

BERNARD[®] CONTROLS

TECHNICAL MANUAL



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1 > INTRODUCTION

Our Master Station is a ready-to-work solution which eases the command and control of large quantities of motor operated valves by the mean of a fieldbus. It will help you saving time and resources. It is an interface located between the DCS and the actuators, which can replace your standard industrial computer. Because BERNARD CONTROLS Master Station is already set up, you will save precious time during the commissioning phase. Just cable it and the system is quickly ready to work! Overall start up time of your site is now reduced to the minimum.

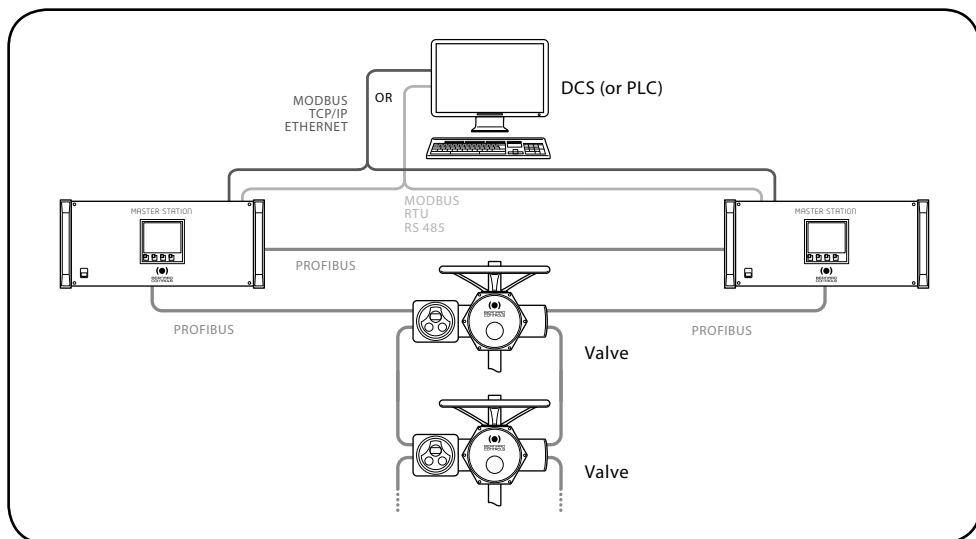
Our Master Station is also able to work without the DCS. In case of default of your DCS or if you do not want to include one in your installation, you can still communicate with your actuators through the Master Station's manual control, from the color touch screen. You can thus keep the control of your valves even if the DCS is on hold or disconnected.

The Master Station is able to interface with a monitoring computer (optional) to control directly valves' automation. This PC workstation, equipped with specific software, allows to operate the MOVs and to retrieve data and alarms from the field units. By choosing the PC workstation, you opt for greater user friendliness. Indeed, we can work together on demand to schematize your installation in the software interface so as to overview all the actuators of your site easily. And for simple use, the software is available in English, French, Spanish, German and Italian.

In order to ensure secure management of your site, considering the several control units, a control hierarchy is set up. The standard control priority is defined from the closest device to actuators, to the device which is the farthest:

Actuators > MS > PC workstation > DCS

The consequence is that if an opposite order is received at the same moment from the Master Station and from the DCS, the priority order is the one coming from the Master Station.



2 > REFERENCE DOCUMENTS

NR1150 - Profibus Intellibus

NR1112 - Intelli+ Notice

NR1178 - PC Workstation for Master Station MS202 Technical Manual

SPEB1246 - Functional analysis of Modbus communication on the Master Station MS202

SETTING UP

3 > MOUNTING AND CONNECTING YOUR MASTER STATION

3.1 > MECHANICAL FIXING

Master Station MS202 is composed of two 19-inch units.

They must be installing in a 19-inch cabinet, one above the other. It is better to put the unit 'PLC1' above the unit 'PLC2'. Use M6 screws to fix those (8 by unit).

All connections are accessible inside the units, so unscrew the two screws on the right of the panel to open it.



For make wiring easier there is a hole on the back side for the passage of the cables.

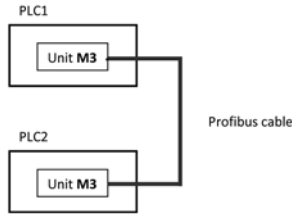
Hole for the passage
of the cables



3.2 > LINKS BETWEEN THE TWO UNITS

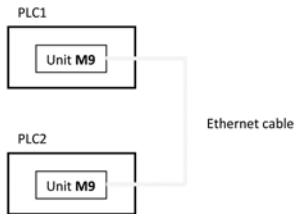
To assure the redundancy of the system there are several links between the two units of the Master Station MS202.

First there is a link between the two PLC which allows to transfer the data corresponding to the commands and the signals from the actuators, and to diagnose the status of the Master Station itself.



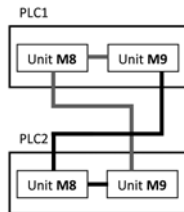
M3 Unit: Profibus interface

Then, there is a link between two Ethernet concentrators which assures the communication between the DCS and the two PLC, even if there is just one DCS line.



M9 Unit: Ethernet concentrator

At last, the Ethernet concentrators have a redundant power supply input which allows them to keep powered on even if one unit is powered off.



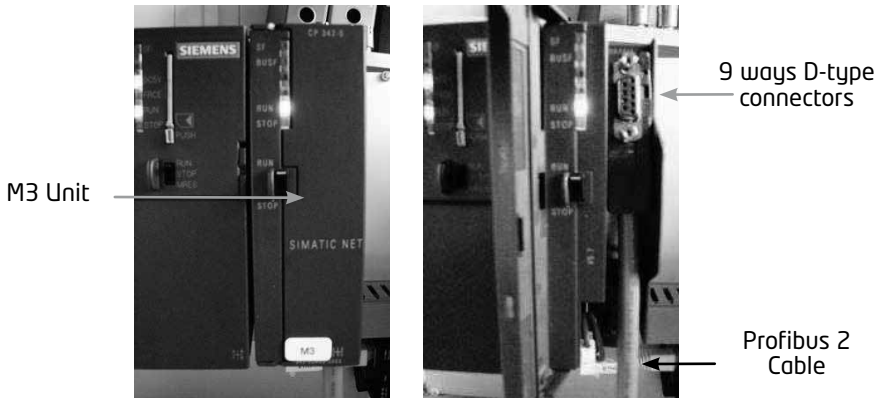
M8 Unit: Power supply

M9 Unit: Ethernet concentrator

Each 'Power supply' supplies the two Ethernet concentrators.

3.2.1 > LINK BETWEEN THE PLC

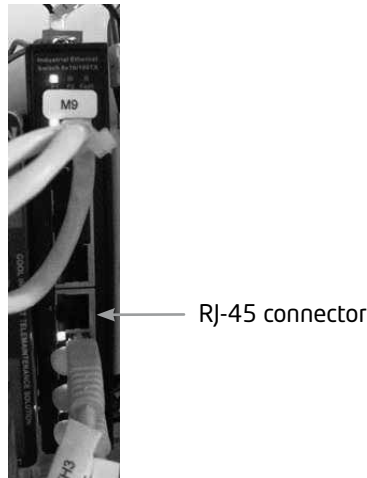
To link both PLC together, take the cable labeled Profibus 2 (which is provided) and plug its two 9 ways D-type connector on the PROFIBUS input of both units labeled **M3**, after you had opened their cover.



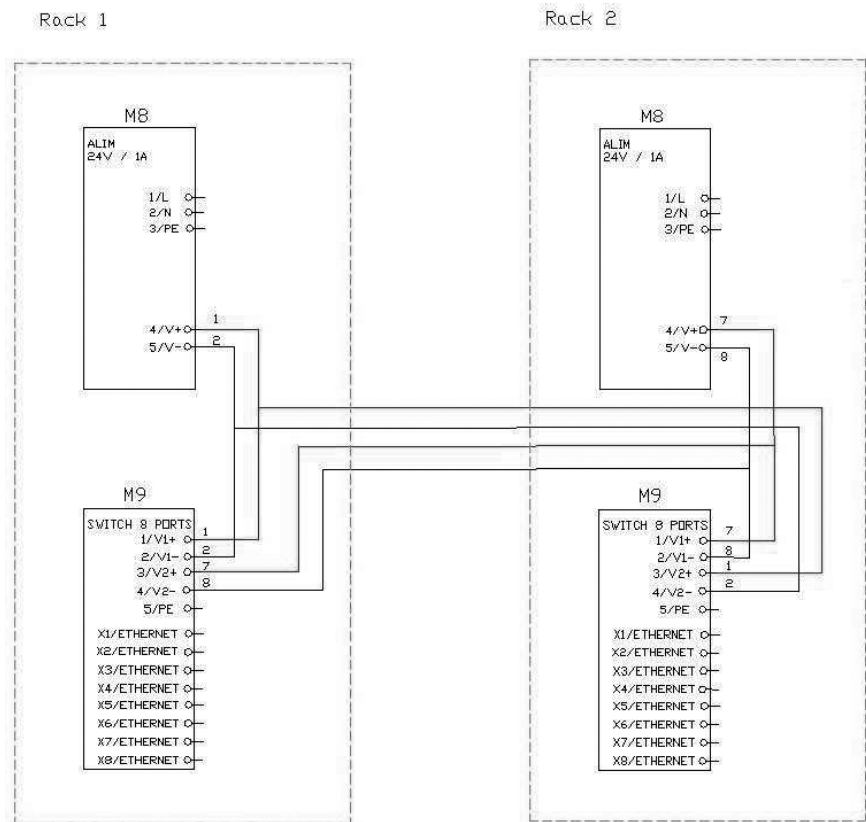
3.2.2 > ETHERNET REDUNDANCY

To ensure redundancy of communication of the DCS with both PLC, there is a link between both Ethernet concentrators.

You must therefore take the cable labeled **ETH 3** (which is provided) and plug its two RJ-45 connectors on a free port of both Ethernet concentrators labeled **M9**.



In addition there is redundant power input on the Ethernet concentrators; they are each powered on by both Power supply labeled **M8**. Thus you have to wire as shown below (wires provided and prewired). For more details refer to wiring diagram S94400175.



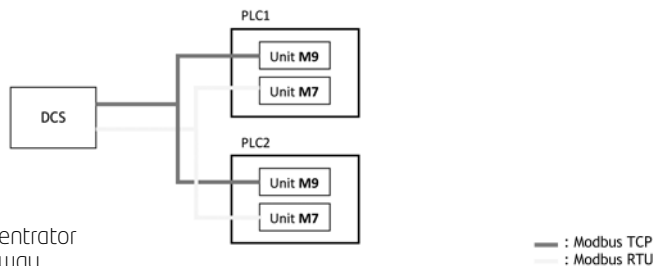
M8 Unit: Power supply

M9 Unit: Ethernet concentrator

Each 'Power supply' supplies the two Ethernet concentrators.

3.3 > COMMUNICATION WITH THE DCS

The Master Station MS202 is made up of two Master Station units, which each possess an RS485 communication input for the Modbus RTU link and an Ethernet communication input for the Modbus TCP link. These inputs provide a redundant communications system between the DCS and the Master Station MS202.



M9 Unit: Ethernet concentrator

M7 Unit: RTU/TCP gateway

Reminder: Communications are made either by the Modbus RTU protocol or by Modbus TCP. Therefore, please refer to part 3.3.1. Modbus RTU setup physical link or part 3.3.2. Modbus TCP setup physical link.

The DCS can communicate indifferently by either of these two ways.

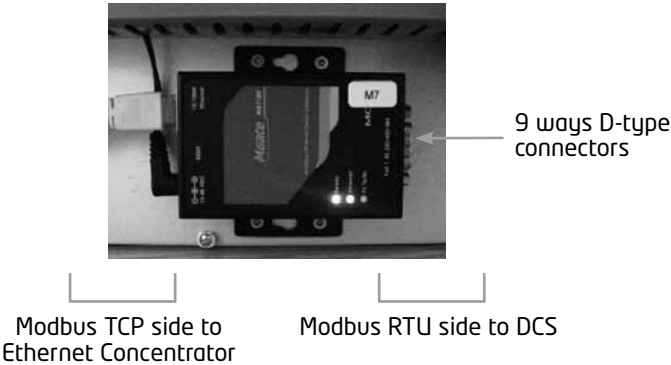
For more information about Modbus communication refer to SPEB 1246 Functional Analysis of the Modbus communication on the Master Station MS202.

3.3.1 > MODBUS RTU SETUP PHYSICAL LINK

The Modbus RTU connection works via the 9 ways D-type connector of the **M7** module inside the Master Station.

M7 Unit is a Modbus RTU/TCP gateway.

Link the first line of the DCS with **M7** Unit of the 'PLC1' and link the second line of the DCS with **M7** unit of the 'PLC2'.



Physical description:

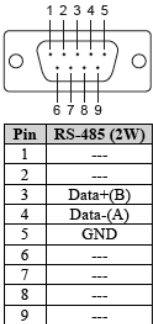
RS 485 type interface
Transmission medium: Single pair armoured cable
Connection: female 9 ways D-type
Multi-drop supported.

Terminating resistances:

To eliminate echo phenomena on the line, terminating resistances of 120 Ohms (not provided) must be placed on the ends of the bus, the best solution being to put them directly in the SUB-D9 connector between pin 3 and 4.

Communication parameters:

Type of protocol: Master Station is the Modbus RTU slave
Transmission speed: 50 to 921.6Kbits/s
Parity: odd, even, none
Slave address: 1 to 254



To change parameters refer to part 4. Setting up the Modbus RTU communication.

3.3.2 > MODBUS TCP SETUP PHYSICAL LINK

The Modbus TCP connection works via the RJ-45 connector of the Switch Ethernet labeled **M9** inside the Master Station or via the RJ-45 port on the front panel.



RJ-45 connector of M9 unit



RJ-45 connector on the front panel

Physical description:

Ethernet type 10/100 Mbits/s interface
Transmission medium: Armoured Ethernet cable
Connection: Socket for RJ45 plug

Communication parameters:

Type of protocol in use: Modbus TCP

Reminder: Communications are made either by the Modbus RTU protocol or by Modbus TCP. Therefore, please refer to part 3.3.1. Modbus RTU setup physical link or part 3.3.2. Modbus TCP setup physical link.

3.4 > COMMUNICATION WITH THE WEB SERVER

In each unit there is a Web Server including several Web pages, so there is a TCP/IP connection to access to these pages. This connection works via the RJ-45 connector of the Switch Ethernet labeled **M9** inside the Master Station, or on the RJ-45 input on the front panel.

Physical description:

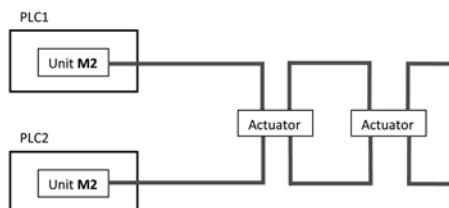
Ethernet type 10/100 Mbits/s interface
Transmission medium: Armoured Ethernet cable
Connection: Socket for RJ45 plug

Communication parameters:

Type of protocol in use: TCP/IP

3.5 > COMMUNICATION WITH THE ACTUATORS – PROFIBUS DP V1

The Master Station MS202 is an interface between the DCS and actuators which manages the redundancy. Each unit manages a Profibus line.



M2 unit: Profibus interface

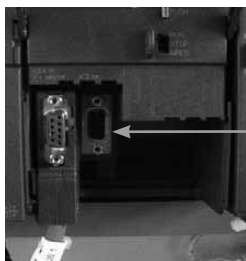
The fieldbus network must be correctly cabled and connected to the Master Station via the D-type connector of the X2 DP input of the **M2** module.

Physical description:

RS485 type interface

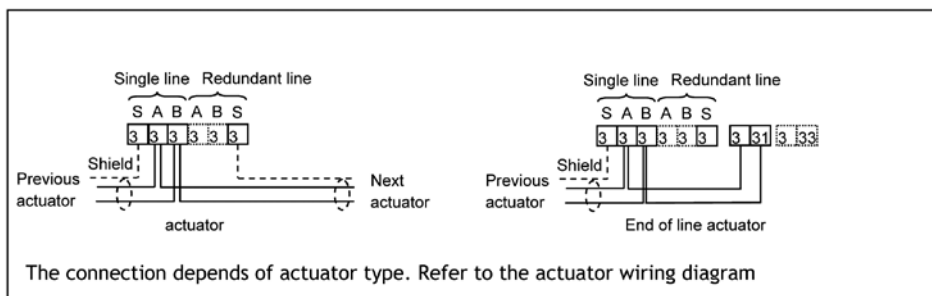
Connection with the Master Station:

SIEMENS SIMATIC BUSCONNECTOR (ref: 6ES7 972-0BB52-0XA0)



X2 DP input of the M2 unit

Connection with the actuators:



Communication parameters:

Type of protocol in use: Profibus DP V1

Transmission speed: 93.75Kbits/s

Slave address: 1 to 122

For more information refer to the NR1150 Profibus DP V1 for Intelli+.

3.6 > COMMUNICATION WITH THE PC WORKSTATION

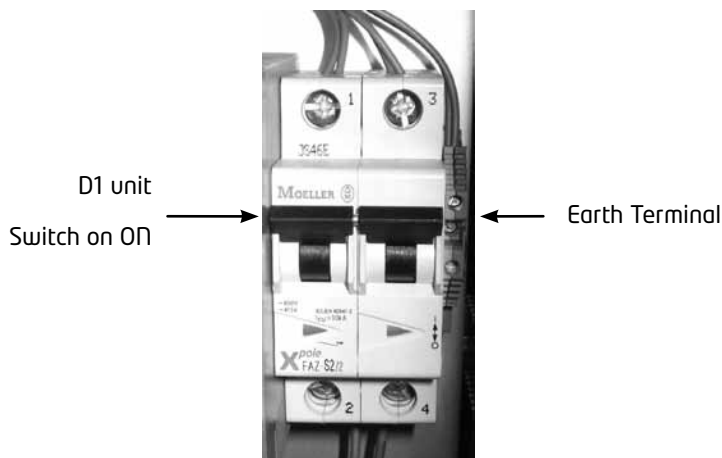
The Master Station is able to interface with a monitoring computer (optional) to control directly valves' automation. This PC Workstation, equipped with specific software, allows you to operate the actuator and to retrieve data and alarms from the field units.

To link the PC Workstation and the Master Station MS202 together, use an Ethernet cable. Connect one of both cable extremity to the Ethernet port of the PC, and the second to **M9** unit or to the Ethernet port on the front panel of one of the Master Station MS202 units. For more information refer to the NR 1178 PC Workstation for MS202 – Technical Manual.

3.7 > POWER SUPPLY

Now, when all components are linked and physically connected, you can power supply your Master Station MS202.

Each unit is supplied separately. Power supply is wired on **D1** unit and the switch must be on 'ON'. Earth is wired on the Earth Terminal.



Voltage: 115 VAC (+10%, -30%)

230 VAC (+10%, -30%)

Frequency: 47 to 63 Hz

Electrical power consumption: 75 W for each unit

Once wiring is done, proceed by switching ON each unit.

4 > SETTING UP THE MODBUS RTU COMMUNICATION

You can change the Modbus slave address of each unit of the Master Station MS202. Available addresses are included between 1 and 254.

To manage the Modbus RTU communication the Master Station MS202 is equipped with two Modbus RTU/TCP gateway. There are 2 IP addresses reserved for each unit (by default it is 192.168.94.181 for the unit 1 and 192.168.94.183 for the unit 2).

If you want to change the Modbus slave address refer to part 4.2. Setting up the Modbus slave address with the Touch Screen.

But, if you want to change the IP address refer to part 3.3. Setting up the Modbus RTU/TCP gateway.

4.1 > DEFAULT PARAMETERS

Default parameters are shown below:

For the gateway of each unit:

Transmission speed: 19200 bauds

Format: 8 data bits, 1 stop bit, no parity

Communication protocol: Modbus RTU

Modbus address of the gateway of the unit 1: 2

Modbus address of the gateway of the unit 2: 4

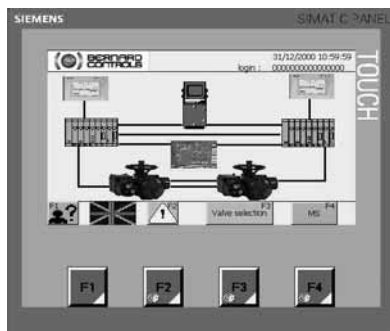
As explained above, if you only want to change the Modbus slave address refer to part 4.2. Setting up the Modbus slave address with the Touch Screen.

But, if you want to change Transmission speed or format refer to part 4.3. Setting up the Modbus RTU/TCP gateway.

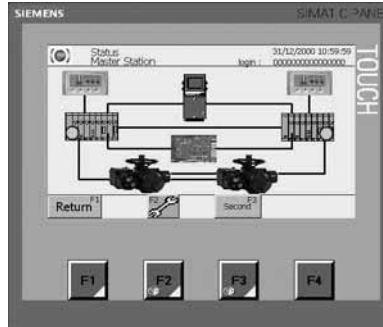
4.2 > SETTING UP THE MODBUS SLAVE ADDRESS WITH THE TOUCH SCREEN

To change the Modbus address of a unit you must be logged in to the Master Station with the Maintenance account. To see how to log in refer to part 9.1. Log in access.

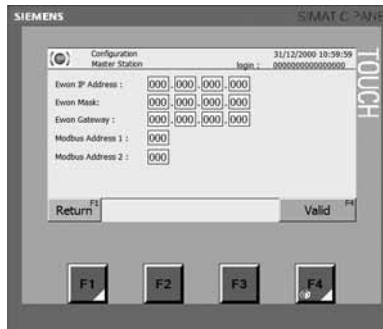
1. From the main page touch the **MS** button or press **F4**.



2. Touch the **Tool** button or press **F2**.



3. Touch the field you want to change, Modbus Address 1 or 2. A virtual Keyboard will appear. Enter the value and touch the **Valid** button or press **F4**. You can return to the main page by touching the **Return** button or by pressing **F1**.



Note: You can change the Modbus addresses of the two units from any touch screen.

When you validate your choice it will reboot the device. The link between the PLC and the server web on the touch screen main page will then blink in red. Wait a few seconds for the device to restarts successfully.

The Master Station is now ready to run with the news parameters.

4.3 > SETTING UP THE MODBUS RTU/TCP GATEWAY

To set up the Modbus RTU/TCP gateway you need a computer with administrator right to install MGate Manager software.

Morover you have to connect the computer to the Master Station with an Ethernet cable (not provided). Connect one of both cable extremity to the Ethernet port of the PC, and the second to the Ethernet port on the front panel of one of the Master Station MS202 units.

4.3.1 > MGATE MANAGER INSTALLATION

The following instructions explain how to install MGate Manager, a utility program for configuring and monitoring MGate Modbus RTU/TCP gateway units over the network.

1. Insert the «Document and Software CD» into the CD-ROM drive. Locate and run the following setup program to begin the installation process:

MGM_Setup_[Version]_Build_[DateTime].exe

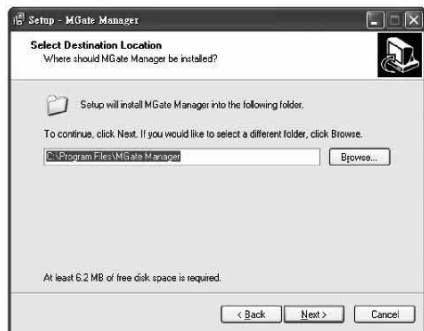
The latest version might be named MGM_Setup_Ver1.1.0_Build_0704...exe, for example:



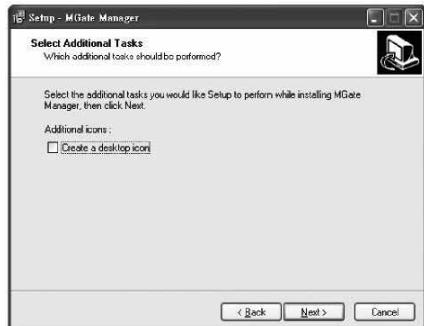
2. The Welcome window will pop up. Click Next to continue.



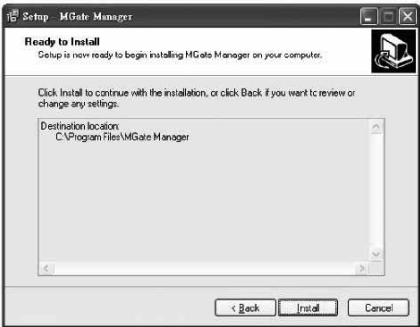
3. When the «Select Destination Location window» appears, click Next to continue. You may change the destination directory by first clicking on «Browse»....



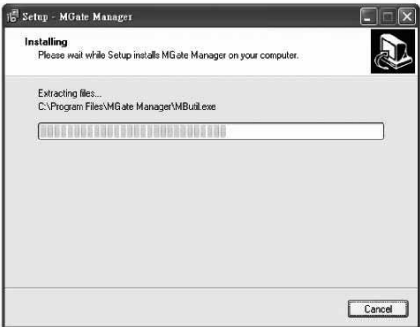
4. When the «Select Additional Tasks window» appears, click Next to continue. You may select «Create a desktop icon» if you would like a shortcut to MGate Manager on your desktop.



5. Click Next to start copying the software files.



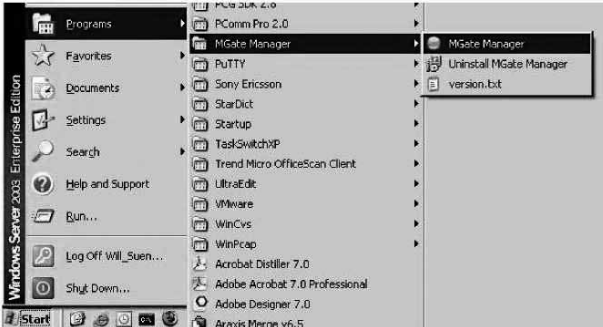
6. A progress bar will appear. The procedure should take only a few seconds to complete.



7. A message will indicate that MGate Manager is successfully installed. You may choose to run it immediately by selecting Launch MGate Manager.

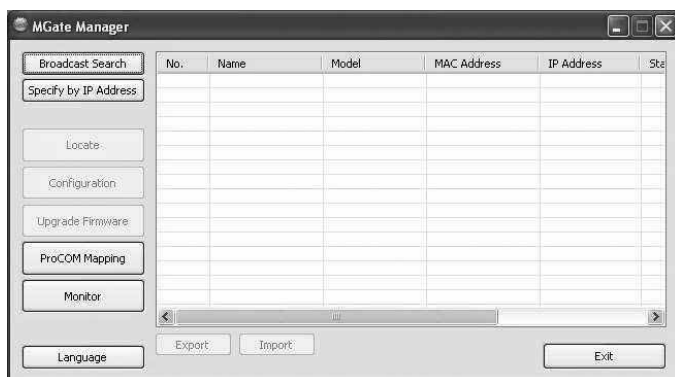


8. You may also open MGate Manager through Start > Programs > MGate Manager > MGate Manager, as shown below.

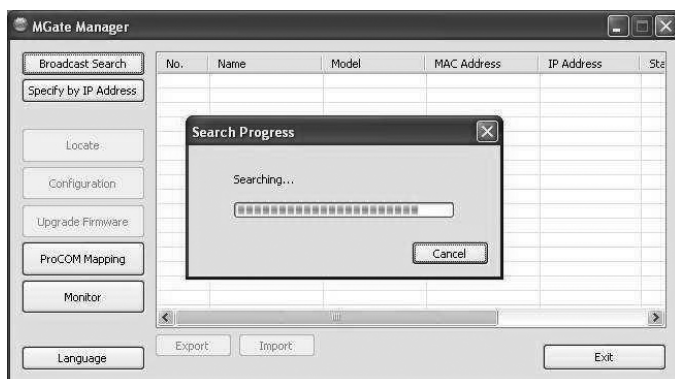


4.3.2 > SETTING UP USING MGATE MANAGER

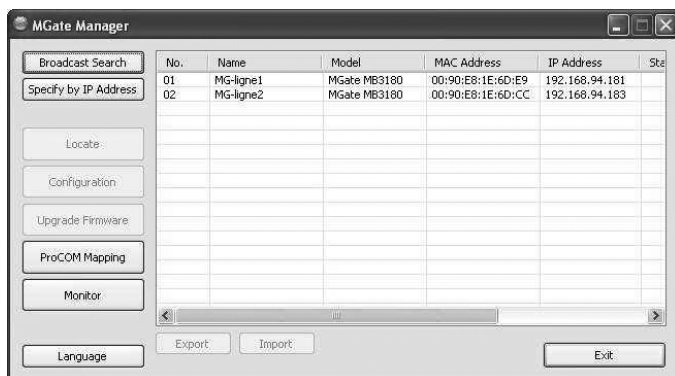
1. Run MGate Manager and click on Broadcast Search, as shown below.



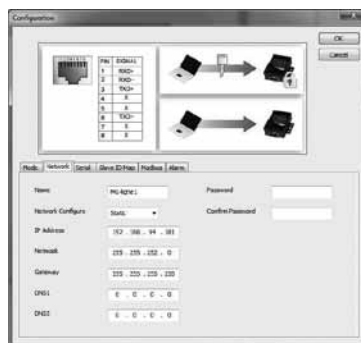
2. A progress bar will appear. The procedure should take only a few seconds to complete.



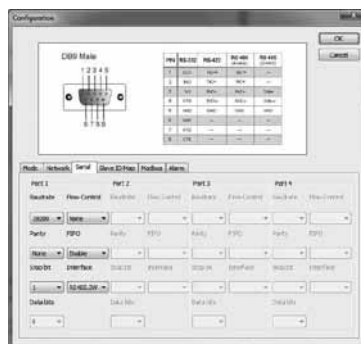
3. The two modules Modbus RTU/TCP gateway will appear on the windows. Select the one you want to modify and click on Configuration.



4. To change the IP address, Netmask or Gateway click on Network.

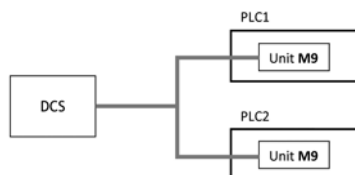


5. To change baudrate, parity or stop bit click on Serial... Click on OK to validate the changes.



6. Once modifications are done, select Exit.

5 > SETTING UP THE MODBUS TCP COMMUNICATION



M9 unit: Ethernet concentrator

As described here above, there are 2 IP addresses reserved for each unit. There is one IP address for the Modbus RTU / TCP gateway (by default it is 192.168.94.181 for the unit 1 and 192.168.94.183 for the unit 2), and there is one IP address for the Web server, which manages the Modbus TCP communication, (by default it is 192.168.94.180 for the unit 1 and 192.168.94.182 for the unit 2).

If IP addresses of the Modbus RTU/TCP are not suitable you can change it as it is explained in part 4. Setting up the Modbus RTU communication.

If IP addresses of the Web server are not suitable you can change it as it is shown below.

5.1 > DEFAULT PARAMETERS

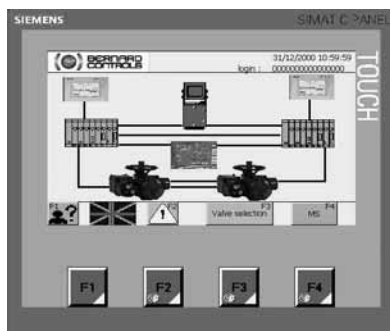
Default parameters are:

	Unit 1	Unit 2
IP address	192.168.94.180	192.168.94.182
Mask	255.255.252.0	255.255.252.0
Gate	0.0.0.0	0.0.0.0
Slave address	1 to 254	

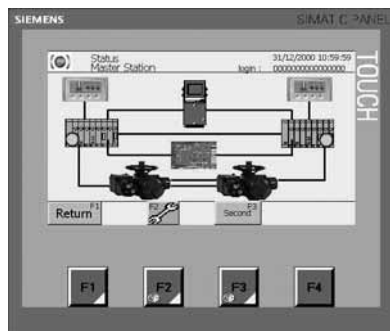
5.2 > SETTING UP USING THE TOUCH SCREEN

To change the IP address of a unit you must be logged in to the Master Station with the Maintenance account. To see how to log in refer to part 9.1. Log in access.
If you want to change the IP address of the unit 'PLC 1' you have to use the touch screen of this unit, the same apply to the unit 'PLC 2'.

1. From the main page touch the **MS** button or press **F4**.

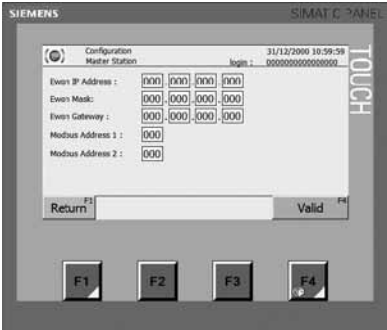


2. Touch the **Tool** button or press **F2**.



3. Touch the field you want to change, a virtual Keyboard will appear. Enter the value and touch the **Enter** button. Then, touch the **Valid** button or press **F4**. You can return to the main page by touching the **Return** button or by pressing **F1**.

When you validate your choice it will reboot the device. The link between the PLC and the server web on the main page will therefore blink in red. Wait a few seconds, so that the device restarts successfully.



The Master Station is now ready to run with the news parameters.

6 > SETTING UP THE WEB SERVER

As described in part 4. Setting up the Modbus TCP communication, the same unit manages the Modbus TCP communication and the Web page.

The Master Station includes some Web pages that may be remotely accessed via Ethernet. They can be used for examining the system for any faults or alarms.

6.1 > DEFAULT PARAMETERS

Default parameters are:

	Unit 1	Unit 2
IP address	192.168.94.180	192.168.94.182
Mask	255.255.252.0	255.255.252.0
Gate	0.0.0.0	0.0.0.0
Slave address	1 to 254	

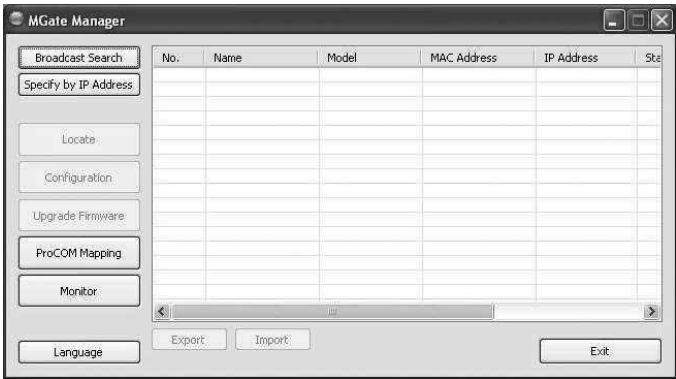
6.2 > SETTING UP USING THE TOUCH SCREEN

If you have to change an IP address, refer to part ‘5.2. Setting up using the touch screen’.

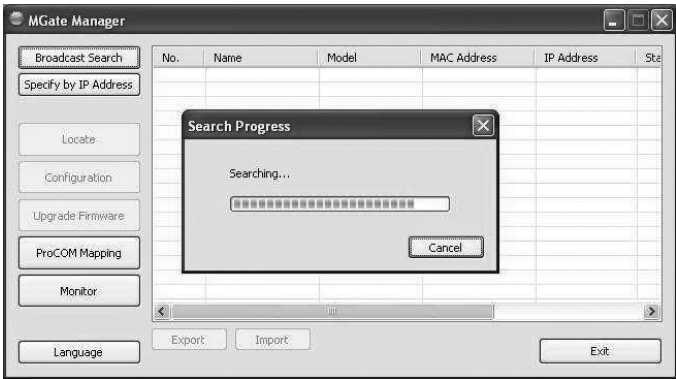
6.3 > SETTING USING MGATE MANAGER

If you changed the Web server IP address and if you use the Modbus RTU communication you have to set up the Modbus RTU/TCP gateway. For that purpose, take a computer and install the MGate Manager software as explained in part 4.3. Setting up the Modbus RTU/TCP gateway, and connect it on the RJ-45 input on the front panel of the Master Station MS20. Then follow these instructions.

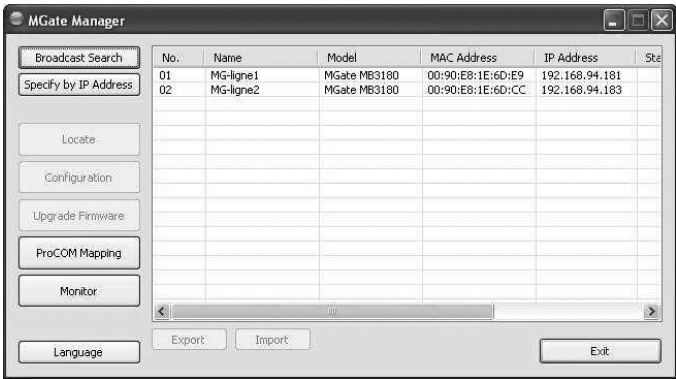
1. Run MGate Manager and click on Broadcast Search, as shown below.



2. A progress bar will appear. The procedure should take only a few seconds to complete.

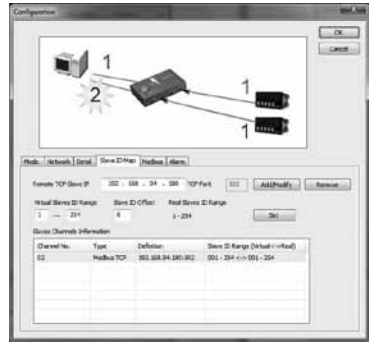


3. The two modules Modbus RTU/TCP gateway will appear on the window. Select the one you want to modify and click on Configuration. To modify the IP address of the unit 1 select MG-Ligne1, and to modify the IP address of the unit 2 select MG-Ligne2.



4. Select Slave ID Map and select the first line of the board Slaves Channels Information and modify the Remote TCP Slave IP. You have to enter the same IP address than the IP address you entered with the touch screen. Click on Add/Modify, and on OK.

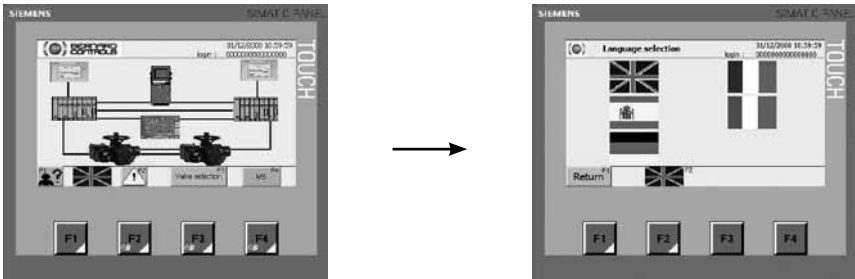
5. Select Exit.



7 > SETTING UP THE TOUCH SCREEN

7.1 > LANGUAGE

Language can be chosen amongst the following list: English, French, Spanish, German and Italian. Any type of user's accounts has access to this setting. To see how to log in, refer to part 9.1. Log in access.



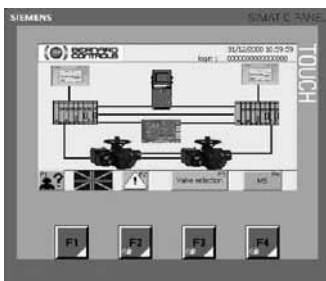
From the home page press the **Flag** to access to the Language selection screen.

To select a language press **F2** until the flag correspond to your choice or press directly the flag corresponding.

7.2 > CLOCK

You can set up date and time only if you are logged in Maintenance account. To see how to log in refer to part 9.1. Log in access.

From the home page touch the date, the **Set up Clock** Screen will appear. Touch the box corresponding to the parameter you want to change and validate the modification by pressing the **F2** button or by touching the **Clock update** button.



8 > SETTING UP THE ACTUATORS

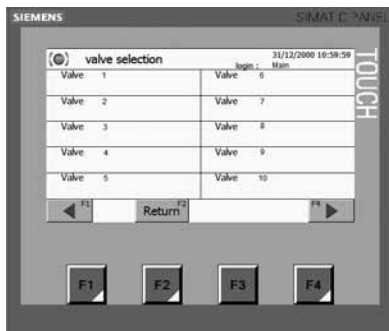
8.1 > Activate the actuators

The first thing you have to do is to activate the actuator on the Master Station to establish the communication between those. Before activating the actuator, make sure it is correctly cabled and connected and its slave address is correctly set up.

To access to the **Activate Screen** you must be logged in with a **Maintenance** account. To see how log in refer to part 9.1. Log in access.

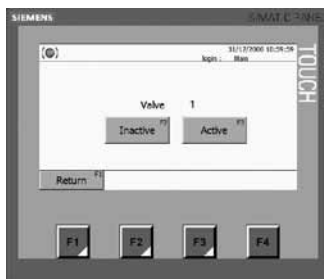
Then, from the home page touch the **Valve selection** button or press the **F3** button.

Now a list of valves is displayed. The valves are presented 10 by 10 with a number and a Tag number. Twelve pages are necessary to display the 120 valves. You can navigate through these pages by pressing the **Left** and the **Right arrow** or by pressing respectively **F1** or **F4**.



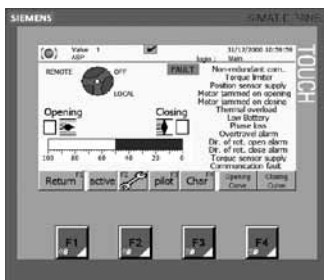
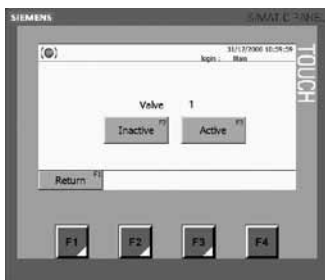
Note: The number of the valve you will activate must corresponds to the slave address number minus 2 (For example, valve number 1 will have 3 as slave address, valve number 2 will have 4 as slave address...).

Select the suitable valve and the corresponding **Status valve** screen will be display. Then press the **Active** button to display the **Activation** screen.



Press **Active** or **F3** to activate the actuator, or press **Inactive** or **F2** to deactivate it. It could be necessary to deactivate an actuator for a maintenance process.

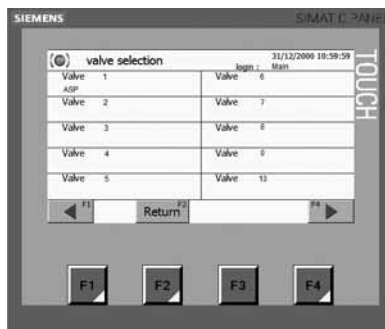
Once your actuator is activated press **Return** or **F1** to come back to the **Status valve** screen. Now more information about the actuator is displayed. Refer to part 9.2. Managing your actuators using the touch screen to know more about this screen.



The communication with your actuator is now established and you have access to all possibilities offered by the actuator.

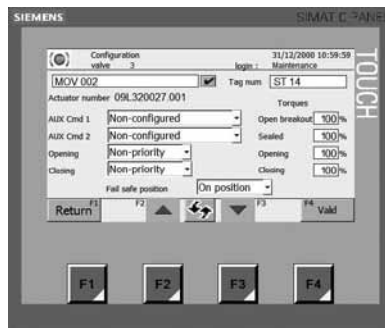
Now, when you come back on the **Valve Status** screen you see some information about the actuator. In case of communication fault, it will be displayed. Therefore make sure Profibus is correctly cabled and slave address is correctly set up, then deactivate and reactivate the actuator.

On the **Valve Selection** screen you can see that your actuator is now activated.



8.2 > CONFIGURE YOUR ACTUATOR

All users' accounts, except **Administrator** account, allow you to access to this page. But, only the **Maintenance** account will be able to change the actuator configuration.



On this page you can change the **Valve reference** and the **Tag** number on these following fields:

MOV 002	<input checked="" type="checkbox"/>	Tag num	ST 14
---------	-------------------------------------	---------	-------

You can allocate the auxiliaries commands to the following functions by selecting a parameter in the down-drop list of the **AUX Cmd 1** and **AUX Cmd 2** fields:

AUX Cmd 1	Non-configured
AUX Cmd 2	Non-configured

- **LOCAL/REMOTE:** Replace the local/remote selector on the actuator and, under remote control conditions, authorize either local control or remote control.
- **LOCAL+REMOTE/REMOTE:** This function has the same role as the previous one, but local and remote control can be authorized simultaneously.
- **PROHIBITING LOCAL CONTROL:** Prohibiting local control is controlled remotely. This function prohibits local opening and closing controls and authorizes remote control even if the actuator selector is placed on local control.
- **PROHIBITING OPENING/CLOSING:** This control is used for preventing the actuator from starting or stopping
- **AUTO / ON-OFF:** For an actuator used in modulating mode with a positioning function, a command can be selected by position set-point (equivalent to the 4/20mA signal) or by opening, closing or stop controls. The auto/on-off control is used for changing from one control mode to another.
- **CLOSING / OPENING / EMERGENCY SHUTDOWN:** The ESD (Emergency Shut Down) is an emergency remote command that has priority over the other commands. Depending on the type of operation for which the valve is to be used, this emergency command can be opening, closing or stopping in an intermediate position. The ESD command is assigned to a Modbus command for auxiliary command 1 and to a wired link (separate cabling) for auxiliary command 2.

Note: The cabled ESD has priority over the Modbus ESD. Emergency control is not possible when the switch is in the OFF position.

- **PARTIAL MOVEMENT:** This control carries out an automatic test to ensure that the actuator is still operational. The test consists of manoeuvring the actuator over a part of its course. The starting position as well as the percentage of movement can be set. An alarm is given off if the test has not been carried out within a predetermined time.

A priority can be selected between the **opening** command and the **closing** command by selecting a parameter in the down-drop list of the Opening and Closing fields:

Opening	Non-priority
Closing	Non-priority

In standard there is no priority between opening and closing.
Priorities are used for:

- Reversing the direction of movement during operation without passing via a stop command. In this case, a priority for opening or a priority for closing must be configured.
- Giving priority to a direction of rotation: If the actuator receives two simultaneous opening and closing orders and an opening priority has been selected, the actuator will start in the opening direction.

You can also select a fail-safe position that the actuator will reach in case of loss of communication with the Master Station MS202, you can choose among the following positions by selecting a parameter in the down-drop list of the **Fail safe** position field:

Fail safe position	On position
--------------------	-------------



- **ON POSITION:** The actuator stays in position.
- **OPENING:** The actuator runs in the opened direction.
- **CLOSING:** The actuator runs in the closed position.



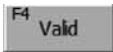
Finally, you can set up the maximum open breakout torque, the maximum sealed torque, the maximum opening and closing torque. The value must be between 40 % and 100%.
Enter the value in the appropriated field:

Torques	
Open breakout	100%
Sealed	100%
Opening	100%
Closing	100%

Note: change the torque setting must be doing with full knowledge for the fact.

Buttons description:

-  or **F1**: these buttons allow you to come back to Valve status screen.
-  allow you to go up in the **AUX Cmd 1**, **AUX Cmd 2**, **Opening**, **Closing** and **Fail safe position** lists. This button is not sensitive so press **F2**.

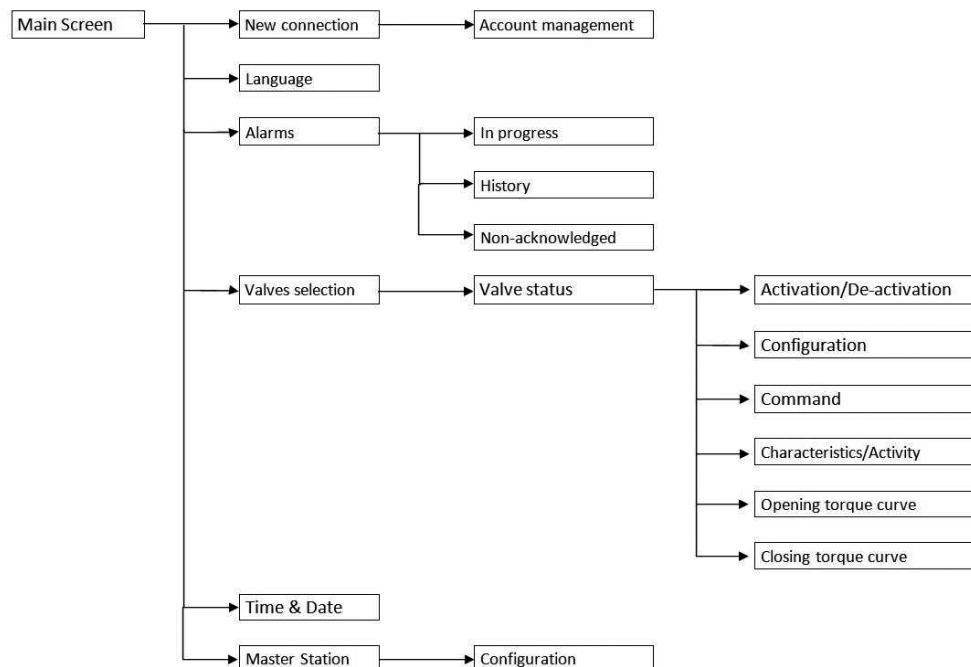
-  : allows you to go down in the **AUX Cmd 1, AUX Cmd 2, Opening, Closing and Fail safe** position lists. This button is not sensitive so press **F3**.
-  : this button allow you to refresh the page.
-  or **F4**: these buttons allow you to validated the changes.
- To change the valve reference and the tag number, or set up several torques, you have to press the corresponding box and enter the appropriate value. Note: the reference displayed on the **Valve selection** screen is the valve reference: 'MOV 002' on page 26.
- To allocate the auxiliaries commands, to select a priority between opening and closing or to select a fail-safe position you have to press the suitable box and select the parameter into the list. To go up or down in the list you can use the Up and Down Arrow or use the scroll bar.

UTILISATION

9 > TOUCH SCREEN

With the touch screen it is possible to activate and configure an actuator, to pilot your actuator, to check its activity and its characteristics and consult its torque curves. You can consult the status of the Master Station MS202 or configure it.

Touch screen layout

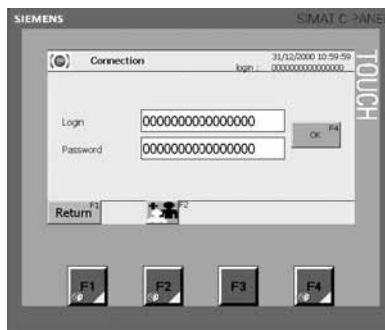


9.1 > LOG IN ACCESS

You can restrict access to the Master Station according to user's profile. Indeed there exist four types of accounts all secured by a password. Possibilities of each account are described in Annex «User's account» page 46.

- **User:** You can only consult information about the Master Station and the actuators connected to it.
By default: Login: User Password: 333333
- **Super-user:** Like with the user account, you can only consult information about the Master Station and the actuators connected to it. But you can also command the actuators.
By default: Login: SuperUser Password: 222222
- **Maintenance:** You can consult information about and set up the Master Station, and have full access to actuators (piloting and setting up).
By default: Login: Main Password: 111111
- **Administrator:** This account is dedicated to the management of user's accounts.
By default: Login: Admin Password: 321321

The first screen after the Touch Screen was power on is the **Log In** Screen. You can come back to this screen by pressing **Return** or **F1** button.



- **Login:** Identification for an individual or group used to give access to the system.
- **Password:** the confirmation required before a login is accepted by the system

Touch the box and enter the appropriate login or password, then touch the **OK** button or press **F4**. If the login is accepted it will appear on the right top corner under the date, or if it fails the data is cleared from the boxes and must be re-entered correctly in both boxes before access is granted.

Press on **Return** or **F1** to come back on the main screen.

Management of user's account:

To manage user's account you must be logged in with the Administrator account. Then you can add an account and set the four parameters which are:

Login
Password
Account type
Timeout delay

Once you are logged in with an **Administrator** account, press the 'Add an user account' icon or **F2** and the list of all existing accounts will appear. Then if you want to add a user's account press '**New user**' and follow the instructions. You have to enter the Login and the Password, but also the type of the account: user, super-user, maintenance or administrator; and the Timeout delay (delay after which the session will expire). If you enter '0' the timeout of the session will be unlimited.

To change a parameter of an existing user's account, select it and modify the parameter you want.

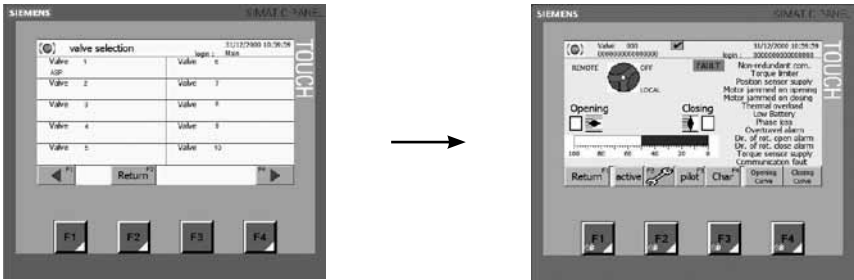
9.2 > MANAGING YOUR ACTUATOR VIA THE TOUCH SCREEN

Master Station MS202 is designed to be interfacing with actuators equipped with Intelli+ control.

All users' accounts, except Administrator account, allow you to access to this page.

From this screen you have access to the entire functions that the Intelli+ control offers to the Master Station MS202, but there are some restrictions depending on the user's account with which you logged in. See below a description of your possibilities.

From the home page touch the **Valve selection** button or press the **F3** button. Now a list of valves is displayed. The valves are presented 10 by 10 with a number and a Tag number. Twelve pages are necessary to display 120 valves; you can navigate through these pages by pressing the **Left** and the **Right arrows** or by pressing respectively **F1** or **F4**. Select the valve you want manage (which must be active, refer to part '8.1. Activate the actuator'), then a **Valve Status** screen is displayed.



Buttons description:

- **Return** or **F1**: these buttons allow you to come back to **Valve selection** screen.
- **Active**: this button allows you to access to the **Activation/Deactivation** screen, but only for the Maintenance account.
- **Tool** or **F2**: these buttons allow you to access to the **Configuration** screen. If you logged in with a User or Super-User account you cannot change the configuration, you must be logged in with a Maintenance account to make some changes.
- **Pilot** or **F3**: these buttons allow you to access to the **Valve Command** screen only if you logged in with a Super-User or Maintenance account. This button will be not displayed if the **Valve Command** screen of the same valve is opened on the other Touch screen.
- **Char** or **F4**: these buttons allow you to access to the **Characteristics/Activity** screen.
- **Opening Curve** and **Closing Curve**: these buttons allow you to display the **Opening Torque Curve** and the **Closing Torque Curve** screens.

Indications description:



It means that the Selector of the actuator is in OFF position.



It means that the Selector of the actuator is in Remote position.



It means that the Selector of the actuator is in Local position.

Opening

It is displayed when the actuator is running in the open direction.

Closing

It is displayed when the actuator is running in the close direction.



It means that the actuator is not open.



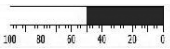
It means that the actuator is open.



It means that the actuator is not closed.



It means that the actuator is closed.



The bargraph represents the percentage of opening (0% = close position and 100% = open position).



This symbol is displayed if the actuator is not available for one of the following reasons:

- The selector is in Local or Off position
- The torque limiter is activated
- Motor thermal overload activated: The actuator will be available again as soon as the motor has cooled down.
- Phase loss fault: Only in 3-phase mode, one phase is missing. No start-up allowed.
- Valve too hard: Opening or closing is incomplete as the torque is too high.
- Rotation direction fault: Direction of rotation non-compliant in opening or closing mode.

- Actuator jam alarm: The actuator is jammed when either opening or closing.
- Torque or position sensor fault: The actuator no longer receives any information from the torque or position sensor.
- Partial movement Fault: The partial movement test has detected a fault.

In addition on the right part of the screen there is a fault list. The messages are displayed only when the fault is actually present and will disappear when the problem will be fixed.

Faults description:

- Non-redundant com.: Communication between the Master Station MS202 and the actuator are no longer redundant.
- Torque limiter: The torque limiter has been activated in opening or closing mode. This information is transmitted even if the valve is closing or opening normally under load.
- Position sensor supply: The actuator no longer receives any information from the position sensor.
- Motor jammed on opening: The motor locked in the opening direction.
- Motor jammed on closing: The motor locked in the closing direction.
- Thermal overload: The motor thermal contact tripped. The actuator will be again available as soon as the motor will cool.
- Low battery: In case of battery option, the battery should be replaced because of too low voltage or the battery is missing.
- Phase loss: Only in 3-phase mode, one phase is missing. No start-up allowed.
- Overtravel alarm: Position overshoot > 5% after motor shut down.
- Dir. of rot. open alarm: Direction of rotation non-compliant in opening mode.
- Dir. of rot. close alarm: Direction of rotation non-compliant in closing mode.
- Torque sensor supply: The actuator no longer receives any information from the position sensor.
- Communication fault: There is a communication fault between INTELLI+ and INTELLIBUS module.

9.2.1 > COMMAND YOUR ACTUATOR

Control Hierarchy

In order to ensure secure management of your site, considering the several control units, a control hierarchy is set up. The standard control priority is defined from the closest device to actuators, to the device which is the farthest:

Actuators > MS > PC workstation > DCS

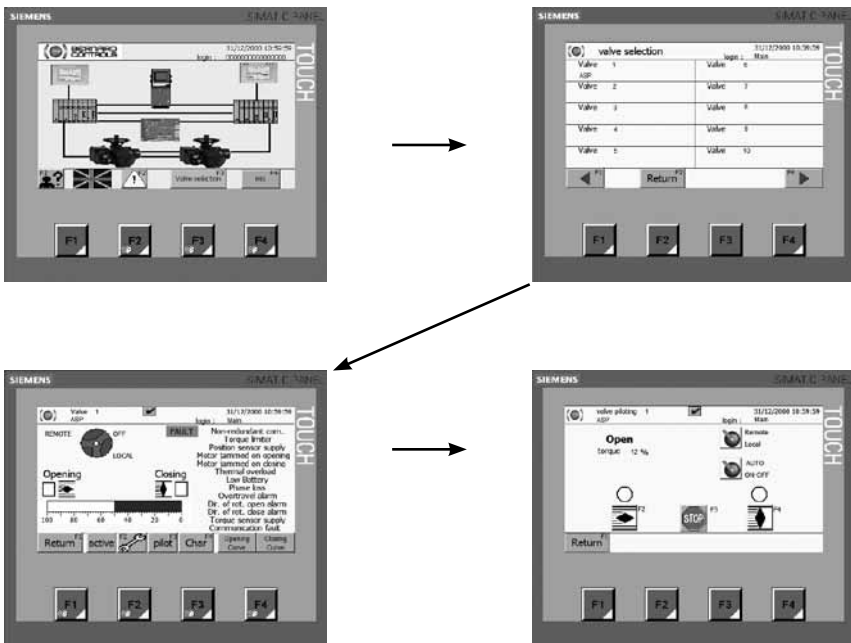
The consequence is that if an opposite order is received at the same moment from the Master Station and from the DCS, the priority order is the one coming from the Master Station.

Therefore an alert will appear on the PC Workstation when you will try to command an actuator while the command page of the same actuator is open on a touch screen.

Similarly, if a command page of an actuator is open the DCS will be informed.

Piloting the actuator

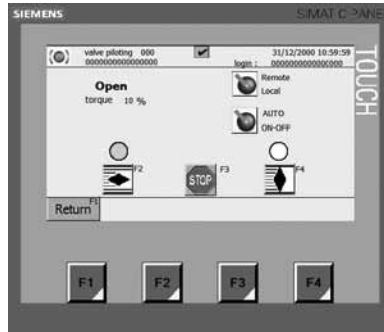
From the home page, touch the **Valve selection** button or press the **F3** button. Then select the valve you want command. The **Valve Status** screen is displayed, press **Pilot** or **F3** to access to the **Valve Command** screen.








Depending on the AUTO / ON-OFF configuration, the **Valve Command** screen may display different information.

ON-OFF control:

To access to the **Valve Command** screen you must be logged in with a Super-User or Maintenance account. To see how log in refer to part 9.1 Log in access.





Buttons description:



-  or **F1**: these buttons allow you to come back to Valve status screen.
-  or **F2**: these buttons allow you to open the actuator. A short pulse will be sufficient for commanding the valve until it is fully open.
-  or **F3**: these buttons allow you to stop the actuator during operation.
-  or **F4**: these buttons allow you to close the actuator. A short pulse will be sufficient for commanding the valve until it is fully closed.
-  : these buttons allow you to activate the auxiliaries commands. Press the button to change the arrow position to select the command you want to activate.



Intelli+ control offers, in addition of the Open, the Close and the Stop commands, two auxiliaries' commands. To know the possibilities refer to part 8.2. Configure your actuator.

For example:

-  : the selector is in Remote position.
-  : the selector is in Local position.

Indications description:

-  : the actuator is not opened.
-  : the actuator is opened.
- If the green symbol is blinking, it means that the actuator is running in the open direction.

-  : the actuator is not closed.
-  : the actuator is closed.
- If the red symbol is blinking, it means that the actuator is running in the close direction

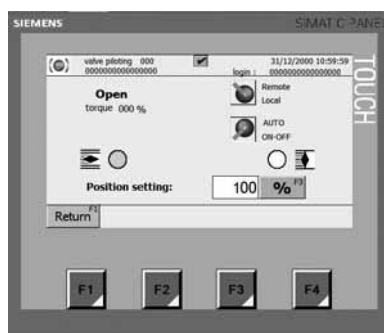
Open
torque 10 %

- : on the first line it is the current position of the actuator (Open, Close or 1 to 99 % open). On the second line it is the current torque of the actuator (10 % to 150 %).

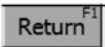
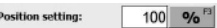

AUTO control:

To access to the **Valve Command** screen you must be logged in with a Super-User or Maintenance account. To see how log in refer to part 9.1 Log in access.

For an actuator used in modulating mode with a positioning function, a command can be selected by position set-point.



Buttons description:

-  or **F1**: these buttons allow you to come back to Valve status screen.
-  : press the position setting box and enter a value between 0 and 100, corresponding to the position you want the actuator to go to. Then press the symbol '%' or **F3** to validated your choice.
-  : these buttons allow you to activated the auxiliaries commands. Press the button to change the arrow position to select the command you want to activate.

Intelli+ control offers, in addition to the Open, Close and Stop commands, two auxiliaries' commands. For more details, refer to part 8.2. Configure your actuator.

For example:



: the selector is in Remote position.



: the selector is in Local position.

Indications description:

- : on the first line is the current position of the actuator (Open, Close or 1 to 99 % open). On the second line is the current torque of the actuator (10 % to 150 %).
- : the actuator is not opened.
- : the actuator is opened.
- If the green symbol is blinking, it means that the actuator is running in the open direction.
- : the actuator is not closed.
- : the actuator is closed.
- If the red symbol is blinking, it means that the actuator is running in the close direction.

9.2.2 > CHARACTERISTICS AND ACTIVITY OF YOUR ACTUATOR

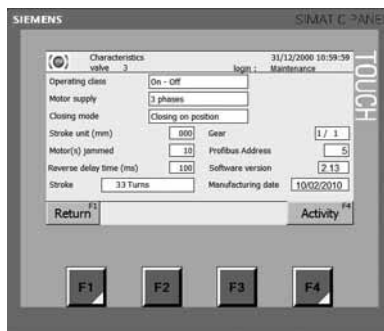
All users' accounts, except Administrator account, allow you to access to this page.

Valve Characteristics:

On this page you can consult the following parameters:

- The Operating class ('On-Off', 'Modulating Class II' or 'Modulating Class III')
- The type of the Motor supply ('3 phases' or '1 phase or DC')
- The Closing mode ('Closing on position', 'Closing on torque' or 'Closing and Opening on torque')
- The Nut thread in millimeter (0 means that it is not a linear actuator)
- The necessary time to detect the motor jammed (in seconds)
- The Reverse delay time between a closing and an opening operation (in milliseconds)
- The Stroke ('Turns', 'Degrees' or 'mm')
- The Gear box reduction
- The actuator Profibus address (3 to 252)
- The Intelli+ software version
- The Manufacturing date

From this page you also have access to the **Valve Activity** screen.



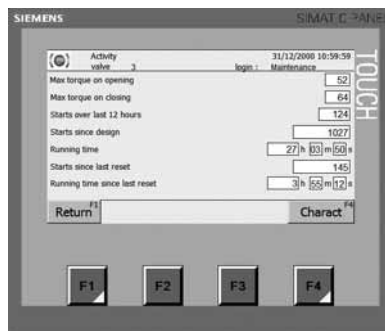
Buttons description:

- **Return^{F1}** or **F1**: these buttons allow you to come back to **Valve status** screen.
- **Activity^{F4}** or **F4**: these button allow you to display the **Valve activity** screen.

Valve Activity:

On this page you can consult the following parameters:

- **OPENING MAX TORQUE**: Opening max torque during the last electrical actuation (in %)
- **CLOSING MAX TORQUE**: Closing max torque during the last electrical actuation (in %)
- **STARTS OVER LAST 12 HOURS**: this data corresponds to the number of actuator starts during the last twelve hours and provides information about the actuator recent activity. It is of interest to know whether the actuator has not been excessively operated, when used for modulating purposes, for example
- **STARTS SINCE DESIGN**: to obtain the accumulated figures since the actuator manufacturing.
- **RUNNING TIME**: To obtain the accumulated figures since the actuator manufacturing (in seconds)
- **STARTS SINCE LAST RESET**: Number of starts since the last reset
- **RUNNING TIME SINCE LAST RESET**: Total running time since the last reset (in seconds)



Buttons description:

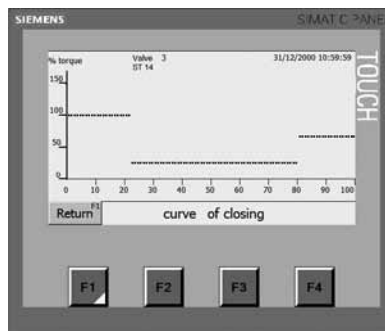
- **Return^{F1}** or **F1**: these buttons allow you to come back to **Valve status** screen.
- **Charact^{F4}** or **F4**: these button allow you to go back to the **Valve characteristics** screen.

For more information about **Reset** refer to NR1112 Intelli+ notice

9.2.3 > TORQUE PROFILE

From the **Valve status** screen you can consult the **Opening torque curve** and the **Closing torque curve** of the last electric actuation.

All users' accounts, except Administrator account, allow you to access to this page.



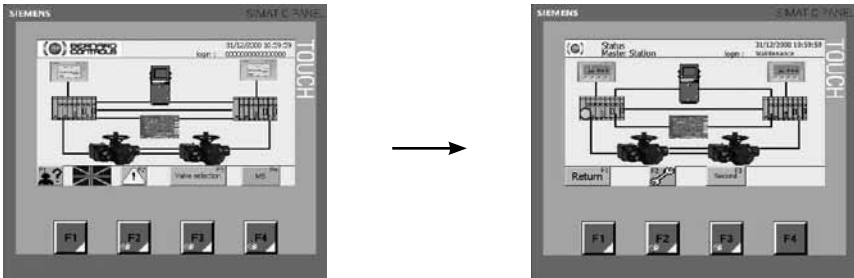
Buttons description:

- **Return^{F1}** or **F1**: these buttons allow you to come back to **Valve status** screen.

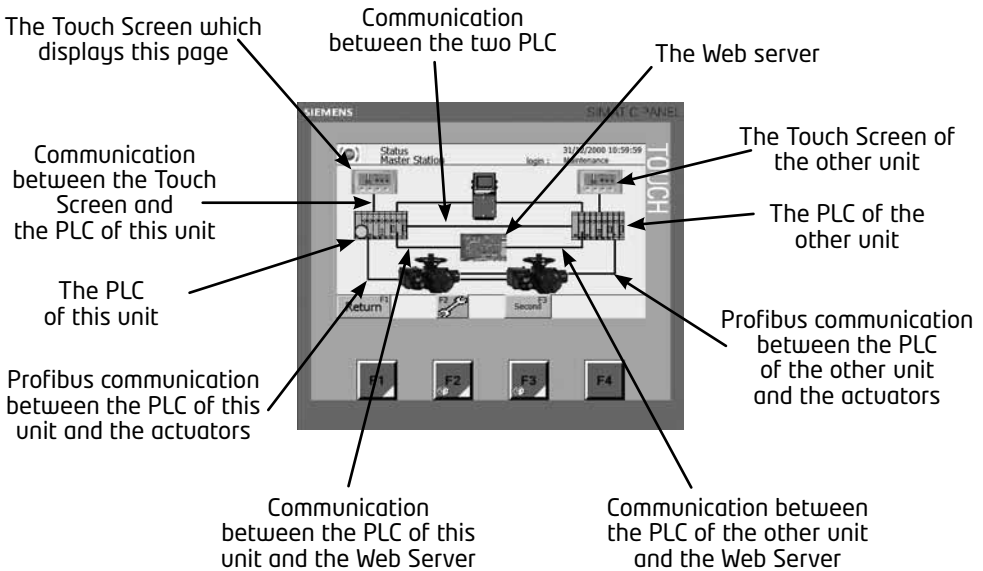
For more information about **Torque curve**, refer to NR1112 Intelli+ notice.

9.3 > MASTER STATION STATUS

From the **Home screen** you can access to the **Master Station Status** screen by pressing **MS** or **F4**.



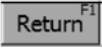



You can see the communication status between each interface. In case of fault communication the link corresponding will blink in red.



To ensure the reliability of the system there is a Primary PLC and a Secondary PLC. The Primary one checks all the orders and signals, makes the decisions and updates the secondary PLC.

On the Master Station status screen the primary is represented with a green light. For maintenance reasons, for example, it is possible to reverse the primary and the secondary. The way to do this is explained below.

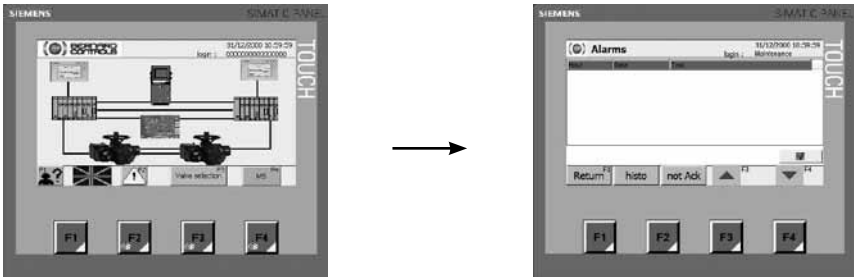
Buttons description:

-  and **F1**: these buttons allow you to come back to **Home** screen.
-  and **F2**: these button allow you to access to the **Master Station Configuration** screen. For more information about the configuration refer to paragraph 3. Setting up the Modbus RTU communication and paragraph 4. Setting up the Modbus TCP communication.
-  and **F3**: this button is displayed on the secondary PLC. It allows you to switch this PLC from secondary to primary.
-  and **F3**: this button is displayed on the primary PLC. It allows you to switch this PLC from primary to secondary.

9.4 > MASTER STATION AND ACTUATORS ALARMS

This part describes the Alarm screens. All the Master Station MS202 faults and all the actuators faults are listed on these screens. The storage capacity of each touch screen is around two thousand messages.

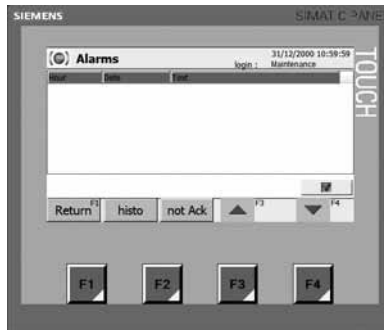
From the **Home** screen you can access to the **Alarms** pages by pressing  or **F2**. By default Alarms in progress are displayed.



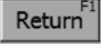
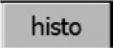




The alarm menu is made of three categories: the first one is Alarms in progress; the second one is Alarms History and the last one is Alarms not acknowledged.

Alarms in progress

On this screen you can find the alarms in progress about the Master Station and the actuators.



Buttons description:

-  and **F1**: these buttons allow you to come back to **Home** screen.
-  : this button allows you to display **Alarm History** screen.
-  : this button allows you to display **Alarm not acknowledged** screen.
-  : this button allows you to go up in the alarms list. It is not sensitive so press **F3**.
-  : this button allows you to go down in the alarms list. It is not sensitive so press **F4**.
-  : this button allows you to acknowledge the selected alarm.

Press on an alarm message to get full description.






Alarm History:

On this screen you can find all the alarms even if the fault disappears.

When a fault appears there is a message which describes the fault, time and date when fault appear and its status (arrived, disappeared and acknowledged).



Buttons description:

-  and **F1**: these buttons allow you to come back to **Home** screen.
-  : this button allows you to display **Alarms in progress** screen.
-  : this button allows you to display **Alarm not acknowledged** screen.
-  : this button allows you to go up in the alarms list. It is not sensitive so press **F3**.
-  : this button allows you to go down in the alarms list. It is not sensitive so press **F4**.

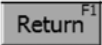




Alarms not acknowledged:

An alarm not acknowledged is an alarm which happened and disappeared before a user see it and acknowledged it.

On this screen, as on the Alarm history screen, you can find all the faults which are not acknowledged. When a fault appears, there is a message which describes the fault, the time and the date at the fault appear and its status (arrived and disappeared).



Buttons description:

-  and **F1**: these buttons allow you to come back to **Home** screen.
-  : this button allows you to display **Alarm History** screen.
-  : this button allows you to display **Alarm in progress** screen.
-  : this button allows you to go up in the alarms list. It is not sensitive so press F3.
-  : this button allows you to go down in the alarms list. It is not sensitive so press F4.

10 > WEB SERVER

The Master Station includes several Web pages that may be remotely accessed via Ethernet. They can be used for examining the system for any faults or alarms. It is not possible to command the valve on the Web pages.

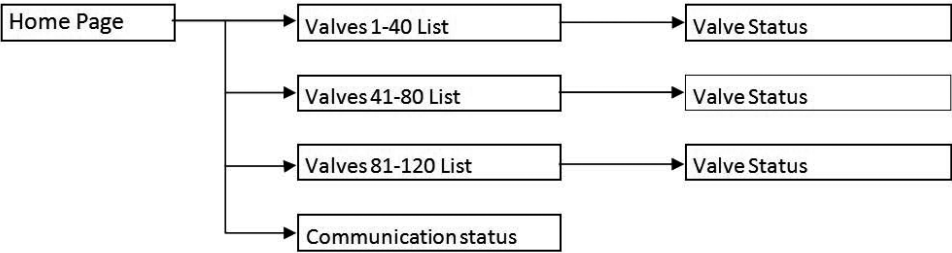
10.1 > MAKING THE INTERNET CONNECTION

Connect a laptop or a PC directly to **M9** unit or to the Ethernet port on the front panel of one of the Master Station MS202 units as described in section 2.5, the PC can also be connected to the same Ethernet network as the Master Station. In any case, the PC needs a Web browser such as Internet Explorer to access the Master Station web pages.

You can access to both Master Station unit. Start the browser and enter the IP address of the unit which you want to connect to. The defaults IP addresses are 192.168.94.180 and 192.168.94.182. Therefore, the addresses are http://192.168.94.180 and http://192.168.94.182 .

To check if there is a change you can find these IP addresses on the **Master Station configuration** screen of each unit as it is described in section 5.2. Setting up using the Touch screen.

10.2 > WEB PAGES LAYOUT



10.3 > HOME PAGE

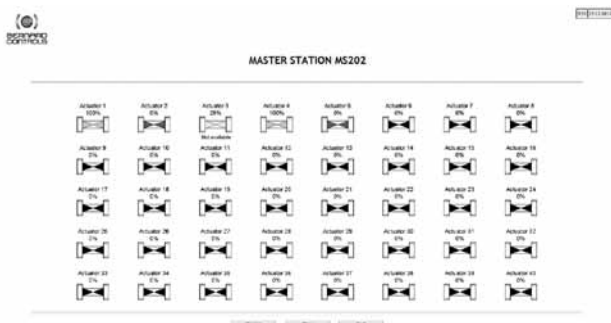


Buttons description:


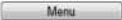


- **Actuators 1-40** : this button allows you to access to the **Valves 1 to 40** List screen.
- **Actuators 41-80** : this button allows you to access to the **Valves 41 to 80** List screen.
- **Actuators 81-120** : this button allows you to access to the **Valves 81 to 120** List screen.
- **Quit** : this button allows you to quit the web pages.
- **Communication status** : this buttons allows you to access to **Master Station Communication** status page.

10.4 > ACTUATORS STATUS





From the **Home** page you can access to the **Actuators Status** pages. Click on one of the three buttons which allow access to a list of actuators, as described in section 8.3. On this page you can find the position and the status of forty actuators.



Buttons description:

-  : this button allows you to access to the **Previous Valves List**.
-  : this button allows you to go back to the **Menu**.
-  : this button allows you to access to the **Next Valves List**.
-  : all the active valve symbols act as a button to access to the **Valve Status** page. See section below to know if the valve is active or not.

Indications description:

- **Actuator 1** : this is the actuator number.
- **100%** : this is the current position of the actuator, from 0 to 100%.
-  : it means that the actuator is active and open (green).
-  : it means that the actuator is active and closed (red).
-  : it means that the actuator is active and in an intermediate position (yellow).
-  : it means that the actuator is not active (black).
- **Not Available** : it means that the actuator is in default.










If you select an actuator you have access to its **Valve status** page. Here you can find some indications about the actuator, such as the position of the Remote/Local selector, the valve current position, the valve current torque or a faults list in case of faults.




Buttons description:


- **Actuator Selection** : this button allows you to go back to the **Actuator Selection** page.
- **Main Menu** : this button allow you to go back to the **Home** page.

Indications description:

-  : it means that the Remote / Local selector is in remote position.
-  : it means that the Remote / Local selector is in local position.
-  : it means that the actuator is open.
-  : it means that the actuator is not open.
-  : it means that the actuator is closed.
-  : it means that the actuator is not closed.
-  : it means that the actuator is open (green).
-  : it means that the actuator is closed (red).
-  : it means that the actuator is in an intermediate position (yellow).
- **Position :100%**
Torque :34% : indicate the current position (0 to 100%) and the current torque (10 to 150%) of the actuator.

-  : indicate that there is an actuator fault which prevents the actuator from running for the following reasons:
 - Torque limiter tripped
 - Loss of communication with Master Station MS202
 - Motor thermal overload
 - Loss of phase
 - Valve jammed
 - Fault of rotation direction
 - Motor locked
 - Torque or Position sensor fault
 - Partial stroke fault

If one of these faults appears, it will be described under the Symbol.

-  : indicate that there is an exceptional event on the actuator, meaning one of the following events:
 - No redundant communication with the Master Station MS202
 - Start's number to high
 - Partial stroke in progress
 - Low power Battery
 - Handwheel action
 - ESD command

If one of these faults appears, it will be described under the Symbol.

10.5 > MASTER STATION STATUS

On this page you can see the status of several communications which are described below. You can also see the Ethernet configuration of the web server which you are connected to, as well as the Modbus address of the unit.



The screenshot shows the 'MASTER STATION MS202' web interface. It features a 'PERSONAL SETTINGS' button in the top left and a 'Back' button in the top right. The main content area is divided into two sections. The first section, titled 'Communication status', contains a table with five rows, each showing a communication status and a corresponding status icon (a circle with a dot). The second section, titled 'Ethernet configuration', contains a table with four rows: 'IP Address' (192.168.0.100), 'Subnet Mask' (255.255.255.0), 'Gateway' (0.0.0.0), and 'Modbus Address' (2).

Communication status	
Modbus communication status between the two nodes	
Modbus communication status of node 1	
Modbus communication status of node 2	
Communication status between Modbus interface and Node 1	
Communication status between Modbus interface and Node 2	
Modbus Address	Node 1

Ethernet configuration	
IP Address	192.168.0.100
Subnet Mask	255.255.255.0
Gateway	0.0.0.0
Modbus Address	2

Buttons description:

-  : this button allows you to go back to the **Home** page.

Indications description:

- **Profibus communication status between the two units** : if the light is green it means that the communication between the two PLC is running, but if the light is red it means that there is a fault communication.
- **Profibus communication status on line 1** : if the light is green it means that the communication between the actuators and the PLC 1 is running, but if the light is red it means that there is a fault communication.
- **Profibus communication status line 2** : if the light is green it means that the communication between the actuators and the PLC 2 is running, but if the light is red it means that there is a fault communication.
- **Communication status between Web Interface and Unit 1** : if the light is green it means that the communication between the Web server and the PLC of the Unit 1 is running, but if the light is red it means that there is a fault communication.
- **Communication status between Web Interface and Unit 2** : if the light is green it means that the communication between the Web server and the PLC of the Unit 2 is running, but if the light is red it means that there is a fault communication.
- **Primary Master Station** : indicate which unit is primary. If communication is OK between the two units, there is a primary unit, which may be unit 1 or unit 2. But if there is a communication fault between the two units, both units will be primary.

IP Address	193.168.94.180
Subnet Mask	255.255.252.0
Gateway	0.0.0.0
Modbus Address	2

- : in this board you can find the IP address, the Subnet mask and the Gateway of the Web server. You can also find the Modbus address of the unit which you are connected to.

> ANNEX - USER'S ACCOUNT

- User:

Master Station MS202:

It is possible to change the language, to consult the status of the Master Station and the alarms.

It is not possible to change the network configuration, date and time, or to create or change a user's account.

Actuators:

It is possible to consult the status of a valve, to check the valve configuration, its characteristics, its activity and its torque curves.

It is not possible to activate/deactivate a valve, to change the actuator configuration and to command the actuator.

- Super-user:

Master Station MS202:

It is possible to change the language, to consult the status of the Master Station and the alarms.

It is not possible to change the network configuration, date and time, or to create or change a user's account.

Actuators:

It is possible to consult the status of a valve, to check the valve configuration, its characteristics, its activity and its torque curves. It is also possible to command the actuator.

It is not possible to activate/deactivate a valve or to change the actuator configuration.

- Maintenance:

Master Station MS202:

It is possible to change the language, to consult the status of the Master Station and the alarms.

It is also possible to change the network configuration, date and time.

It is not possible to create or change a user's account.

Actuators:

It is possible to consult the status of a valve, to check the valve configuration, its characteristics, its activity and its torque curves.

It is also possible to activate/deactivate a valve, to change the actuator configuration and to command the actuator.

- Administrator:

Master Station MS202:

It is possible to create or change a user's account, to change the language, to consult the status of the Master Station and the alarms.

It is not possible to change the network configuration or the date and time.

Actuators:

It is not possible to consult the status of a valve, to check the valve configuration, its characteristics, its activity and its torque curves.

It is not possible to activate/deactivate a valve, to change the actuator configuration and to command the actuator.

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