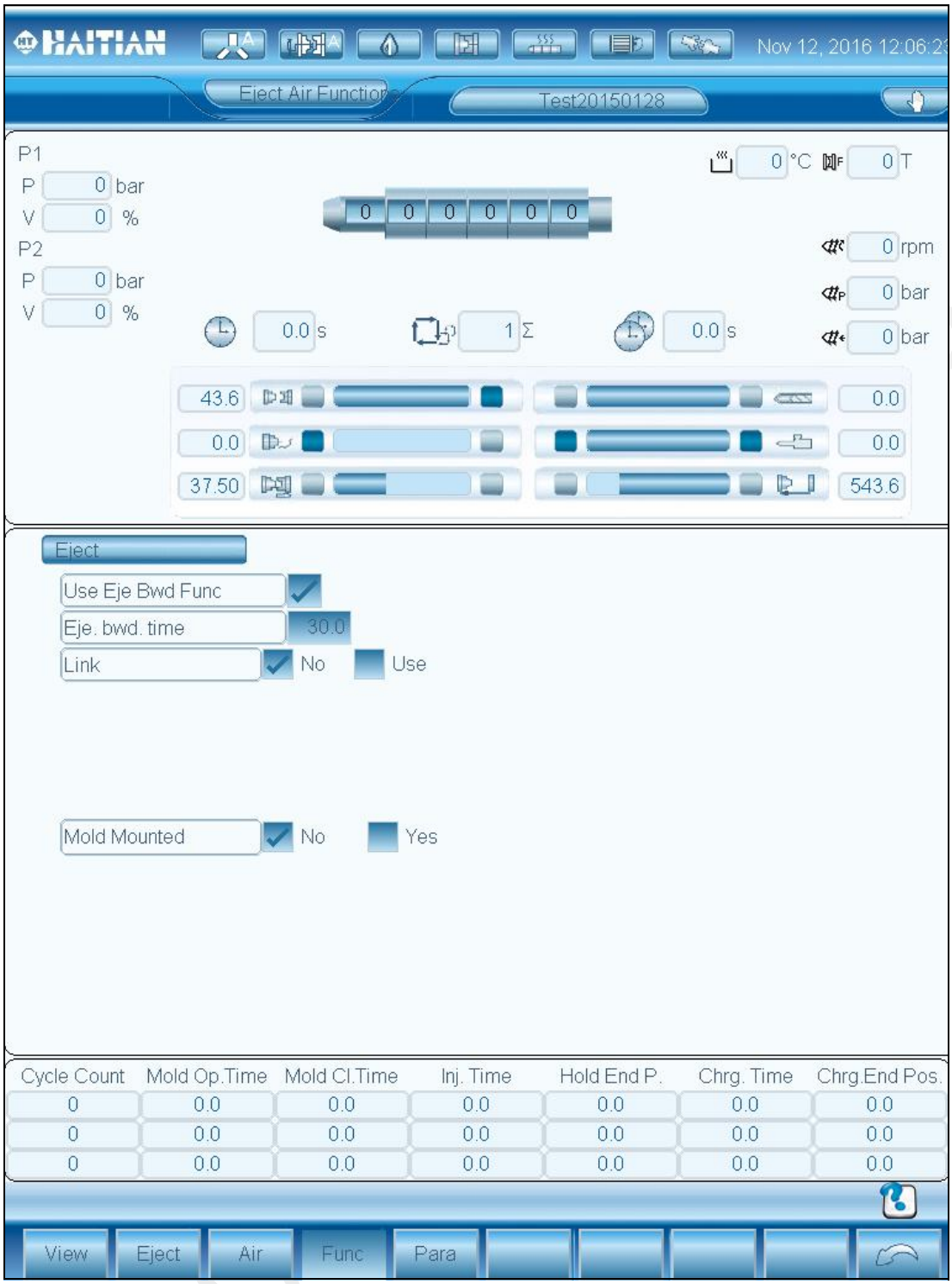
As the inertial force will be produced in the acceleration or deceleration process of the template, it is necessary to activate the ejection valve in the opening process so as to maintain the pull rod at the ejection place.

Options involved in the document

- Ejection maintain screen
- Ejection maintain parameter screen

I. Ejection maintain screen

Choose and set parameters at thimble – function screen as follows:



II. Ejection maintain parameter setting

Tick to choose the ejection maintain function.

Set the maintaining time here.

Notes: The above functions are only functional when the thimble is not used.

3. 2. 2. 4 Introduction of thimble sprue cutting function (Option)

General rules

It means to cut the sprue by using the thimble structure to cut the material with the product so as to separate the product from the mould.

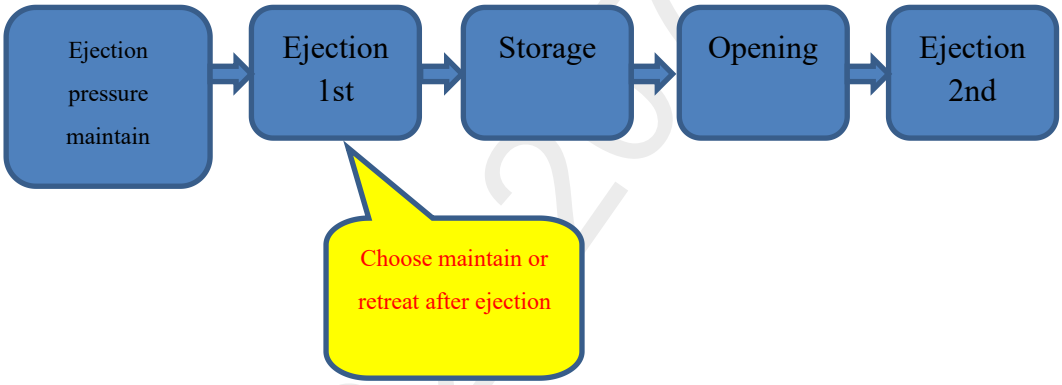
Section overview

- Description of thimble sprue cutting function
- Logic of thimble sprue cutting function
- Screen of thimble sprue cutting function

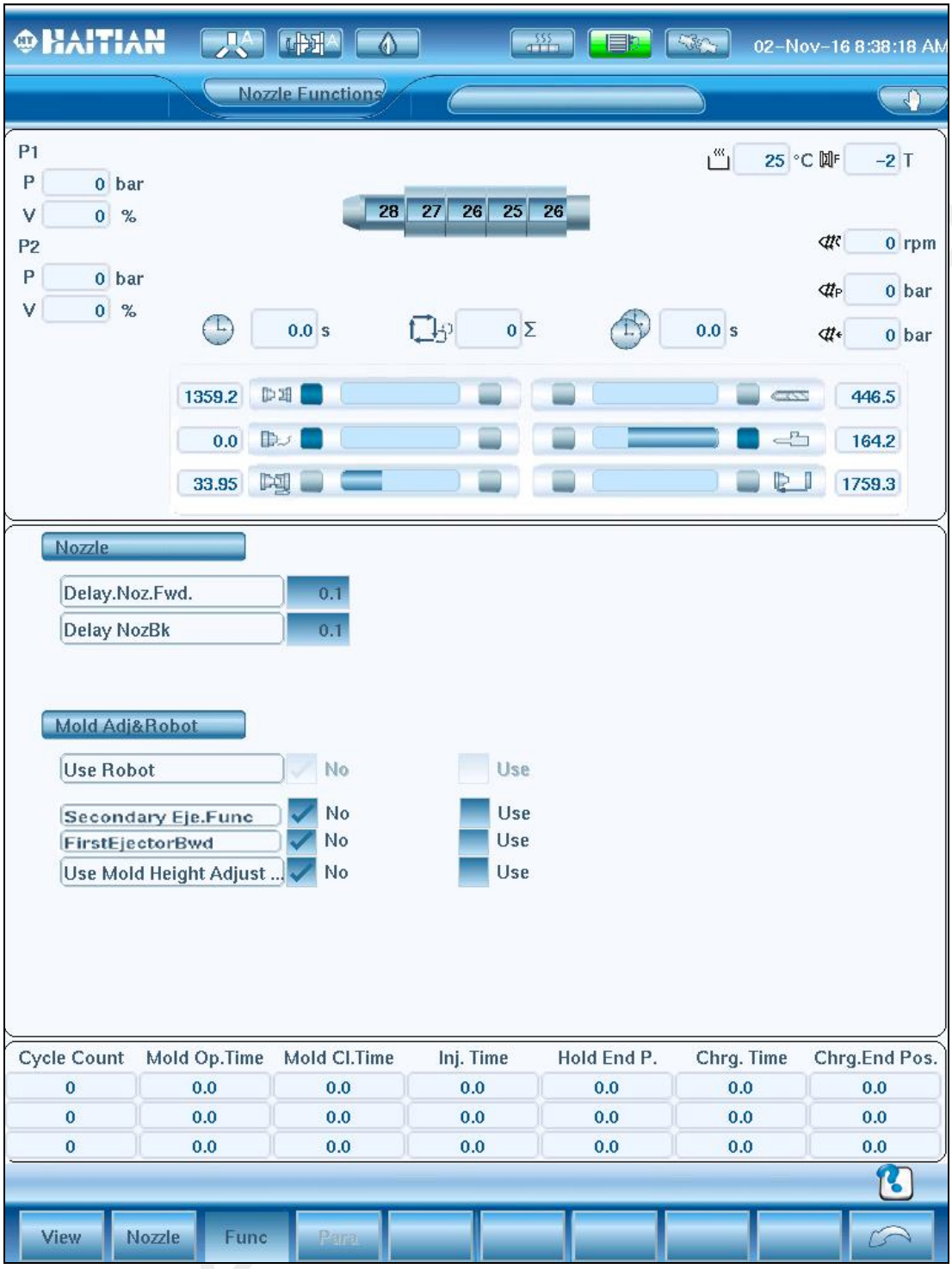
Description of thimble sprue cutting function:

Sprue cutting procedure in the mould: set a section of ejection pressure-flow to eject when the injection pressure maintain completes under automatic mode; the user can choose to maintain or retreat after ejection and then the standard ejection action after storage and opening actions start.

Logic of thimble sprue cutting function:



Screen of thimble sprue cutting function



The user can choose the second ejection function at the screen, i.e. ejection sprue cutting function; the lower one is ejection retreat option, i.e. whether to retreat after the thimble cuts the sprue.

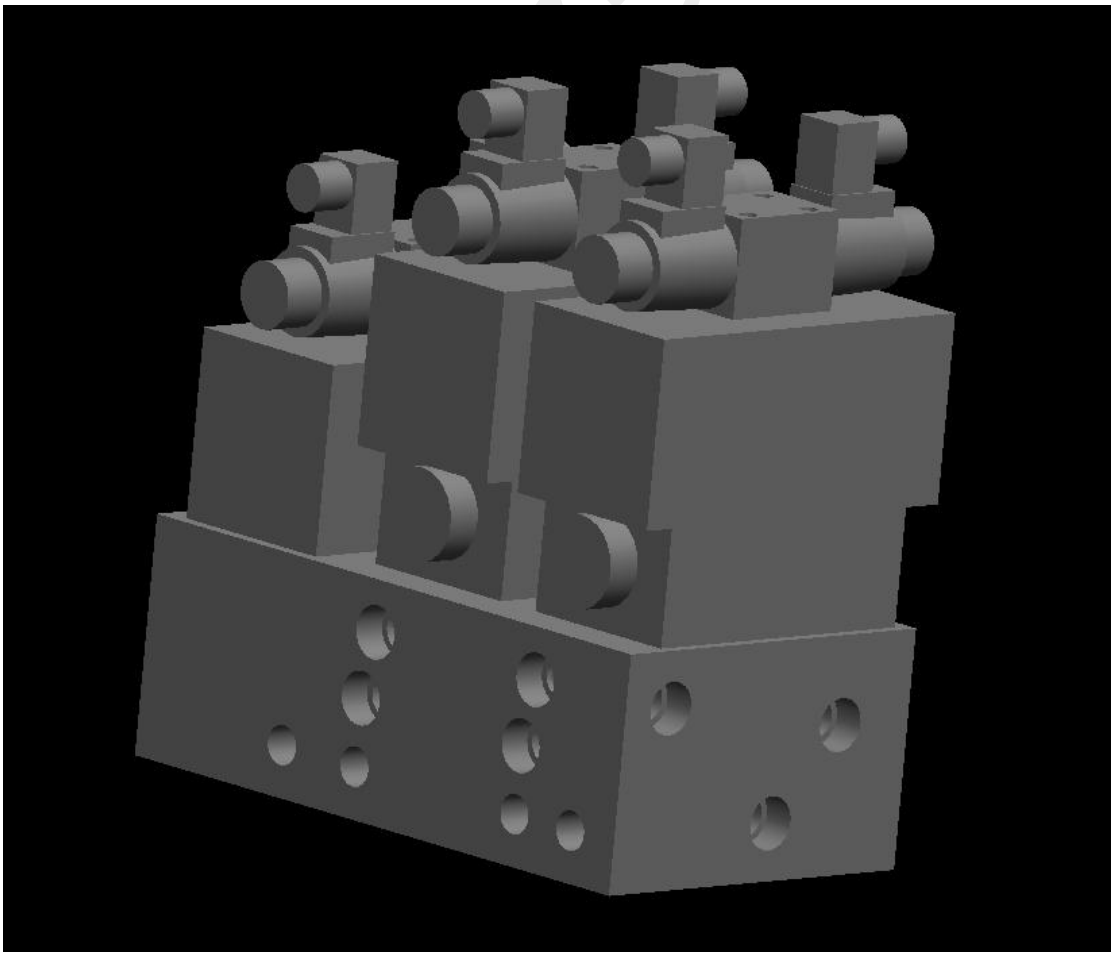
3. 2. 3 Introduction of core valve plate

General rules:

Core is a part of the mobile oil cylinder in the mould, which can advance or retreat the oil cylinder in the full-auto process of the injection molding machine. The core valve plate and core valve of the injection molding machine are for the control of the core actions.

I. Introduction of core valve plate

The core valve plate of the injection molding machine is usually installed at the non-operation side of the moving and fixed template as follows.



You can find the core valve (red box as above) at the core valve plate. The hydraulic oil passes from the core valve plate to the control the advance and retreat actions of the core

through the core valve action. The core valve structure is as follows.

Core valve

Schematic diagram of three-position four-way valve of core

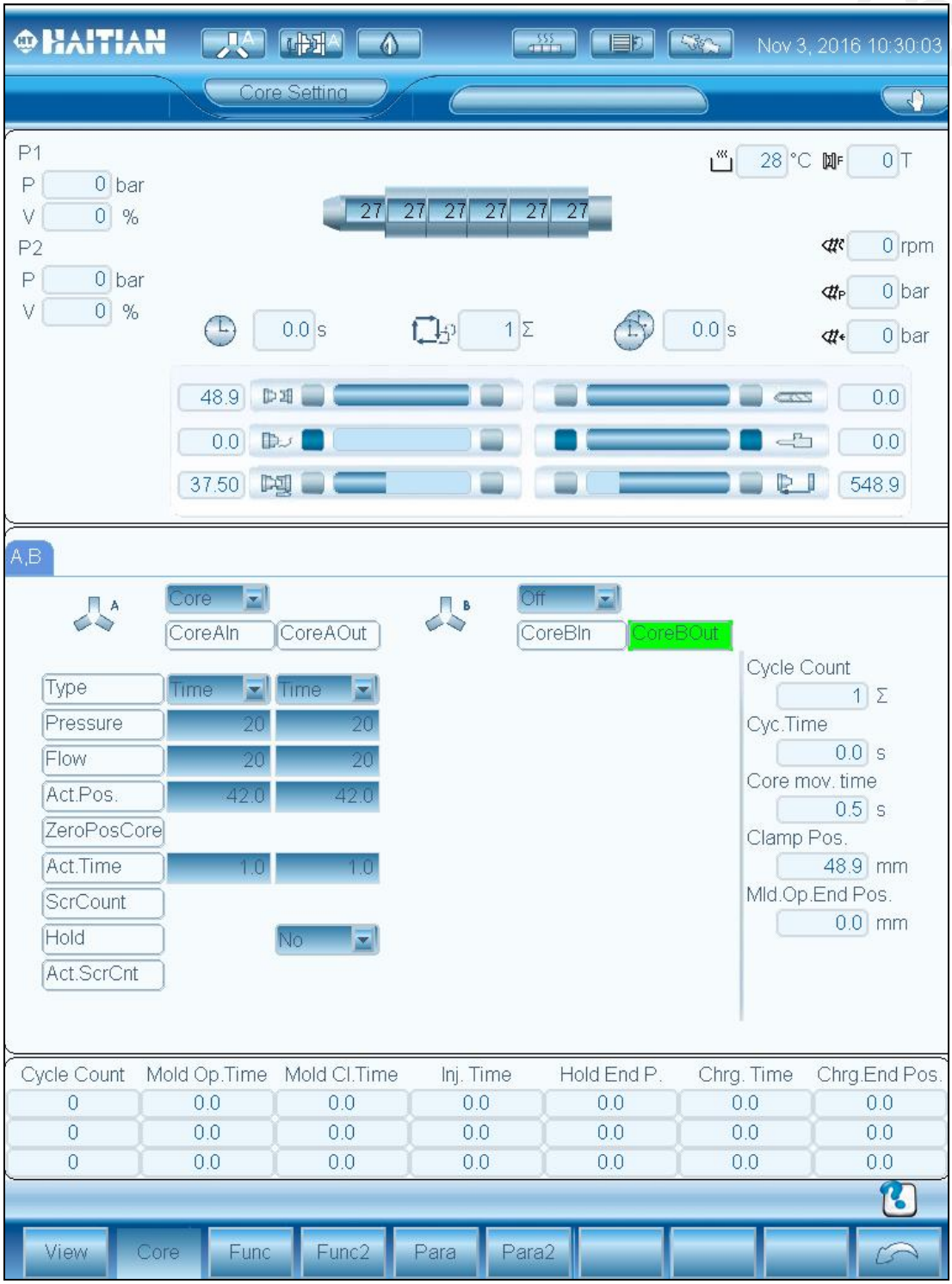
From the schematic diagram of three-position four-way valve of the core as above we can see that: at the neutral position, the valves are different; if the left electromagnet is power on, the working chambers A and B opens and the hydraulic oil flows from port P to chamber B and then chamber A and returns from port T; to the contrary, if the right electromagnet is power on, the hydraulic oil flows from port P to chamber A, then chamber B and returns from port T. The left and right situations separately correspond to advance and retreat actions of core.

3. 2. 3. 1 Introduction of core function selection and types

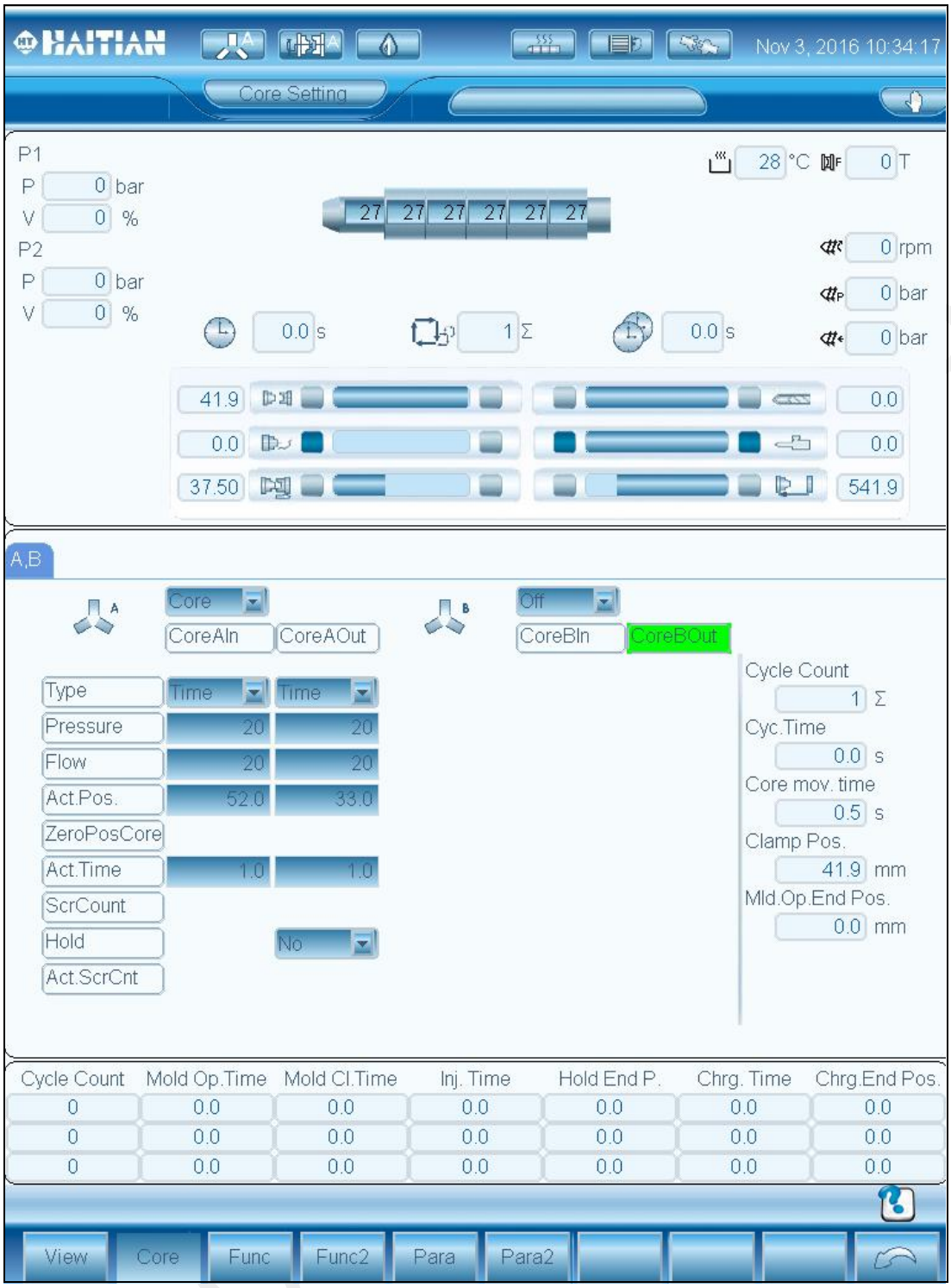
General rules

The user can choose the core functions at the injection molding machine's core screen. The user can choose whether to use the core or set the parameters related to the core.

I. Core function selection



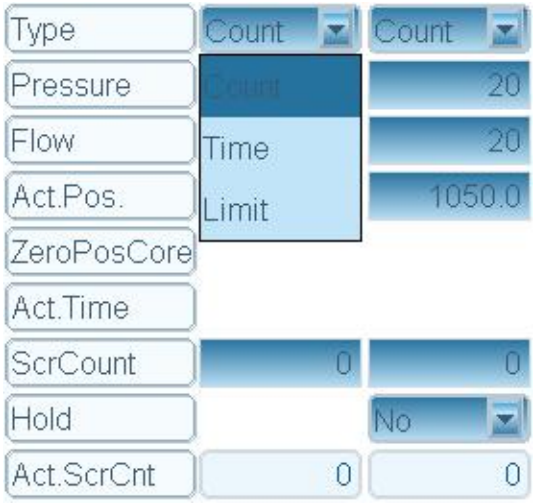
Enter the core screen of the injection molding machine as the above figure to choose whether to use the core or adjust.



After choosing core or adjust function, the parameters of core or adjustment will appear at the screen as the above figure.

The next step is to choose the core or adjustment type and set the corresponding parameters.

II. Core type selection and parameter setting



As the above figure, the types are available in counting, time and switch. When the control method is core, the core types can be time and switch; when the control method is adjustment, the core types can be counting and time.

（1）Type:

【1】Time: The core or adjustment action is controlled by time. When the template moves to the set place, the core will advance or retreat within the set time. Movement of the core can only be controlled by time without dependence on the limit switch protection. When the set time is up, it stops moving. The adjustment mode is the same as the core

【2】Switch: The core's action is controlled by the limit switch. When the template moves to the set place, the core advances or retreats and stops the action when achieving the end place of the limit switch.

（2）Counting: This is for the adjustment action. When the template moves to the set place, the adjustment actions to the set times and stops the action.

（3）Pressure: Set the pressure of the core action.

（4）Flow: Set the flow of the core action.

（5）Set place: Set the core advance and retreat position so that when the template moves to the set position, the core will advance or retreat.

（6）Set time: When the type selected is time, it means the core action time. Once the set time is up, the core action stops.

（7）Adjustment times: When the type selected is adjustment, it means the adjustment action time. Once the set times are up, the adjustment action stops.

（8）Maintain: The user can choose whether to use it or not. If it is used, once the injection button is pressure, it starts to inject and the core valve will output; if the button is released, the injection action ends and the core valve closes.

（9）Actual times: It shows the actual action times of the adjustment.

3. 2. 3. 2 Introduction of core action place

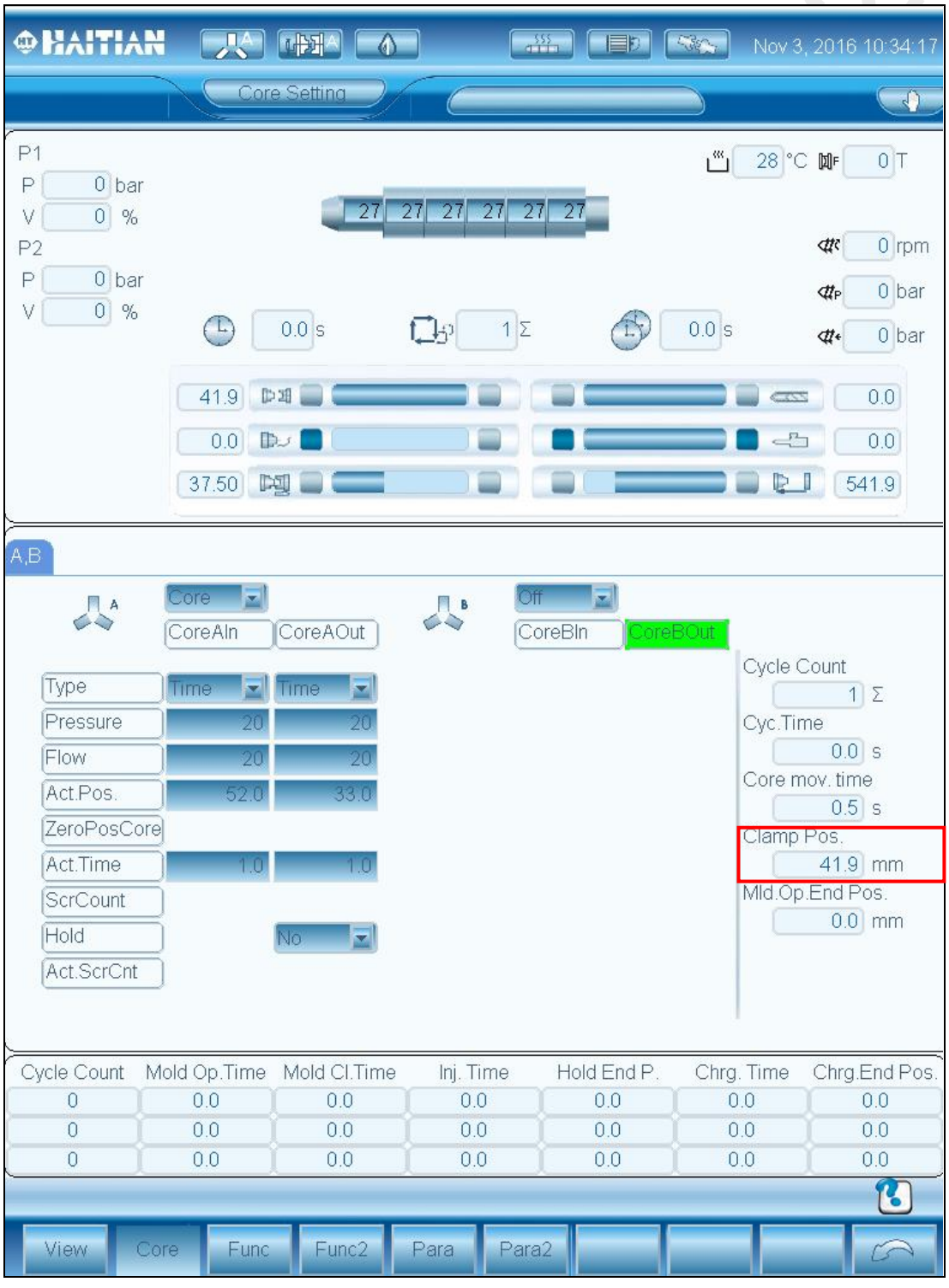
General rules

The core action is decided by the set position: when the template moves to the set position, the core advances or retreats; if the set position of the core is deviated, the core action is decided together by the set position and the core position's deviation.

I. Introduction of core action and position

The following example is based on core A to introduce the relationship between the core action and the set position.

Core position deviation not set:



Normal core action logic: during the clamping process, when the template moves to the set